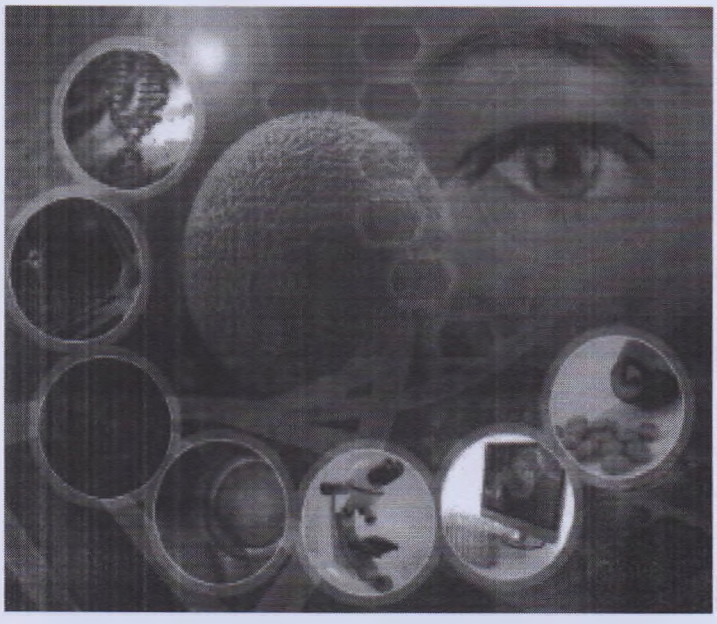
Романко І.Г., Пісоцька О.О., Знаменська І.В.

Професійне використання англійської мови у галузі «Медицина»

Навчальний посібник-хрестоматія

Затверджено ЦМК УМСА, протокол №8 від 24 квітня 2014 р.



Полтава 2014 р.

ADDITIONAL LITERATURE

Tasks:

1. Read and translate the text.
2. Put 3-4 questions on the text and be ready to answer them.
3. Make up a short summary according to the questions from task 2.

LEONARDO DA VINCI – THE FATHER OF ANATOMIC ART

There is a film called Ever After, a remake of Cinderella, now showing in the movie theaters. This new version of the old tale has some novel twists. Here Cinderella is based on a real person. She is a strong, competent woman and the fairy godmother is replaced by a man: Leonardo Da Vinci. It is doubtful that Leonardo ever played this role in real life. However, he did play many other roles including that of architect, engineer, scientist, inventor, poet, sculptor, painter and anatomic artist. Leonardo da Vinci (1452-1519) first became interested in anatomic art when he was asked by a Veronese anatomist named Marc Antonia Della Torre to do the illustrations for a text of anatomy. Della Torre was to do the dissecting and Leonardo the drawings. But Della Torre died unexpectedly. Not to be deterred by Della Torre's demise, Leonardo assumed both tasks. He dissected and drew more than 10 human bodies in the cathedral cellar of the mortuary of Santa Spirito under the secrecy of candlelight, necessitated by the Church's belief in the sanctity of the human body and a papal decree that forbade human dissection. Leonardo recognized that a scientific knowledge of human anatomy could only be gained by dissecting the human body. This was in striking contrast to the pronouncements of Galen and other anatomists. Da Vinci injected the blood vessels and cerebral ventricles with wax for preservation, an anatomical technique still used today. His drawings of the human anatomy have long been considered as unrivaled.

GALEN

Tasks:

1. Read the text and get ready to narrate it.

This Greek's genius is more certain than his dates. He was born about 129 AD and lived until about 210 AD. During this considerable life span, Galen managed to perform studies that would long influence medicine. He is still known among other things for his discovery of blood in human arteries and for his dissection of the human cranial nerves, the nerves that supply key areas of the head, face, and upper chest. The son of Nicon, a well-to-do architect and builder in Pergamum (Asia Minor), Galen had all the world open to him. He first studied philosophy, one of the traditional fields for a boy of his background. Nicon then had a dream in which Asclepius, the god of healing, told him to permit his son to study medicine.

Galen began his medical studies in Pergamum at the age of 16-17. In search of medical knowledge, he then roamed about much of the eastern Mediterranean studying medicine in various cities including Smyrna (now Izmir, Turkey) and Corinth (Greece). He completed his studies at the famous medical school in Alexandria (Egypt). Galen returned to Pergamum and at age 28 was appointed physician to the school of gladiators, a post he occupied for four years and that some say made him the first sports medicine specialist. After that, a career in Rome was in the cards. There he went at age 32 and became a famous and influential physician, taking on cases that no one else could handle. The consultant's consultant, so to speak. He accompanied the Roman legions of Marcus Aurelius on their campaigns, and served as the personal physician to several emperors. Galen described what he saw (not always the practice of the day). He identified the majority (seven of the twelve) of the cranial nerves. Each nerve is customarily accorded a Roman numeral. The full complement of the dozen cranial nerves, for those interested, is as follows:

- I - Olfactory nerve
- II - Optic nerve
- III - Oculomotor nerve
- IV - Trochlear nerve
- V - Trigeminal nerve
- VI - Abducens nerve
- VII - Facial nerve
- VIII - Acoustic nerve
- IX - Glossopharyngeal nerve
- X - Vagus nerve
- XI - Accessory nerve
- XII - Hypoglossal nerve

Galen did experiments such as severing a nerve and observing the effects. He is thus regarded as the founder of experimental physiology. Galen was the first to determine that arteries carried blood and not air! (For over 400 years the Alexandrian school of medicine had taught that arteries are full of air). Galen's theories about the blood circulation, however, were well off the mark and it was not until the 17th century that the great English physician William Harvey would challenge Galen's ideas in this regard. With Hippocrates who preceded him by some 500 years, Galen was preeminent among the most distinguished physicians of antiquity. He knew all of the medical knowledge of his day, gathered it together, and wrote voluminously (and well) about it. Galen summed up the medicine of antiquity. The writings of Galen were a blessing to the ancient world. But they became a curse when, for more than a millennium, they were held to be the unassailable authority on medicine. This paralyzed the progress of medicine, something Galen would have deplored.

MEDICAL MILESTONES – The Past 500 Years

Tasks:

1. *Read the text and find medical terms in it.*

The New England Journal of Medicine (NEJM) commented on the end of the millennium by choosing the most important medical developments of the past thousand years. Their choices were restricted to developments that "changed the face of clinical medicine, not preventive medicine or public health or health care delivery or medical ethics." They arbitrarily chose 11 and presented them "not in order of importance, but in rough chronologic order according to the first noteworthy step taken in a given area." There were few advances in clinical medicine until the Renaissance. "There are many reasons little progress was made" until then "but one of them was surely that the only fit pursuit for scholars in those centuries was considered to be knowledge of God, not of man. Only with the flowering of humanism that characterized the Renaissance did that change…." So, the major developments of the past millennium are really those of the past 500 years. Here are the major developments as presented by NEJM in outline form.

Elucidation of Human Anatomy and Physiology

First noteworthy step in contemporary anatomy: 16th century. Founding figure: Andreas Vesalius in 1543 published his great anatomical treatise. The illustrations (by an unknown artist) set a new standard for the understanding of human anatomy.

First noteworthy step in physiology: 17th century. Founding figure: William Harvey established that the blood circulates within a closed system with the heart serving as a pump; the pulse is due to the filling of arteries with blood after the heart contracts; the right ventricle of the heart pumps blood to the lungs; and the left ventricle pumps blood to the rest of the body.

Other major figures: Stephen Hales (first measured blood pressure [in a horse]); Werner Forssmann, Andre Cournand, and Dickinson Richards (the clinical use of heart catheterization); and Robert Gross, Elliott Cutler, Charles Hufnagel, and Alfred Blalock (open-heart surgery).

Discovery of Cells and Their Substructures

First noteworthy step in cell biology: 17th century. Founding figure: Antony van Leeuwenhoek, with an object held close to the lens he had made (and with his nearsightedness) was first able to see minute "animalcules" (probably bacteria and protozoa) and discover that tissues had complex inner structures.

Other major figures: Robert Hooke (described plant cells); Matthias Schleiden and Theodor Schwann (described animal cells); and Rudolf Virchow, Ludwig Aschoff, and Carl Rokitansky (their work in cell biology led to insights into disease processes).

First noteworthy step in subcellular biology: 20th century. Founding figure: Ernst Ruska made the first electron microscope in the early 1930s. With this

primitive apparatus and, later, more sophisticated machines, the rich subcellular structure of the cell became visible.

Another founding figure: George Palade in the 1950s developed ways of isolating subcellular elements such as mitochondria. "The elegant choreography of the various elements in particular cell types could finally be appreciated."

Elucidation of the Chemistry of Life

First noteworthy step in biochemistry: 17th century. Founding figures: Thomas Willis set forth the idea in 1659 that "every Disease acts its tragedies by the strength of some Ferment." This notion was amplified by scientists such as Antoine Lavoisier, Jons Jakob Berzelius, and Louis Pasteur.

Other major figures: Amadeo Avogadro (whose law permitted the calculation of atomic weights, the determination of molecular structure and an understanding of the enzyme reactions); Leonor Michaelis and Maud Menten (who found how to express enzyme reactions in mathematical terms); Otto Warburg (who deduced pathways of metabolism); and Hans Krebs (who discovered the pathway called the citric acid cycle).

Other major discoveries: Hormones and neurotransmitters; the ways cells communicate with each other (which has led to an understanding of diseases such as diabetes mellitus); the relation of sodium to edema and to dehydration; and the importance of potassium in the fluid loss from diarrhea.

Application of Statistics to Medicine

First noteworthy step in modern statistics: Turn of the 17th century. Founding figures: Pierre de Fermat and Blaise Pascal developed probability theory to analyze games of chance. Their ideas of relative frequency were first applied to mortality from the plague in 17th-century London.

Famous clinical trial: James Lind treated 12 ship passengers who had scurvy with either an elixir containing citrus juice or a remedy recommended by the ship's surgeon. The success of the citrus-containing treatment led the British Admiralty to mandate the provision of lime juice to all sailors (who became limeys), thereby eliminating scurvy from the Royal Navy.

Other major figures in statistics: John Graunt (introduced the concept of inference from a sample to an underlying population and described life expectancy); Karl Friedrich Gauss (developed modern statistical reasoning); the 18th-century English theologian Thomas Bayes (showed how probability can be used in inductive reasoning); Sir Ronald Fisher (the principle of randomization as a method for avoiding bias in studies); and Jerzy Neyman (the theories of estimation and testing).

First noteworthy step in modern epidemiology: 19th century. Founding figure: John Snow demonstrated the transmission of cholera from contaminated water by analyzing disease rates among people served by the Broad Street Pump in

London. He stopped the spread of the disease in 1854 by removing the pump handle from the polluted well.

- Another major figure: Richard Doll who did a pioneering study of smoking among British physicians!

Development of Anesthesia

First noteworthy step in modern anesthesia: 19th century. Founding figure: In 1799 Humphry Davy recognized the analgesic (pain-relieving) properties of nitrous oxide when he inhaled it while he had a toothache. He coined the term "laughing gas."

Other major figures: The dentist Horace Wells (who in 1844 first used nitrous oxide to anesthetize patients); his former partner, William Morton (who demonstrated ether anesthesia in 1846 at the Massachusetts General Hospital); James Young Simpson (who in 1847 administered chloroform to a woman in childbirth): and Harold Griffith (who introduced the routine use of muscle relaxants during surgery in 1942).

Discovery of the Relation of Microbes to Disease

First noteworthy step in discovering the relation of microbes to disease: 19th century. Founding figure: Louis Pasteur established bacteriology as a science. He proved that "all living things, microbes included, come from other living things"; he used heat treatment (pasteurization) to destroy microbes, showed that vaccination of sheep with weakened anthrax bacteria protects them against the disease, and discovered that the agent of rabies, a virus, could be weakened; his immunization of a young boy bitten by a rabid dog prevented what had been a fatal outcome.

Other major figures: Robert Koch (first person to isolate bacteria in pure culture; discovered the agents of cholera and the cause of tuberculosis, and used his own criteria [Koch's postulates] to distinguish a bacterial culprit causing a disease from an innocent microbe); and Joseph Lister (who used carbolic acid spray to kill bacteria, insisted that antiseptics be used on hands, instruments, and dressings and made it safe to do major surgery).

Elucidation of Inheritance and Genetics

First noteworthy step in genetics: 19th century. Founding figure: Gregor Mendel did experiments and reported his results on the segregation of traits in peas in 1865. (Mendel's work was ignored until 1902, when William Bateson and others rediscovered it.)

Other major figures: Archibald Garrod (who showed that inborn errors of metabolism are inherited); Thomas Hunt Morgan (who drew maps of genes along chromosomes); George Beadle, Edward Tatum, and Boris Ephrussi (who showed that genes specify enzymes); Thomas Avery, Colin MacLeod, and Maclyn

McCarty (who found that DNA is the genetic material); Erwin Chargaff (who described the bases of DNA and the rules of base pairing); Rosalind Franklin (whose x-ray diffraction pictures of DNA permitted the discovery of the double helix); James Watson, Francis Crick, and Maurice Wilkins (the double helix); Jacques Monod and Francois Jacob (DNA to protein via messenger RNA); Frederick Sanger and Walter Gilbert (who created methods for decoding the sequence of bases in DNA); and David Baltimore and Harold Temin (who discovered reverse transcriptase, which converts RNA into DNA).

Famous train ride: On a train from Denver to Chicago in 1949, William Castle told Linus Pauling about sickle cell anemia. Pauling and coworkers then demonstrated the molecular consequence of a mutation (sickle hemoglobin) that causes a genetic disorder (sickle cell anemia) and termed it "a molecular disease." (The sickle mutation was later shown by Vernon Ingram to be due to a single amino acid substitution in the molecule).

Knowledge of the Immune System

First noteworthy step in immunology: 19th century. Founding figures: Emil Behring and Kitasato Shibasaburo in 1890 developed a diphtheria antitoxin and, in the process, discovered antibodies. Almost simultaneously, Elie Metchnikoff identified cells called phagocytes that can engulf foreign particles and put forth the cellular theory of immunity.

Other major figures: John Enders (measles vaccine) ; Thomas Weller, Frederick Robbins and Enders (the polio vaccine); Albert Sabin (the live weakened polio virus); Jonas Salk (the killed-virus vaccine); and Michael Heidelberger (laid the foundation for the pneumococcal vaccines).

The first vaccine produced by DNA technology (for hepatitis B) was approved by the Food and Drug Administration in 1986. The new millennium "promises a potentially revolutionary form of vaccination based on sequences of DNA that encode microbial antigens."

Development of Body Imaging

First noteworthy step in body imaging: Turn of the 20th century. Founding figure: Wilhelm Konrad Roentgen discovered x-rays in 1895, a discovery for which he received the first Nobel prize for physics in 1901.

First stage: Imaging science has evolved in three stages. In the first stage, the aim was to develop imaging techniques to define the anatomic features and functions of the internal organs. Additional "rays" for this purpose were discovered, including ultrasound and radioactive tracers, and contrast agents were developed to reveal previously indiscernible structures.

Second stage: The interior of the heart and blood vessels were delineated by angiography. Other new tools included computed tomography (CT or CAT scan) and magnetic resonance imaging (MRI), which permitted resolution of very small structures throughout the body.

Third stage: Imaging methods are now being used to guide therapy directly -- from long-term guidance of cancer therapy to immediate, on-line guidance of minimally invasive surgery.

Discovery of Antimicrobial Agents

First noteworthy step in the discovery of antimicrobial agents: Turn of the 20th century. Founding figure: Paul Ehrlich discovered salvarsan (also known as "606," the 606th compound he had tried) as a treatment for syphilis and showed that certain dyes also had antimicrobial activity.

Other major figures: Gerhard Domagk (who found that the red dye Prontosil cured strep infections, which led to the development of the sulfa drugs); Alexander Fleming (who stumbled onto the inhibition of Staph bacteria by a mold, Penicillium) ; Howard Florey and Ernst Chain (who purified penicillin for clinical use); Rene Dubos (who found an antibiotic in an organism in the soil); and Selman Waksman (who searched systematically among soil organisms for antibiotics and there discovered the second clinically important antibiotic, streptomycin).

Development of Molecular Pharmacotherapy

First noteworthy step in molecular pharmacotherapy: Turn of the 20th century. Founding figure: In the course of his experiments on the therapeutic potential of organic dyes, Paul Ehrlich coined the word "chemotherapy" and extended the concept of the "magic bullet" from infectious diseases to cancer.

Other major figures Thomas Beatson (who used ovariectomy [removal of the ovaries] for breast cancer); Charles Huggins (showed value of orchiectomy [removal of the testes] for prostate cancer). Alfred Gilman and Frederick Philips (found that nitrogen mustard -- the mustard gas of World War I – helped treat lymphomas); Sidney Farber (introduced methotrexate for treating childhood leukemia); Barnett Rosenberg (discovered the anticancer drug cis- platinum); and James Black (whose work led to the development of beta- blockers).

The ongoing revolution in molecular biology permits the recognition of a great number of new potential drug targets, while pharmacogenetics is beginning to explain the genetic variability among people in their responses to drugs.

Conclusions

The effective treatment and prevention of disease has "extended life expectancy and reduced disability beyond the most optimistic hopes of physicians even a few decades ago -- and far beyond the dreams of their predecessors a thousand years ago. We are no more able than they were to predict what this new millennium will bring."

Ex.2. Describe: "Development of body imaging", "Knowledge of the immune system", "Development of molecular pharmacotherapy", "Discovery of cells and their substructures", "Elucidation of human anatomy and physiology".

BONES

Tasks:

1. Prove that: "Without bones, we would have no "structural frame" for our skeleton, be unable to move our skeleton, leave our internal organs poorly protected, lack blood and be short on calcium."

Just in case you forgot, we humans have a total of 206 sizable bones in our bodies. There are also 6 additional bones, 3 in each ear, known as the ossicles (little bones). So the grand total is 212. We generally think of bone as being part of our skeletal system, but let's not forget its other important functions. These are:

1. To serve as a "structural frame" for the human skeleton.
2. To work with ligaments, tendons, and joints to provide movement of the skeleton.
3. To be an outer shell protecting our internal organs (as the skull protects the brain within it).
4. To house the bone marrow, the main source of blood formation in humans.
5. To serve a source of calcium for the entire body.

Without bones, we would have no "structural frame" for our skeleton, be unable to move our skeleton, leave our internal organs poorly protected, lack blood and be short on calcium.

The construction of our bones is a complex process. Bone formation starts in the fetus 6 months before birth and is not generally "complete" until adolescence. In truth, bone formation is never really "complete". It is constantly being destroyed and formed anew throughout our lifetime in a process of unremitting remodeling. The cells that participate in the maintenance and remodeling of bone include:

- Osteocytes (bone cells) that maintain bone as a living tissue;
- Osteoclasts (bone breakers) that destroy bone; and
- Osteoblasts (bone builders) that form the supporting matrix of new bone.

Ex.2. *Answer the question:*

- *What are the main functions of the skeletal system?*

THE SACRUM

Tasks:

1. *Read the following text and make up the plan according the text.*

Humans have two hundred or so bones, but we have but one bone that is holy: the sacrum.The word "sacrum", meaning "sacred" in Latin, lives on in English anatomy as the name for the large heavy bone at the base of the spine.The Romans called the bone the "os sacrum," which literally meant the "holy bone" and the Greeks termed it the "hieron osteon," the same thing, the "holy bone".According to the Oxford English Dictionary, the anatomic "sacrum" entered English minus the "os" in 1753. The OED defines "sacrum" with precision (if not concision) as:

> "A composite, symmetrical, triangular bone which articulates laterally with the ilia, forming the dorsal (back) wall of the pelvis and resulting from the ankylosis (fusion) of two or more vertebrae between the lumbar and coccygeal regions of the spinal column."

The regions of human spine, lest we forget, are the cervical (neck) with 7 vertebrae, the thoracic (upper-back) with 12 vertebrae, the lumbar (lower-back) with 5 vertebrae, and the sacral region with 5 vertebrae.The last sacral vertebra sits just above the coccyx, which during evolution was the beginning of the tail (and now, it seems, is mainly a bone to bruise or break).

The female sacrum is wider and straighter (less curved) than that of males. This difference in sacral anatomy has evolved because of its value to childbearing.

Why was the sacrum sacred? Several schools of thought exist about this matter, including the following:

- Temple: In Greek "hieron" meant not only sacred but also a "temple." It was the temple in the sense that within its bony concavity lay, in the female, the ovaries and uterus, the sacred organs of procreation.
- The afterlife: Thanks to its great size, the sacrum is usually the last bone of a buried body to rot. The ancients may thus have believed the sacrum to be the focal point around which the body could be reassembled in the afterlife.
- A sacrificial vessel: There is some archeological evidence to support the use of the sacrum as a vessel to hold the sacrifice in ancient sacred rites.

Whatever be the exact explanation, the sacrum was surely sacred to the ancients. It was the holy bone, as its name reveals even today.

GOUT HISTORY

Tasks:

1. *Look through the text and give its main idea.*

Gout is medical condition characterized by abnormally elevated levels of uric acid in the blood, recurring attacks of joint inflammation (arthritis), deposits of hard lumps of uric acid in and around the joints, and decreased kidney function and kidney stones. Gout has the unique distinction of being one of the most frequently recorded medical illnesses throughout history. It is often related to an inherited abnormality in the body's ability to process uric acid. Uric acid is a breakdown product of purines, that are part of many foods we eat. An abnormality in handling uric acid can cause attacks of painful arthritis (gout), kidney stones, and blockage of the kidney tubules with uric acid crystals, leading to kidney failure. On the other

hand, some patients may only develop elevated blood uric acid levels (hyperuricemia) without arthritis or kidney problems. The term "gout" commonly is used to refer to the painful arthritis attacks. It derives from an ancient term "gutta" which referred to arthritis at the base of the big toe over 2000 years ago. The uric acid crystals were first noted with a microscope by Antonj van Leeuwenhoek in 1684. Alfred Garrod first described the uric acid crystals in the tissues of the skin and joints of patients with gout.

1. Entitle the text.

October 9, 2000 - Stockholm -- The Nobel Assembly at the Karolinska Institute decided to award the Nobel Prize in Physiology or Medicine for the year 2000 jointly to Arvid Carlsson, Paul Greengard and Eric Kandel for their discoveries concerning a communication process known as "signal transduction" in the nervous system. Dr. Carlsson is from Gothenburg, Sweden while Drs. Greengard and Kandel work in New York City. The awarding of the Nobel Prize to Drs. Carlsson, Greengard and Kandel underlines the importance today of molecular and cell biology in learning how the brain works. Their research is directly relevant to neurologic disorders such as Parkinson disease and schizophrenia as well as the basic brain phenomenon of memory.

Signals between cells in the brain

In the human brain there are more than hundred billion nerve cells. They are connected to each other through an infinitely complex network of nerve processes. The message from one nerve cell to another is transmitted through different chemical transmitters. The signal transduction takes place in special points of contact, called synapses. A nerve cell can have thousands of such contacts with other nerve cells.

The three Nobel Laureates in Physiology or Medicine have made pioneering discoveries concerning one type of signal transduction between nerve cells, referred to as slow synaptic transmission. These discoveries have been crucial for an understanding of the normal function of the brain and how disturbances in this signal transduction can give rise to neurological and psychiatric diseases. These findings have resulted in the development of new drugs.

Arvid Carlsson

Arvid Carlsson, Department of Pharmacology, University of Gothenburg is rewarded for his discovery that dopamine is a transmitter in the brain and that it has great importance for our ability to control movements. His research has led to the realization that Parkinson's disease is caused by a lack of dopamine in certain parts of the brain and that an efficient remedy (L-dopa) for this disease could be developed. Arvid Carlsson has made a number of subsequent discoveries, which

have further clarified the role of dopamine in the brain. He has thus demonstrated the mode of action of drugs used for the treatment of schizophrenia.

Paul Greengard

Paul Greengard, Laboratory of Molecular and Cellular Science, Rockefeller University, New York, is rewarded for his discovery of how dopamine and a number of other transmitters exert their action in the nervous system. The transmitter first acts on a receptor on the cell surface. This will trigger a cascade of reactions that will affect certain "key proteins" that in turn regulate a variety of functions in the nerve cell. The proteins become modified as phosphate groups are added (phosphorylation) or removed (dephosphorylation), which causes a change in the shape and function of the protein. Through this mechanism the transmitters can carry their message from one nerve cell to another.

Eric Kandel

Eric Kandel, Center for Neurobiology and Behavior, Columbia University, New York, is rewarded for his discoveries of how the efficiency of synapses can be modified, and which molecular mechanisms that take part. With the nervous system of a sea slug as experimental model he has demonstrated how changes of synaptic function are central for learning and memory. Protein phosphorylation in synapses plays an important role for the generation of a form of short term memory. For the development of a long term memory a change in protein synthesis is also required, which can lead to alterations in shape and function of the synapse.

Jean Nicot Discovers The Healing Properties Of Tobacco

Tasks:

1. *Read the following text. Discuss the text with your fellow-student.*

At the time Jean Nicot (pronounced niko) was born in France, about 1530, there was nothing to suggest that his name would be remembered. He was not from a family of consequence in the grand city of Paris. His father was just a humble notary in the old southern town of Nimes. (It was from Nimes that came a tough blue cloth Levi Straus found useful for making tents and pants (blue jeans) for the California goldminers. De Nimes, from Nimes, became jeans.) Jean Nicot managed to gain employment in the service of the Keeper of the Great Seal of France. In that capacity he attracted the attention of the King, who made him his private secretary. He was then appointed ambassador to Portugal. Among Nicot's friends in Lisbon was the scholar and botanist Damiro de Goes. Once when Damiro de Goes had Nicot over for dinner, he showed him a tobacco plant growing in his garden and told him of its marvellous healing properties. The application of the tobacco plant to a cancerous tumor allegedly worked wonders. Nicot tried treating an acquaintance's face wound for 10 days with the plant with

excellent results. Nicot became convinced of the healing powers of tobacco from Damiro de Goes, Nicot obtained cuttings which he planted in the garden of the French Embassy. In 1560 Nicot wrote of tobacco's medicinal properties. He described tobacco as a panacea and sent tobacco plants to the French court. Nicot sent snuff to Catherine de Medici, the Queen of France, in 1560 to treat her migraine headaches. Nicot had applied it to his nose and forehead and found it relieved his headaches. Catherine de Medici followed suite and was so favorably impressed. She decreed that tobacco was henceforth to be called Herba Regina, the "queen's herb." Jean Nicot died in Paris in the year 1600. He was an obscure diplomat in 16th-century Europe. Of Nicot, the standard reference book Le Petit Larousse says merely: "NICOT (Jean), born Nimes circa 1530 - died Paris 1600. French diplomat. Ambassador to Lisbon, he introduced tobacco into France." Nicot is, in fact, remembered today only because of his connection to tobacco. His name was given to the tobacco plant (Nicotiana tabacum) and to a stimulating (and addicting) substance now known as nicotine.

Dentist and Golfer - Cary Middlecoff

Tasks:

1. *Give a summary of the text.*

Some people in the health sciences make more of a name for themselves in another area of life, as was the case with Dr. Cary Middlecoff, a dentist, who as a professional golfer won fame (and more prize money than anyone else) in the 1950's. Dr. Middlecoff died of congestive heart failure in Memphis, Tennessee on September 1, 1998 at the age of 77.

Dr. Middlecoff grew up in Memphis, where his father Dr. Herman Middlecoff, a dentist, was club golf champion and taught him to play. Cary Middlecoff learned to play well and at 17 was Memphis city champion.

Middlecoff graduated from the Tennessee College of Dentistry in 1944 and became an Army dentist. According to the Army records, in 18 months he filled 12,093 teeth.After Dr, Middlecoff was discharged from the Army in 1946, he joined his father's dental practice. He began playing golf full-time a year later.

His father asked a friend, the great golfer Bobby Jones, to persuade Cary to come back to dentistry. Jones agreed and tried. When Middlecoff won the 1955 Masters tournament, Jones admitted, "The way he filled those 72 cavities during the last four days makes me think I may have been wrong."
Dr. Middlecoff never filled another tooth!

Cataract Surgery: Ancient And Modern

Tasks:

1. *Put questions on the text.*

A cataract is a clouding of the lens of the eye as though grease were dabbed on the lens of a camera, impairing vision.

The first known reference to cataract surgery was in India, it is thought, in a Sanskrit manuscript from the 5th century BC written purportedly by a Hindu surgeon named Susruta. Dr. Susruta did a type of cataract surgery known as couching (or reclination) in which the lens with the cataract was displaced. The diseased lens was pushed away from the pupil into the back of the eye. This permitted the patient to see somewhat better but by no means normally because the patient's own lens was then of no use and a corrective lens was not available to substitute for it. Couching was still practiced in Egypt, India and Tibet until the middle of the 20th century.

In the West, the first written description of the cataract and its treatment appeared in 29 AD in De Medicinae by the Latin encyclopedist Celsus. Celsus described the practice of needling (also called discission) of cataracts. This was a technique in which the cataract was broken up into smaller particles, which facilitated their absorption.

Modern cataract surgery was first done in France by Jacques Daviel in 1748 who removed the cataract from the lens. Later surgeons removed the clouded lens in its entirety.

Today, most cataract surgeries are performed using phacoemulsification, breaking up the lens with ultrasound and suctioning it out. Then an intraocular lens (IOL) made of plastic is inserted. The operation which takes about an hour and often needs no hospitalization has revolutionized the treatment of cataracts.

The treatment of cataracts has come a long ways from the 5th century BC.

1. ***Entitle the text.***

Most people think that medical humor consists of doctor and HMO jokes (and some of it does) but in medicine the word "humor" has another sense and refers to a fluid (or semifluid) substance.

The aqueous humor and the vitreous humors are fluids within the eye. The aqueous humor is the watery fluid normally present in the chambers of the eye around the iris while the vitreous humor is the "glassy" fluid behind the lens in the eyeball.

The humors (humours, in England) originated in an ancient theory that held that health came from a balance between the bodily liquids. These liquids, the humors, were four in number:

- Phlegm (water)
- Blood
- Black bile or gall (secreted by the kidneys and spleen)
- Yellow bile or choler (secreted by the liver)

Disease arose when imbalance occurred between these four humors. The treatment of disease was simple, straightforward, and logical (assuming the humoral theory to be correct).

The doctor needed first to diagnose the humoral imbalance. Then if one humor were deficient, the doctor had to strengthen it. And, conversely, if another humor were excessive, the doctor needed to purge it.

Take a person who was "bad-humored" because of too much blood. Superfluous blood was removed by bleeding the patient or applying leaches to suck out the extra blood. By such means, the person became "good-humored."

This theory (which is variously called the humoral theory, humoralism, and humorism) has been ascribed to ancient Greek writers at the time of Hippocrates. Hippocrates' inexact dates were about 460 to about 375 BC. But, in truth, the theory was devised well before Hippocrates and it was widely believed for over two thousand years.

The four humors did not just explain health and disease. They were believed to correspond to the four principal temperaments:

- Phlegm to the phlegmatic (laid-back) temperament
- Blood to the sanguine (passionate) temperament
- Black bile to the melancholic (sad) temperament
- Yellow bile to the choleric (angry) temperament

If someone was both depressed and angry, he or she obviously had too much black and yellow bile. Any temperament could be explained by an appropriate blend of humors.

The humoral theory was not definitively demolished until Rudolf Virchow published his formative book, Cellularpathologie (1858), in which he persuasively set forth the cellular basis of pathology. Pathology today rests on Virchow's cellular (and the new molecular) foundation.

The four principal humors have been happily dispelled, leaving in their wake the aqueous and vitreous humors, and the recommendation to drink plenty of water every day— especially during the summer months!

RESPIRATORY SYSTEM

Tasks:

1. *Read the text, translate it, divide it into logical parts and entitle them.*
2. *Describe the respiratory system according to the picture below.*

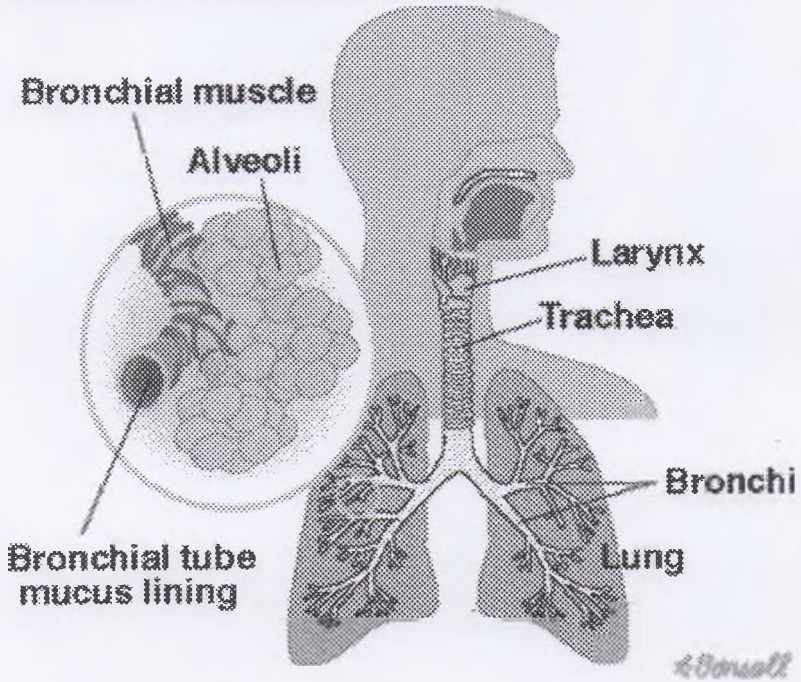
Lungs Design And Purpose

The lungs are a pair of organs in the chest which are primarily responsible for the exchange of oxygen and carbon dioxide between the air we breathe and the blood.

The cells in the body constantly need a new supply of oxygen to produce energy. With lack of oxygen, cellular function is impaired and damage or cell death may occur. As energy is utilized, waste products are created, one of which is the gas carbon dioxide. Eliminating carbon dioxide from the body is just as important as taking in oxygen from the air. If carbon dioxide builds up in the blood it will lead to headaches, drowsiness, coma, and eventually even death.

Air enters the body via the nose (preferably) or the mouth. The air enters the main windpipe, called the trachea, and continues en route to each lung via either the right or left bronchi. The lungs are separated into sections called lobes, two on the left and three on the right. The air passages continue to divide into ever smaller tubes which finally connect with tiny air sacs called alveoli. This gradually branching array of tubes is referred to as the tracheobronchial "tree" because of the remarkable similarity to the branching pattern of a tree.

The other half of the respiratory system involves blood circulation. Venous blood from the body is returned to the right side of the heart and then pumped out the pulmonary artery. This artery splits in two for the left and right lungs and then continues to branch much like the tracheobronchial tree. These vessels branch into a fine network of very tiny tubes called capillaries. The capillaries are situated adjacent to the alveoli and are so small that only one red blood cell at a time can pass through their openings. It is during this passage that gases are exchanged between the blood and the air in the nearby alveoli. After passing the alveoli, capillaries then join together to begin forming the pulmonary veins which carry the blood back to the left side of the heart.



Respiration is divided into two components. The first, inhalation, is active in that muscle contraction is required. The major muscle of respiration is a sheet-like dome shaped muscle called the diaphragm. The diaphragm separates the chest and abdominal cavities. As the diaphragm contracts, it flattens out, moving toward the abdominal cavity. This action causes an increase in the size of the chest cavity, thus creating a vacuum. Air is then sucked in through the mouth. When physical activity increases dramatically, or with some lung conditions, other muscles like those of the neck and those between the ribs also assist in the increase in size of the chest cavity. These muscles are referred to as accessory muscles. The second component of respiration, exhalation, is passive in that it does not require muscle contraction. During this phase, the expanded lung acts like a stretched rubber band

and simply contracts to its resting position. This contraction forces air out of the lungs and through the mouth.

As energy is utilized by cells, one of the waste products is the gas carbon dioxide. Oxygen-enriched red blood cells release oxygen to the cells of the body and then pick up the waste carbon dioxide. This oxygen- deprived, dark blue blood is then delivered to the blood vessels of the lung. Carbon dioxide is released by the red cell, easily passes through the capillary wall into the space in the air sac of the adjacent alveoli, and is then eliminated with each breath out the mouth. Oxygen present in the air sac easily passes into the capillaries and into the red blood cells. The capillary network carrying this oxygen-rich, bright red blood empties into the left side of the heart where it is pumped to all the tissues of the body. Thus, the cycle or circle of blood is complete. Hence, the name circulation.

Outside air needs to be heated and moistened to match the body's temperature and humidity. As air passes down the tracheobronchial tree, it is warmed and water is added. Contaminants must also be removed. Nose hairs and tiny microscopic hairs called cilia, along with sticky mucus produced by the lining membrane, help cleanse the air of impurities. Cilia beat in a synchronized fashion brushing any collected dirt and mucus up toward the mouth. The accumulated material is then coughed out or swallowed. By the time the air reaches the alveoli, it is virtually sterile. Amazingly, all of the above is occurring naturally while you are reading this information!

3. *Write a short summary according to the following plan.*

- The lungs exchange oxygen and carbon dioxide between the air we breathe and the blood.
- The tracheobronchial tree is the passage way from the mouth to the interior of the lung.
- Gas exchange occurs in the alveoli deep in the lungs.
- Breathing air in (inhalation) requires muscular effort.
- Air is warmed, humidified, and cleaned by the nose and lungs.

4. *Answer the following questions:*

1. What are the lungs?
2. What does breathing accomplish?
3. What is the structure of the respiratory system?
4. How is air moved into and out of the lungs during respiration? How does gas exchange occur?
5. What are other important events during the breathing cycle?

TUBERCULOSIS
(TB)

Tasks:

1. *Read the text and find answers to the following questions:*

    1. What is tuberculosis?
    2. How does a person get TB?
    3. What happens to the body when a person gets TB?
    4. How common is TB and who gets it?
    5. How do patients with tuberculosis feel?
    6. How does a doctor diagnose tuberculosis?
    7. How is tuberculosis treated?
    8. What's in the future for TB?

Tuberculosis (TB) is an infectious disease caused by bacteria whose scientific name is Mycobacterium tuberculosis. TB most commonly affects the lungs but also can involve most any organ of the body. Many years ago, this disease used to be called "Consumption" because without effective treatment, these patients often would waste away. Today, of course, tuberculosis usually can be treated successfully with antibiotics.

A person can become infected with tuberculosis bacteria when he or she inhales minute particles of infected sputum from the air. The bacteria get into the air when someone who has a tuberculosis lung infection coughs, sneezes, shouts, or spits (which is common in some cultures). People who are nearby can then possibly breathe the bacteria into their lungs. You don't get TB by just touching the clothes or shaking the hands of someone who is infected. Tuberculosis is spread (transmitted) primarily from person to person during close contact by breathing infected air. There is a form of tuberculosis, however, that is transmitted by drinking unpasteurized milk. Related bacteria, called Mycobacterium bovis, cause this form of TB. It previously was a major cause of TB in children, but rarely causes TB now since most milk is pasteurized (a heating process that kills the bacteria).

When the inhaled tuberculosis bacteria enter the lungs, they can multiply, causing a local lung infection (pneumonia). The local lymph nodes associated with the lungs may also become involved. In addition, TB can spread to other parts of the body. The body's immune (defense) system, however, can fight off the infection and stop the bacteria from spreading. The immune system does so ultimately by forming scar tissue around the TB bacteria and isolating it from the rest of the body.

If the body is able to form scar tissue (fibrosis) around the TB bacteria, then the infection is contained in an inactive state. Such an individual typically has no symptoms and cannot spread TB to other people. The scar tissue and lymph nodes may eventually harden, like stone. (That is, these scars and nodes can calcify.)

Sometimes, however, the body's immune system becomes weakened and the TB bacteria break through the scar tissue. For example, the immune system can be weakened by old age, the development of another infection or a cancer, or certain medications such as cortisone or anti-cancer drugs. The break through of bacteria can result in a recurrence of the pneumonia and a spread of TB to elsewhere in the body. The kidneys, bone, and lining of the brain and spinal cord are the most common sites affected by the spread of TB beyond the lungs.

Anyone can get TB, but certain people are at higher risk including:

- Those who live with individuals who have active TB infection
- Poor or homeless people
- Foreign-born persons from countries that have a high occurrence of TB
- Nursing home residents and prison inmates
- Alcoholics and intravenous drug users
- Those with diabetes, certain cancers, and HIV infection (the AIDS virus)
- Health care workers

There is no strong evidence for a genetically determined (inherited) susceptibility for TB.

As previously mentioned, TB infection usually occurs initially in the upper part (lobe) of the lungs. The body's immune system, however, can stop the bacteria from continuing to reproduce. Thus, the immune system can make the lung infection inactive (dormant). On the other hand, if the body's immune system cannot contain the TB bacteria, the bacteria will reproduce (become active or reactivate) in the lungs and spread elsewhere in the body.

It may take many months from the time the infection initially gets into the lungs until symptoms develop. The usual symptoms that occur with an active TB infection are a generalized tiredness or weakness, weight loss, fever, and night sweats. If the infection in the lung worsens, then further symptoms can include coughing, chest pain, coughing up of sputum (material from the lungs) and/or blood, and shortness of breath. If the infection spreads beyond the lungs, the symptoms will depend upon the organs involved.

TB can be diagnosed in several different ways, including chest X-rays, analysis of sputum, and skin tests. Sometimes, the chest x-rays can reveal evidence of active tuberculosis pneumonia. Other times, the x-rays may show scarring (fibrosis) or hardening (calcification) in the lungs, suggesting that the TB is contained and inactive. Examination of the sputum on a slide (smear) under the microscope can show the presence of the tuberculosis bacteria. A sample of the sputum can also be grown (cultured) in special incubators so that the tuberculosis bacteria can subsequently be identified.

Several types of skin tests are used to screen for TB. These so-called tuberculin skin tests include the Mantoux test, the Tine test. In each of these tests, a small amount of dead tuberculosis bacteria is injected under the skin. If a person is not infected with TB, then no reaction will occur at the site of the injection (a negative skin test). If a person is infected with tuberculosis, however, a raised and reddened area will occur around the site of the test injection. This reaction, a positive skin test, occurs in about 48 to 72 hours after the injection.

If the infection with tuberculosis has occurred recently, however, the skin test can be falsely negative. The reason for a false negative test with a recent infection is that it usually takes two to ten weeks after the time of infection with tuberculosis before the skin test becomes positive. The skin test can also be falsely negative if a person's immune system is weakened or deficient due to another illness such as AIDS or cancer, or while taking medications that can suppress the immune response, such as cortisone or anti-cancer drugs.

Remember, however, that the TB skin test cannot determine whether the disease is active or not. This determination requires the chest x-rays and/or sputum analysis (smear and culture) in the laboratory. A special test to diagnose TB, called the PCR (polymerase chain reaction) for TB, is now available. This test is extremely sensitive (detects minute amounts of the bacteria) and specific (detects only the TB bacteria) but, of course, it also is very expensive. A person with a positive skin test, a normal chest x-ray, and no symptoms most likely has only a few TB germs in an inactive state and is not contagious. Nevertheless, treatment with an antibiotic may be recommended for this person to prevent the TB from turning into an active infection. The antibiotic used for this purpose is called isoniazid (INH). If taken for 6 to 12 months, it will prevent the TB from becoming active in the future. In fact, if a person with a positive skin test does not take INH, there is a 5 to 10% lifelong risk that the TB will become active.

Taking isoniazid can be inadvisable (contraindicated) with pregnancy, alcoholism, and liver disease. Also, isoniazid can have side effects. The side effects occur infrequently, but a rash can develop and the patient can feel tired or irritable. Liver damage from isoniazid is a rare occurrence and typically reverses once the drug is stopped. Very rarely, however, especially in older people, the liver damage (INH hepatitis) can even be fatal. It is important, therefore, for the doctor to monitor a patient's liver by periodically ordering blood tests called "liver function tests" during the course of INH therapy.

A person with a positive skin test along with an abnormal chest x-ray and sputum evidencing TB bacteria has active TB and is contagious. As already mentioned, active TB usually is accompanied by symptoms, such as a cough, fever, weight loss, and fatigue.

Active TB is treated with a combination of medications along with isoniazid. Rifampin (Rifadin), ethambutol (Myambutol), and pyrazinamide are the drugs commonly used to treat active TB in conjunction with isoniazid (INH). Streptomycin, a drug that is given by injection, may be used as well, particularly when the disease is extensive and/or the patients do not take their oral medications reliably (poor compliance). Treatment usually lasts for many months and sometimes, for years. Successful treatment of TB is dependent largely on the compliance of the patient. Indeed, the failure of a patient to take the medications is the most important cause of failure to cure the TB infection.

Drug-resistant TB (TB that does not respond to drug treatment) has become a very serious problem in recent years in certain populations. For example, INH resistant TB is seen among patients from Southeast Asia. The reason for this INH resistance is not quite clear. However, the presence of INH-like substances in the

cough syrups in that part of the world may play a role in causing the INH resistance. An even more serious problem is the multi-drug resistant TB that has been seen in prison populations. Poor compliance by the inmates is thought to be the main reason for this multi-drug resistance.

Surgery on the lungs may be indicated to help cure TB when medication has failed, but in this day and age, surgery for TB is unusual. Treatment with appropriate antibiotics will usually cure the TB. Without treatment, however, tuberculosis can be a lethal infection. Early diagnosis, therefore, is important. Those individuals who have been exposed to a person with TB, or suspect that they have been, should be examined by a doctor for signs of TB and screened with a TB skin test.

Conceivably, TB could have been eliminated by effective treatment, vaccinations, and public health measures by the year 2000. However, the emergence of HIV changed the whole picture. Because of HIV, a tremendous increase in the frequency (incidence) of TB occurred in the 80s and throughout the 90s. This increase in TB happened because suppression of the body's immune (defense) system by HIV allowed TB to occur as a so-called opportunistic infection. Hopefully, control of HIV in the future will check this resurgence of tuberculosis.

TRACHEOSTOMY

Tasks:

1. *Read the text and write out the key words.*
2. *List the symptoms of tracheostomy.*
3. *Speak about the complications after trachostomy.*

A **tracheostomy** is a surgically created opening in the neck which allows direct access to the **trachea (the breathing tube).** It is maintained open with a hollow tube called a tracheostomy tube.

A tracheostomy is usually done for one of three reasons: (1) to bypass an obstructed upper airway; (2) to clean and remove secretions from the airway; and (3) to more easily, and usually more safely, deliver oxygen to the lungs.

It is important to understand that a tracheostomy, as with all surgeries, may involve risks of unsuccessful results, complications, or injury from both known and unforeseen causes. Because individuals vary in their tissue circulation and healing processes, as well as anesthetic reactions, ultimately there can be no guarantee made as to the results or potential complications.

The following complications have been reported in the medical literature. This list is not meant to be inclusive of every possible complication. It is listed here for information only in order to provide a greater awareness and knowledge concerning the tracheostomy procedure.

- Airway obstruction and aspiration of secretions (rare).
- Bleeding. In very rare situations, the need for blood products or a blood transfusion.
- Damage to the larynx (voice box) or airway with resultant permanent change in voice (rare).

- Need for further and more aggressive surgery.
- Infection.
- Air trapping in the surrounding tissues or chest. In rare situations, a chest tube may be required.
- Scarring of the airway or erosion of the tube into the surrounding structures (rare).
- Need for a permanent tracheostomy. This is most likely the result of the disease process which made the a tracheostomy necessary, and not from the actual procedure itself.
- Impaired swallowing and vocal function.
- Scarring of the neck.

Obviously, many of the types of patients who undergo a tracheostomy are seriously ill and have multiple organ-system problems. The doctors will decide on the ideal timing for the tracheostomy based on the patient's status and underlying medical conditions.

THE PROCEDURE

In most situations, the surgery is performed in the intensive care unit or in the operating room. In either location, the patient is continuously monitored by pulse oximeter (oxygen saturation) and cardiac rhythm (EKG). The anesthesia doctors usually use a mixture of an intravenous medication and a local anesthetic in order to make the procedure comfortable for the patient.

The surgeon makes an incision low in the neck. The trachea is identified in the middle and an opening is created to allow for the new breathing passage (tracheostomy tube) to be inserted below the voice box (larynx).

GENERAL INSTRUCTIONS & FOLLOW-UP CARE

The surgeons will monitor the healing for several days after the tracheostomy. Usually, the initial tube that was placed at the time of surgery will be changed to a new tube sometime between 4 and 10 days following surgery, depending on the specific circumstances. Subsequent tube changes are usually managed by the treating physician or nursing staff.

Speech will be difficult until the time comes for a tube to be placed which may allow talking by allowing the "leakage of air" around the tube up to the vocal cords. Any time a patient requires mechanical ventilation, air is prevented from leaking around the tube by a balloon. Therefore, while the patient is on a mechanical ventilator, he/she will be unable to talk. Once the doctors are able to decrease the-size of the tube, speaking may be possible. At the appropriate time, instructions will be given. Oral feeding may also be difficult until a smaller tube is placed.

If the tracheostomy tube will be necessary for a long period of time, the patient and family will be instructed on home care. This will include suctioning of the trachea, and changing and cleaning the tube. When the time comes you will be provided with ample information, instruction, and practice. Often, home healthcare

will be provided, or the patient will be transferred to an intermediate health care facility.

Tasks:

1. *Make up a short summary according to the following plan.*

- ✓ Tracheostomy is a surgical procedure to create an opening in the neck for direct access to the trachea (the breathing tube).
- ✓ Tracheostomy is performed because of airway obstruction, problem secretions, and efficient oxygen delivery.
- ✓ Tracheostomy can have complications.
- ✓ A tracheostomy requires follow-up care.

2. *Describe: "A procedure".*

1. ***Entitle the text:***

Respiratory syncytial virus (RSV) is a virus that causes mild respiratory infections (colds and coughs) in adults but in young children can produce severe breathing problems (bronchitis and pneumonia).

RSV is predominantly a winter illness characterized by a broad range of respiratory symptoms. Young infants or those with compromised immune or pulmonary systems can be especially hard hit. The disease is highly contagious.

Characteristically, there is fever, prominent nasal secretions and congestion, coupled with wheezing. The duration of symptoms is 1-2 weeks.

There is no specific treatment for respiratory syncytial virus. Treatment is directed toward maintaining normal organ function and breathing support.

Effective immunity against RSV requires a continuous solid level of antibodies against the virus. There is particular concern for RSV in premature babies because of their lack of maturity and lack of antibodies.

PNEUMOTHARX

Tasks:

1. *Answer the question:*

What is the main idea of the text?

A **pneumothorax** is free air in the chest outside the lung.

Pneumothorax can occur spontaneously ("out of the blue", with or without underlying lung disease), follow a fractured rib, occur in the wake of chest surgery, or be deliberately induced in order to collapse the lung. Smoking has been shown to increase the risk for spontaneous pneumothorax.

A small pneumothorax without underlying lung disease may resolve on its own. A larger pneumothorax and a pneumothorax associated with underlying lung disease often require aspiration of the free air and/or placement of a chest tube to evacuate the air. Possible complications of chest tube insertion include pain, infection of the space between the lung and chest wall (the pleural space), hemorrhage (bleeding), fluid accumulation in the lung, and low blood pressure (hypotension).

PNEUMOCOCCAL VACCINATION
(Pneumonia Vaccination)

Tasks:

1. *Read the text, translate it. Divide the text into logical parts and entitle them.*

2. *Answer the following questions and find answeres in the text:*

1. What is pneumococcal vaccination?
2. Who should consider pneumococcal vaccination?
3. Who should not receive pneumococcal vaccine?
4. How is pneumococcal vaccine administered?
5. What are side effects of pneumococcal vaccine?
6. What if it is not clear what a person's vaccination history is?

Pneumococcal vaccination is a method of preventing a specific type of lung infection (pneumonia) that is caused by Pneumococcus bacterium. The vaccine is injected into the body to stimulate the normal immune system to produce antibodies that are directed against pneumococcus bacteria.

This method of stimulating the normal immune system to be directed against a specific microbe is called immunization. Pneumococcal vaccination is also referred to as Pneumococcal immunization.

Pneumococcal vaccination does not protect against pneumonia caused by microbes other than pneumococcus bacteria.

Pneumococcal vaccination should be considered by people in the following groups:

- Adults 65 years of age and older.
- Persons > 2 years of age with chronic heart or lung disorders including congestive heart failure, diabetes mellitus, chronic liver disease, alcoholism, spinal fluid leaks, cardiomyopathy, chronic bronchitis or emphysema (COPD) or emphysema.
- Persons > 2 years of age with spleen dysfunction (such as sickle cell disease) or lack of spleen function (asplenia), blood malignancy (leukemias), multiple myeloma, kidney failure, organ transplantation or immunosuppressive conditions, including HIV infection.
- Alaskan Natives and certain American Indian populations.

If elective surgical removal of the spleen (splenectomy) or immunosuppressive therapy is planned, the vaccine is given 2 weeks prior to the

procedure, if possible. The pneumococcal vaccine should not be received by persons with a prior history hypersensitivity reactions to the vaccine.

The safety of PPV during the first trimester of pregnancy has not been evaluated. Pregnant women or those contemplating pregnancy should consult their doctors for additional information.

The pneumococcal vaccine is given as one dose for most people. The vaccine is injected as a liquid solution of 0.5 mL into the muscle (intramuscular or IM), typically deltoid muscle, or under the skin (subcutaneous or SC). The area injected is typically sterilized by rubbing alcohol onto the skin prior to the injection.

Persons vaccinated prior to age 65 should be vaccinated at age 65 if 5 or more years have passed since the first dose. For all persons lack of spleen function (such as in sickle cell disease or after spleen removal), transplant patients, patients with chronic kidney disease, immunosuppressed or immunodeficient persons, and others at highest risk of fatal infection, a second dose should be given - at least 5 years after first dose.

Pneumococcal vaccine uncommonly causes side effects. Reported side effects include soreness and/or redness at the site of the injection, fever, rash, and allergic reactions.

When indicated, vaccine should be administered to patients with unknown vaccination status. All residents of nursing homes and other long-term care facilities should have their vaccination status assessed and documented. In July 2000, the American Academy of Pediatrics (AAP) and the CDC jointly recommended childhood pneumococcal immunization, since pneumococcal infections are the most common invasive bacterial infections in children in the United States, causing about 1,400 cases of meningitis, 17,000 cases of bloodstream infections, and 71,000 cases of pneumonia every year in children under age 5.

The new AAP/CDC guidelines stipulated the use of the newest form of the pneumococcal vaccine, the heptavalent pneumococcal conjugate vaccine (PCV7) and recommended it "for use in all children 23 months of age and younger. Although other pneumococcal vaccines are available, PCV7 represents the first pneumococcal vaccine approved for use in children younger than age 2. The policy recommends that PCV7 be given concurrently with other recommended childhood vaccines at 2, 4, 6, and 12 to 15 months. The number of PCV7 doses required depends upon the age at which vaccination is initiated. The vaccine was also recommended for all children 24 to 59 months of age who are at especially high risk of invasive pneumococcal infection. This includes children with sickle cell disease, human immunodeficiency virus (HIV) infection, and other children who are immunocompromised."

PLEURISY
(Pleuritis)

Tasks:

1. *Read the text and find the medical terms in it.*

Pleurisy is inflammation of the linings around the lungs (the pleura). There are two layers of pleura; one covering the lung and the other covering the inner wall of the chest. These two layers are lubricated by pleural fluid. Pleurisy is frequently associated with the accumulation of extra fluid in the space between the two layers of pleura. This fluid is referred to as a pleural effusion. Pleurisy is also referred to as pleuritis.

Pleurisy causes pain, cough, chest tenderness, and shortness of breath. In particular, it causes pain when breathing in.

Pleurisy can be caused by any of the following conditions:

- **Infections:** bacterial, mycobacteria, fungus, parasites, or viruses
- **Inhaled particles:** exposure to asbestos
- **Collagen vascular diseases:** lupus, rheumatoid arthritis
- **Cancers:** for example, the spread of lung cancer or breast cancer
- **Tumors of the pleura:** mesothelioma or sarcoma
- **Congestion:** heart failure
- **Lung embolism:** blood clot inside the blood vessels to the lungs
- **Obstruction of lymph channels:** because of centrally located lung tumors
- **Trauma:** rib fractures or injury from instruments in the chest from an operation, car accidents
- **Certain drugs:** drugs that can cause lupus (such as Hydralazine, Procan, Dilantin, and others)
- **Abdominal processes:** such as pancreatitis, cirrhosis of the liver
- **Lung infarction:** lung tissue death due to lack of oxygen from poor blood supply.

The pleura is composed of two layers of thin lining tissue. One layer covers the lung (visceral pleura) whereas the second one covers the inner wall of the chest (parietal pleura). These two layers are lubricated by pleural fluid. Normally, there is 10-20 ml of clear liquid lubricating between these layers. The fluid is continually absorbed and replaced, mainly through the outer lining. Pressure inside the pleura is negative (as in sucking) and becomes even more negative during inspiration (breathing in). The pressure becomes less negative during exhalation (breathing out). Therefore, the space between the two layers of pleura always has a negative pressure. The introduction of air (positive pressure) into the space (such as from a knife wound) will result in a collapse of the lung.

2. *Answer the following questins in written form:*

1. What is pleurisy?
2. What causes pleurisy?
3. How does the normal pleura work?
4. What are the symptoms of pleurisy?
5. How is pleurisy diagnosed?
6. How is pleurisy treated?
7. Can pleurisy be prevented?

LUNGS

Tasks:

1. *Read the following text and make up the questions to it.*

Air, which is inhaled through the mouth and nasal passages, travels through the windpipe or "trachea" into two main air passages. These divide into smaller branches which separate into even smaller "twigs" like an upside-down tree. The respiratory system is mainly contained in two lungs. The little air sacs at the end of the twigs comprise the fruit of the tree, and through its thin walls gasses pass into and out of the blood. The right lung is made up of three compartments, each of which contain a branch and each of which stems off into smaller "twigs," which hold the air sacs (or "fruit" of the tree) that process the oxygen in the air to be released into the blood and expel carbon dioxide, which is exhaled through the nose and mouth. The left lung cavity contains only two sections (each with its own branches, twigs and fruit) and encloses the heart, which processes the oxygenated blood and returns deoxygenated blood into the lungs for exhalation. Breathing is an automatic process which comes from the brain stem and is so strong a force that the involuntary reflexes will not allow us to stop breathing for any length of time. The passageways in the respiratory system are lined with various types of epithelia to prepare the air properly for utilization and with hair-like fibers called cilia that move in a wave-like motion to sweep debris out of the lungs for expulsion. The women in ancient Greece and Rome wore corsets of linen to restrain their figures. The female waistline has been moved up and down over the passage of time, but this became a real health hazard when whalebone corsets came into use during the last part of the 19th and early part of the 20th centuries, because they constricted the vital organs in the body - especially those of the respiratory and digestive systems. Women with "wasp-like" waists fainted so often that those who were well-off purchased "fainting" couches; and when a woman "swooned," the cry, "Cut her laces!" often allowed her enough air to recover.

PULMONARY ARTERY/VEIN

Tasks:

1. *Say the main idea of the text.*

When the muscular wall of the right ventricle contracts, the blood inside the heart chamber is put under more pressure, and the tricuspid valve closes. As a result, the only exit is through the "pulmonary trunk," which divides to form the right and left "pulmonary arteries." At the base of this trunk is a "pulmonary semilunar valve" that is made up of three leaflets or cusps. This valve opens when the right ventricle contracts. When the right ventricular muscles relax, blood starts back up the pulmonary trunk, causing the valve to close to prevent the flow from

returning into the ventricular chamber. The pulmonary vein travels parallel to the pulmonary artery as it carries the blood back up to the heart.

DIAPHRAGM

Tasks:

1. *Read the following text , translate it and retell.*

Pulmonary ventilation or breathing has two phases - inspiration which moves air into the lungs and expiration or exhalation that moves air out of the lungs. Inspiration occurs when the chest cavity enlarges expanding the lungs along with it causing air to rush into them and down into the alveoli. The diaphragm is a large dome-shaped muscle separating the abdominal cavity from the thoracic cavity, and is the primary muscle of respiration. The diaphragm contracts during inspiration and flattens out moving down toward the abdominal cavity. It is the flattening of the diaphragm that makes the chest cavity longer from top to bottom. Aided by the external intercostal muscles between ribs, thoracic size is also increased from front to back and side to side with contraction of the external intercostal muscles. Contraction of the inspiratory muscles increases the volume of the thoracic cavity and reduces pressure within it causing the air from outside to fill the lungs. When the inspiratory muscles relax, the thoracic cavity returns to its normal size and air flows out of the lungs to be exhaled through the mouth and nose. This is brought about by contraction of the internal intercostal and abdominal muscles which decrease the front-to-back size of the thorax and in addition, push the abdominal contents up against the underside of the diaphragm making it more "dome-shaped". The result is to further shorten or decrease the top to bottom size of the thoracic cavity. As the thoracic cavity decreases in size, the air pressure within the cavity increases and air flows out of the lungs. The diaphragm originates at the level of the 7th to 12th ribs, arcuate ligaments and lumbar vertebrae with a central tendon insertion into the inferior aspect of the sternum internally.

ARTIFICIAL VENTILATION OF LUNGS DURING REANIMATION

Tasks:

1. *Read the following text and the text "Normal Ventilation" , translate them. Discuss the problem of artificial and normal ventilation, using the info obtained from the text.*

The problem of artificial ventilation of lungs during reanimation has been intensively studied at our Institute from the very first days of foundation of the clinical department. It was the subject of special studies by Kassil. The results of his studies have been systematized in many monographs and other publications- Observations of more than 800 patients in the terminal state of various aetiology served as the basis for the development of the method for artificial ventilation of lungs in acute respiratory distress.

First of all, indications for artificial ventilation of lungs were defined. It has been established that in emergency cases, when time and possibilities are limited for detailed examination of the patient, artificial ventilation of lungs is indicated for apnoea, acute respiratory arrhythmia, tachypnoea over 40 per minute, in the presence of clinical sings of progressive hypoxia and/or hypercapnia which persists after restoration of patency of the respiratory tract and oxygen therapy. The analysis of the observations demonstrated the great of the time when artificial respiration is started for the outcome of treatment of acute respiratory distress. Delayed administration or early discontinuation of artificial ventilation of lungs is a common error in clinical practice.

When determining special indications, it is necessary to remember that artificial ventilation of lungs can not only correct hypoventilation, but can also restore the disturbed relationships between regional ventilation and perfusion of the lungs, and save the patient of the respiration work. The work of respiration can be too difficult for patients with acute respiratory distress because it requires much energy. Moreover, it was established that in the presence of artificial ventilation of lungs, large doses of some medicines which are necessary for the patient, but can produce an inhibiting effect on spontaneous respiration, become safe. A concept of prophylactic use of artificial ventilation in peritonitis, massive blood loss and eclamptic coma was thus developed. It has been shown that planned artificial ventilation during the postoperative and postlabour periods for at least 4 hours, without attempting spontaneous respiration, decreases mortality rate.

NORMAL VENTILATION

The primary function of your lungs is to provide oxygen to your blood and to remove carbon dioxide from it. Your lungs are suspended within your chest (thoracic cavity), which is enclosed on all sides by your ribs, cartilage, and the muscle between them. Your diaphragm, which consists of sheets of muscle, separates your thoracic cavity from your abdominal cavity.

Your lungs are soft and spongy. If you are healthy, your lungs probably are a mottled pinkish gray color, although even healthy lungs can become blackened from carbon particles in polluted air. Your right lung is divided into three sections (lobes). Your left lung has two lobes. Your heart is between your lungs, nestled over one corner of your left lung.

To reach your lungs, air enters through your mouth and nose and then travels through the back of your throat (pharynx), through your voice box (larynx), and down your windpipe (trachea). The trachea branches into two main bronchial tubes, or air passageways. Each bronchial tube then branches into smaller passageways (bronchi), which divide several times more, finally forming much smaller tubes (bronchioles). The branching creates the appearance of an upside-down tree. The smallest bronchioles end in tiny dosed elastic air sacs called alveoli. Your blood is carried to these air sacs by tiny blood vessels. The vessels, called pulmonary capillaries, release carbon dioxide from your blood into the air sacs and at the same time absorb oxygen from the air sacs into your blood. Your lungs

contain approximately 300 million such alveoli. If they could be stretched out on a flat surface, they would cover an area approximately the size of a tennis court.

- The pleura, a double-layer membrane with a very thin lubricating layer of fluid between the two layers, covers the outside of your lungs and the adjacent chest wall. This membrane allows your lungs to move easily within the chest cavity as you breathe.

When you inhale, the muscles of your ribs contract, causing your ribs to move upward and outward. At the same time, your diaphragm contracts, pushing down toward your abdomen. These two actions increase the size of your chest cavity and thus cause your lungs to expand and air to be sucked into them. The individual alveoli also expand with air. During normal breathing, a healthy adult can draw about a pint of air into the lungs with each breath. However, during heavy breathing, you can draw as much as 3 to 6 quarts of air into your lungs.

When you exhale, your diaphragm and rib muscles relax and return to their original positions. This decreases the size of your chest cavity, compressing your lungs slightly and forcing the stale air, now carrying carbon dioxide, out of your body. The whole process of breathing in and out occurs automatically without your thinking about it.

LUNG CANCER

Tasks:

1. *Read and translate the following text. Discuss the complications of lung cancer.*

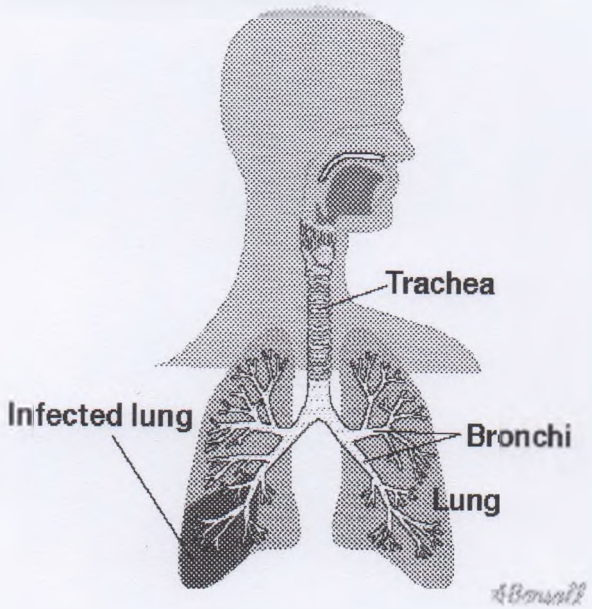
Lung cancer kills more men and women than any other form of cancer. It is estimated that by the year 2000, over three hundred thousand people will die from lung cancer in the United States alone. The economic loss is calculated to be over two billion dollars a year.

Most lung cancers begin to grow silently, without any symptoms. Patients with lung cancer often do not develop symptoms until the cancer is in an advanced stage. The actual time from when one cell becomes cancerous until it is large enough to be diagnosed or produce symptoms may take as long as 10 to 40 years. Since the majority of lung cancer is diagnosed at a relatively late stage, only 10% of all lung cancer patients are ultimately cured. If the patient cannot be cured by surgery at the time the cancer is found, there is a 50% chance that death will occur in less than one year.

Eighty percent of lung cancers are due to tobacco smoke. There are over 2,000 known cancer-causing chemicals in tobacco smoke. Normal human cells change into cancer cells when exposed to carcinogens (chemicals which cause cancer). Other well established carcinogens of the lung include radon, asbestos, bischolomethylether, nickel, chromates, coal tar, copper radioactive materials and arsenic.

Many occupations have an increased risk for developing lung cancer. For example, asbestos insulation workers have 92 times the risk of developing of lung cancer, and smelter workers have 3-8 times the risk of developing lung cancer. The risk of lung cancer is also increased in people who work in the manufacturing of certain industrial gases, pharmaceuticals, soaps and detergents, paints, inorganic pigments, plastics, and synthetic rubber.

The risk of developing lung cancer is related to the amount of exposure to the cancer causing agent. For example, the risk of lung cancer in humans is proportional to the number of cigarettes smoked. The risk of developing lung cancer is 8-20 times greater in smokers compared to people who have never smoked. A smaller, but real risk exists for cigar and pipe smokers. Some cancer causing agents react together to significantly worsen the risk of developing cancer. The combined exposure to asbestos and tobacco smoke clearly multiplies the risk of developing lung cancer.



PNEUMONIA

RADIODIAGNOSIS OF ACUTE PNEUMONIA IN CLINICAL PRACTICE

Tasks:

1. *Translate the text without using a dictionary.*

The analysis is given for 985 cases of the acute pneumonia radiodiagnosis. Roentgenologic examination, sonography and roentgenologic computer tomography were used. Thorax plain roentgenography was the main diagnosis method. The sonography was the main method of pleurisy diagnosis (especially with the basal localization), its origin and evolution. This method also makes it

possible to discern the gangrene of lung and the suppuration of pleural exudate. The roentgenologic computer tomography may be used as a more precise method for determining an extensiveness of the pulmonary tissue decomposition, for discerning the roentgenonegative pneumonia and for differential diagnosis. One of the important aspects of radiodiagnosis is determination of the acute pneumonia outcomes and its complications. The article gives the pneumonia classification which is based on lung macrostructure obtained by means of radiodiagnosis. A diagnosis algorithm is given depending on the disease development.

1. ***Entitle the text, write the key sentences out from the text and translate them.***

An 18-year old patient was admitted to the Institute of General Reanimatology with a diagnosis of perforating ulcer of the stomach. The onset of the disease was acute. The patient had headache, weakness, the body temperature was 39°C. On admission to the clinical department the condition was critical. The patient was inhibited, complained of pain in the right epigastrium, nausea, and difficult breathing. The skin was pallid; the lips cyanotic. Respiration rate: 20 per minute. Arterial pressure undeterminable; pulse on the femoral vein: 100 per minute. The patient was examined by specialists; the diagnosis was obscure. Centripetal arterial blood supply was stimulated. Dopamine was given by intravenous drip. The arterial pressure rose to 130/80, the pulse rate became 106 beats per minute, respiration rate 28 per minute; lung oedema developed. Gas composition of the blood: PaO_2 (Pressure (arterial Oxygen tension) — 45 mm Hg, HbO_2a (Hemoglobin Oxygen amount) - 75.3 per cent.

X-ray examination revealed total pneumonia of the right lung. Artificial lung ventilation was given for progressive respiratory distress, but oxygen tension and saturation of blood remained low. Heparin and fibrinolysin were administered by intravenous drip 4 times a day. At 12 o'clock, despite the treatment the arterial pressure suddenly dropped and the heart stopped (asystole). The pupils dilated, the pulse and arterial pressure on the main arteries were undeterminable, the heart sounds were absent. Closed chest cardiac massage was started immediately; 5 ml of 10 percent calcium chloride solution and 0.5 ml of a 0.2 percent norepinephrine solution were administered intravenously. In 3 minutes the cardiac activity was restored. The patient came to senses in 20 minutes but the arterial pressure dropped periodically to 50/0 mm Hg. Within the course of three hours, the heart of the patient stopped three times, while intensive therapy was being administered. Each time cardiac activity was restored after 3 — 4 minutes of resuscitation measures, and the patient regained consciousness. At 11 o'clock p. m. the heart stopped for the fifth time. In 2 —3 minutes of resuscitation the heart resumed its activity again and the patient regained consciousness in 25 minutes. Dopamine was given to the patient during subsequent two days of unstable circulation of blood. The clinical diagnosis was established: toxaemic pneumonia; the diagnosis was biter confirmed serologically. Gas indices of blood and metabolism improved considerably. In 19 days the patient could breathe spontaneously. Neurological examination revealed

asthenia and rapid fatigue; gross neurological disturbances were absent. In 23 days the patient was moved to a pulmonological department and later dismissed from the hospital after complete recovery.

Final diagnosis: toxaemic total pneumonia of the right lung. Acute respiratory distress; left ventricular failure. Lung oedema. Acute cardiovascular failure. Clinical death developed 5 times. The patient has been reanimated. Complete recovery.

1. ***Entitle the text.***

80 patients with acute pneumonia were complexly examined when they were admitted to, and discharged from, a hospital as well as 6~12 months later. The outcomes into chronic non-specific pulmonary diseases were revealed in 25% of cases. Analysis of the examination results made it possible to ascertain the following risk factors of the acute pneumonia transition into chronic non-specific pulmonary diseases: severe or delayed course of disease; presence of Streptococcus or Escherichia coli in the sputum; lingering and massive antibacterial therapy; such symptoms of incomplete recovery on the moment of a patient discharge from a hospital as cough, non-specific showings of inflammation in biochemical blood analysis, roentgenographically revealed changes, external respiration disorder; reduction of pulmonary blood flow when patients were admitted to, and especially when they were discharged from, a hospital; adaptive stress reaction; chronic alcoholic intoxication. The following factors contribute to favor outcomes: physiotherapy, exercise therapy, medicines improving microcirculation; normal function of external respiration and normal pulmonary blood flow as well as adaptive training reaction when discharging from a hospital. Patients with risk factors of pneumonia transition into chronic non-specific pulmonary diseases require particular attention when making a decision on discharging and during the subsequent medical supervision

ASTHMA

Tasks:

1. *Entitle the following text.*

What do each of these individuals have in common: First, an eighteen-year-old suddenly develops wheezing and shortness of breath when visiting his grandmother who happens to have a cat. Second, a thirty year old woman has colds that "always go into her chest," causing coughing and difficulty breathing. Lastly, a sixty- year-old man develops shortness of breath with only slight exertion even though he has never smoked. The answer is that they all may have asthma.

These are some of the many faces of asthma. Most researchers believe that the different patterns of asthma are all related to one condition. Other researchers feel that separate lung conditions exist. There is currently no cure for asthma and

no single exact cause has been identified. Therefore, understanding the changes that occur in asthma, how it makes you feel, and how it can behave over time is vital. This knowledge empowers you to take an active role in your own health care.

MYTHS ABOUT ASTHMA

Tasks:

1. *Read and discuss the information given below.*

Before we present the typical symptoms of asthma, we should dispel some common myths about this condition. This is best achieved by conducting a short true or false quiz.

1. (True) or (False) Asthma is "all in the mind." false
2. T or F You will "grow out of it."
3. T or F Asthma can be cured, so it is not serious and nobody dies from it.
4. T or F You are likely to develop asthma if someone in your family has it.
5. T or F You can "catch" asthma from someone else who has it.
6. T or F Moving to a different location, such as the desert, can cure asthma.
7. T or F People with asthma should not exercise.
8. T or F Asthma does not require medical treatment.
9. T or F Medications used to treat asthma are habit-forming.
10. T or F Someone with asthma can provoke episodes anytime they want in order to get attention.

Here are the answers:

1. F - Asthma is not a psychological condition. However, emotional triggers can cause flare-ups.
2. F - You cannot outgrow asthma. In about 50% of children with asthma, the condition may become inactive in the teenage years. The symptoms, however, may reoccur at anytime in adulthood.
3. F - There is no cure for asthma, but the disease can be controlled in most patients with good medical care. The condition should be taken seriously since uncontrolled asthma may result in emergency hospitalization and possible death.
4. T - You have a 6% chance of having asthma if neither parent has the condition; a 30% chance if one parent has it; and a 70% chance if both parents have it.
5. F - Asthma is not contagious.
6. F - A new environment may temporarily improve asthma symptoms, but it will not cure asthma. After a few years in the new location, many persons become sensitized to the new environment and the asthma symptoms return with the same or even greater intensity than before.

7. F - Swimming is an optimal exercise for those with asthma. On the other hand, exercising in dry, cold air, may be a trigger for asthma in some people.
8. F - Asthma is best controlled by having an asthma management plan designed by your doctor that includes the medications used for quick relief and those used as controllers.
9. F - Asthma medications are not addictive.
10. F - Asthma attacks cannot be faked.

Asthma is a chronic inflammation of the bronchial tubes (airways) that causes swelling and narrowing (constriction) of the airways. The result is difficulty breathing. The bronchial narrowing is usually either totally or at least partially reversible with treatments.

Bronchial tubes that are chronically inflamed may become overly sensitive to allergens (specific triggers) or irritants (non-specific triggers). The airways may become "twitchy" and remain in a state of heightened sensitivity. This is called "Bronchial Hyperreactivity" (BHR). It is likely that there is a spectrum of bronchial hyperreactivity in all individuals. However, it is clear that asthmatics and allergic individuals (without apparent asthma) have a greater degree of bronchial hyperreactivity than non-asthmatic and non-allergic people. In sensitive individuals, the bronchial tubes are more likely to swell and constrict when exposed to triggers such as allergens, tobacco smoke, or exercise. Amongst asthmatics, some may have mild BHR and no symptoms while others may have severe BHR and chronic symptoms.

ALLERGY ASSIST

Tasks:

1. *Read and translate the following text and get ready to speak about respiratory system.*

2. *Give the main idea of the following text.*

3. *Discuss: "Allergy Jargon", "Allergy Fact".*

Asthma affects people differently. Each individual is unique in their degree of reactivity to environmental triggers. This naturally influences the type and dose of medication prescribed, which may vary from one individual to another.

From the past to the present

Physicians in ancient Greece used the word "asthma" to describe breathlessness or gasping. They believed that asthma was derived from internal imbalances, which could be restored by healthy diet, plant and animal remedies, or lifestyle changes.

Allergy Jargon

Asthma is derived from the Greek word "Panos," meaning panting.

Chinese healers understood that "xiao-chiran," or "wheezy breathing," was a sign of imbalance in the life force they called "Qi." They restored "Qi" by means of herbs, acupuncture, massage, diet, and exercise.

The Hindu philosophers connected the soul and breath as part of the mind, body, and spirit connection. Yoga uses control of breathing to enhance meditation. Indian physicians taught these breathing techniques to help manage asthma.

Allergy Fact

Maimonides was a renowned twelfth century rabbi and physician who practiced in the court of the sultan of Egypt. He recommended to one of the Royal Princes with asthma that he eat, drink, and sleep less. He also advised that he engage in less sexual activity, avoid the polluted city environment, and eat a specific remedy - chicken soup.

The balance of the "four humors," which was derived from the Greco-Roman times, influenced European medicine until the middle of the eighteenth century. In a healthy person, the four humors, or bodily fluids - blood, black bile, yellow bile, and phlegm - were in balance. An excess of one of these humors determined what kinds of disorders were present. Asthmatics who were noted for their coughing, congestion, and excess mucus (phlegm) production were therefore regarded as "phlegmatic."

By the 1800's, aided by the invention of the stethoscope, physicians began to recognize asthma as a specific disease. However, patients still requested the traditional treatments of the day, such as bloodletting, herbs and smoking tobacco. These methods were used for a variety of conditions, including asthma. Of the many remedies that were advertised for asthma throughout the nineteenth century, none were particularly helpful.

CARDIOVASCULAR SYSTEM

Tasks:

1. *Read the following text and put questions on it.*

The **cardiovascular system** includes the heart and the blood vessels, and the respiratory system contains those organs which are responsible for carrying oxygen from the air to the blood stream and expelling the waste product of carbon dioxide. Blood is that sticky, red fluid that circulates throughout our bodies in veins and arteries. The heart pumps oxygen into the blood and collects carbon dioxide from it to be expelled through the lungs. We usually think of respiration as the process of the lungs after air is breathed in through the mouth or nose. The lungs do play a very important role, but every living cell in the body is involved in this process. Respiration is the act of burning energy from oxygen. Breathing is an obvious part of the respiratory passages, but these also involve yawning, sneezing, coughing, hiccups, the power of speech, and the sense of smell. The respiratory flow has been

"kidnapped" by the larynx, or voice box, which uses it to create a multiple range of sounds so that humans can communicate vocally. These systems' tasks include organs which take up space in the face and neck and most of the chest. The cardiovascular and respiratory systems are basic to life and breathing, like the beat of one's heart, is an automatic function which is controlled by the brain.

Cardiovascular System (Simplified)

The cardiovascular system includes the heart and the blood vessels. The heart pumps blood, and the blood vessels channel and deliver it throughout the body. Arteries carry blood filled with nutrients away from the heart to all parts of the body. The blood is sometimes compared to a river, but the arteries are more like a river in reverse. Arteries are thick-walled tubes with a circular covering of yellow, elastic fibers, which contain a filling of muscle that absorbs the tremendous pressure wave of a heartbeat and slows the blood down. This pressure can be felt in the arm and wrist - it is the pulse. Eventually arteries divide into smaller arterioles and then into even smaller capillaries, the smallest of all blood vessels. One arteriole can serve a hundred capillaries. Here, in every tissue of every organ, blood's work is done when it gives up what the cells need and takes away the waste products that they don't need. Now the river comparison really does apply. Capillaries join together to form small veins, which flow into larger main veins, and these deliver deoxygenated blood back to the heart. Veins, unlike arteries, have thin, slack walls, because the blood has lost the pressure which forced it out of the heart, so the dark, reddish-blue blood which flows through the veins on its way to the lungs oozes along very slowly on its way to be reoxygenated. Back at the heart, the veins enter a special vessel, called the pulmonary arteries, into the wall at right side of the heart. It flows along the pulmonary arteries to the lungs to collect oxygen, then back to the heart's left side to begin its journey around the body again.

YOUR HEALTHY HEART AND BLOOD VESSELS

Tasks:

1. *Read the text, translate it.*
2. *Choose the medical terms and get ready to speak on the structure of the cardiovascular system.*

For generations, poets have endowed the human heart with a wide range of emotional abilities. Yet the plain truth is a good deal simpler: the heart is a pump—no more, no less.

But it is an extraordinary pump. Every minute of your life, your heart beats approximately once a second, and considerably more often when you are exercising. It weighs only about a pound but manages to pump 5 or more quarts per minute. In a single day, your heart will pump about 2,000 gallons of blood through your circulatory system.

When functioning normally, your heart pumps blood to the tissues to provide the cells with die oxygen and nutrients they need. This circulatory system consists of arteries and veins. The arteries take the blood to the tissues; the veins bring it back to the heart to be cycled through the lungs before it is returned to the tissues.

When the pumping of your heart, and the resultant circulation of the blood, is interrupted for more than a few minutes, life ends. In fact, all too often the first sign of heart disease is sudden death. It is for this reason that in recent years so much emphasis has been given to prevention.

Parts of Your Heart

The heart actually has two pumps. Each pump consists of a pair of chambers formed of muscles. It is the contraction of these muscles that causes the blood to be pumped. In each pump, the lower chamber is called a ventricle and the upper chamber is called an atrium. The four chambers of the heart are separated by valves.

The tissue of the heart consists of three layers. The exterior layer is the thin epicardium. In the middle is the myocardium, the heart muscle itself (from the Greek myo for "muscle" and kardia for "heart"). The inner lining of the heart is the endocardium, a thin, smooth structure. Protecting the whole package is the pericardium, a fibrous sac with a very smooth lining. In the space between the pericardium and the epicardium there is a small amount of fluid.

Left Atrium

Internally, the heart is divided into four hollow chambers, two on the left and two on the right. The upper chambers, called "atria," have relatively thin walls and receive blood returning through the veins. The left atrium chamber of the heart receives blood from the lungs through four "pulmonary veins" - two from the right lung and two from the left lung. Blood passes from the left atrium into the left ventricle through the atrioventricular opening, which is guarded by a valve. This valve has two leaflets or cusps, and is called the "bicuspid valve." It prevents blood from flowing back into the left atrium from the ventricle and is attached to papillary muscles by the "chordae tendinae."

Right Atrium

Internally, the heart is divided into four hollow chambers, two on the left and two on the right. The upper chambers, called "atria," have relatively thin walls and receive blood returning through the veins. The right atrium receives blood from two large veins: the "superior vena cava" and the "inferior vena cava." These veins return blood that is low in oxygen from various sites in the body. A smaller vein, called the "coronary sinus," also drains blood into the right atrium from the wall of the heart.

Aortic Valve

When the left ventricle of the heart contracts, the bicuspid valve closes, and the only way out is through a large artery called the "aorta." The branches of the aorta distribute blood to all parts of the body (See Arch of the Aorta). At the base of the aorta, there is an "aortic semilunar valve" that has three leaflets or cusps. It opens to allow blood to leave the left ventricle as it contracts. When the ventricular muscles relax, the valve closes to prevent blood from backing up into the ventricular chamber.

Interventricular Septum

The left ventricle is separated from the right ventricle by the interventricular septum. It is slanted backwards and to the right, and it also curves to the right, which completes the oval of the thick ventricle and encroaches upon the chamber of the right ventricle. The greater part of it is thick and muscular. The upper portion, which separates the aortic vestibule from the lower part of the right atrium and the upper part of the right ventricle, is much thinner and is fibrous.

Ventricles

Internally, the heart is divided into four hollow chambers, two on the left and two on the right. The lower chambers, the "ventricles," force blood out of the heart into the arteries to be carried back to the various sites throughout the body. The right ventricle has a much thinner wall than the left ventricle. This chamber pumps blood a fairly short distance to the lungs. The left ventricle, however, must force blood to all other parts of the body against a great flow of resistance, so the walls are stronger.

Chordae Tendinae

Strong, fibrous strings, called "chordae tendinae," are attached to the leaflets (or cusps) of the heart on the ventricular side; i.e., the lower chamber. These strings originated from small mounds of muscle tissue, the "papillary muscles," which project inward from the walls of the ventricle. When the cusps close, the chordae tendinae prevent them from swinging back into the atrium cavity (the upper chamber).

INSIDE THE HEART

Tasks:

1. *Write the main idea of the text.*

2. *Discuss: "Left Atrium", "Right Atrium", "Aortic Valve", "Interventricular Septum","Chordae tendine".*

A good majority of the heart consists of a special type of muscle which works like a pump and contracts automatically to send blood to the lungs and the rest of the body. The inside of the heart is made up of four chambers: an upper chamber on the right and left sides and a lower chamber also on the right and the left sides. Each half of the heart consists of an upper chamber (called the atrium) and a larger lower chamber (called the ventricle). Several large blood vessels emerge from the top and sides of the heart and deliver blood into the atrium or carry the blood out through the ventricles. As the heart relaxes, both atrium chambers fill with blood: nonoxygenated blood comes into the right side from the body's main veins and oxygenated blood returns to the left side after a trip to the lungs. The heart valves open and the atria force the blood into the ventricles. The ventricles then contract to pump the nonoxygenated blood through another valve into the lungs and the oxygenated blood through a valve into the body's main circulatory system. The atria relax to once more fill with blood to restart the cycle. As the valves slap shut to prevent the blood's backflow, they make a noise. Most of us have heard the noise: it is the "lub-dub" sound a heartbeat which is romanticized in drama and literature.

TYPES OF CELLS IN THE BLOOD

Tasks:

1. *Read, translate the following text and write a short summary.*

Erythrocytes (red blood cells). These cells are made in the bone marrow and are important in that they transport oxygen from the lungs through the bloodstream to the cells all over the body. The oxygen is then used up by body cells in the process of converting food to energy (catabolism). Hemoglobin, containing iron, is an important protein in erythrocytes which helps to carry the oxygen as it travels through the blood stream. Erythrocytes also carry away carbon dioxide, a waste product of catabolism of food in cells from the body cells to the lungs where it is expelled in the process of breathing.

Leukocytes (white blood cells). There are several types of leukocytes:

(a) **Granulocytes** are formed in bone marrow. There are three types of granulocytes:

(1) **Eosinophils** are thought to be active and elevated in allergic conditions such as asthma.

(2) **Basophils**. **The** function of basophils in the body is unclear.

(3) **Neutrophils** are called **polymorphonuclear leukocytes (poly** = many; **morpho=** shape or form) because the nucleus has many forms or shapes. The function of polymorphonuclears is defense of the body against bacteria by means of phagocytosis.

(b) **Agranulocytes** are produced by lymph nodes and spleen. There are two types of agranulocytes:

(1) **Lymphocytes** fight disease by producing antibodies and thus destroying foreign material.

(2) **Monocytes** ingest (phagocytose) and destroy foreign material.
Platelets or **thrombocytes.** These tiny cells, formed in the bone marrow, are necessary for blood clotting.

SPLEEN

Tasks:

1. *Read and translate the text.*

The spleen is the largest of the lymphoid tissues. It is just about the size of the heart and is a spongy material which will hold up to .3 gallons of blood. It is located on the left side of the body, just behind the stomach. The spleen is a valuable organ which produces some of the white blood cells, filters the blood, destroys old, worn-out red blood cells and returns needed iron to the blood, disposing of the rest as waste. The spleen also stores excess blood for emergencies; for example, when oxygen in the circulatory system is short. We often hear that the victim of an auto accident has had a ruptured spleen which has been removed surgically. Because the spleen is so soft and spongy, it cannot be repaired by surgery, so it is removed to stop the loss of blood.

VEINS

Tasks:

1. *Read and make up 3-4 questions on the text and get ready answer them.*

Internally, the heart is divided into four hollow chambers, two on the left and two on the right. The upper chambers, called "atria," have relatively thin walls and receive blood returning through the veins. The lower chamber, the "ventricles," force blood out of the heart into the arteries to be carried back to the various sites throughout the body. Veins are responsible for returning blood to the heart after exchanges of gases, nutrients, and wastes have been made between the blood and the body cells. Veins begin when capillaries merge into venules, the venules into small veins, and the small veins merge into larger ones. They are harder to follow than the arteries, because these vessels are interconnected with irregular networks, so that many small unnamed venules may join to form a larger vein. On the other hand, larger veins typically parallel the courses taken by named arteries, and the veins are often given the same name as the companion arteries. The veins from all parts of the body (except from the lungs back to the heart) converge into two major paths that lead to the right atrium of the heart. These veins are the "superior vena cava" and the "inferior vena cava."

DISORDERS OF THE HEART AND BLOOD VESSELS

Tasks:

1. *Read the text and write a medical terms out from the text.*
2. *Say what the text deal with.*

Because of the constant activity of the heart and blood vessels, there is a wide range of potential problems and disorders. The two most common disorders are coronary artery disease, the principal cause of heart attack, and hypertension. Yet there are other kinds of problems that can affect the health of the valves, the heart muscle, the rhythm of the heart, or the ability of your blood vessels to circulate the blood to your tissues. Some problems, called congenital, are present at birth; others occur as the result of infection, hereditary factors, problems with the action of thyroid hormone on your heart, lung diseases that affect your heart, or trauma.

In the following pages, we will consider individually several dozen heart and blood vessel disorders, as well as some of the remarkable advances made in recent years in diagnosis and treatment for heart and circulatory problems. But before considering the problems, it is important to understand something about the basic interaction between the lives we lead and our health.

What we eat, our exercise patterns, whether we smoke, and a number of other lifestyle considerations have an impact on the health of our hearts as well as on other organ systems. So we will begin with the risk factors for coronary artery disease and what we can do to use that knowledge for longer, healthier lives.

Your primary care physician may treat some heart and circulatory disorders. However, your physician may refer you to a cardiologist, a specialist who has had additional training in the diagnosis and management of heart and blood vessel disorders.

CORONARY ARTERY DISEASE

Tasks:

1. *Make up 3-4 questions on the text.*

Coronary artery disease is our nation's leading cause of death, accounting for about 600,000 deaths each year. Although the condition may develop slowly over many years, its impact is instantaneous in nearly a third of the cases—death, without warning, is its only manifestation.

The blood vessels (coronary arteries) that provide oxygen and nutrients to the muscles of the heart are small. These arteries encircle the heart like a crown (hence the name "coronary") and send branches downward to the tip of the heart. In coronary artery disease, there is a buildup of material—cholesterol, scar tissue, calcium, and other substances— in the lining of these arteries. This accumulation, called atheromatous plaque, is the principal characteristic of atherosclerosis. The effects can vary, from recurring chest pain called angina to congestive heart failure and heart attack.

Atherosclerosis usually occurs in a somewhat irregular fashion, so there will be considerably more narrowing at some points than at others. The roughening of the.lining of the arteries over the atheromatous plaques favors the development of a blood clot. Usually, in a heart attack, the final closure of the narrowed segment occurs as the result of a clot forming in this location.

The same factors (for example, smoking, high blood cholesterol levels, high blood pressure) that contribute to develop of atherosclerosis in other parts of the body also favor occurrence of atherosclerosis coronary arteries.

ANGINA PECTORIS

Tasks:

1. *Read and describe the text "Angina pectoris". Prove that: "Angina usually occurs during exertion, severe emotional stress, or after a heavy meal".*

Signs and Symptoms

- Pain (tight, band-like, crushing, suffocating sensation) that usually is centered beneath the breastbone (sternum) and may spread to the throat, jaw, or one arm
- Sensation of heaviness or tightness that is less than pain
- Attacks generally brought on by exercise or emotional stress

Angina pectoris gets its name from the nature of the pain: the Latin *angere* for "choke" describes the characteristic suffocating sensation, and *pectoralis* for "chest," where it is located.

The discomfort usually lasts for a minute or two, sometimes as long as 10 to 15 minutes. The pain may be severe and may be accompanied by a constricting feeling behind the breastbone (sternum) that may extend into the throat, jaw, or one arm. It may also be a mild heaviness, tightness, or burning discomfort.

Angina usually is brought on by exertion such as heavy lifting, sexual activity, or strenuous exercise. It is relieved by rest. Extreme cold or emotion such as intense fear, anger, grief, or frustration can cause it, as can ingestion of a heavy meal.

Angina is the direct result of insufficient blood reaching your heart muscle (ischemia). When you exert yourself, your heart requires more oxygen to do the extra work. When the coronary arteries that serve your heart are narrow and unable to accommodate the increase in flow of blood demanded by the exercise, nerves in your heart transmit pain messages to your brain.

Angina is a symptom, not a disorder. It can be the result of arteries narrowed by a passing spasm. More likely, a limitation of blood flow is the result of atherosclerosis, in which the arteries are narrowed by an accumulation of deposits of fatty plaque.

ANGINA

Tasks:

1. *Write a short comprehension of the text.*

Chest pain is a common symptom which can be caused by many different conditions. Some causes of chest pain require prompt medical attention, such as angina, heart attack, or tearing of the aorta. Other causes of chest pain can be evaluated electively, such as spasm of the esophagus, gallbladder attack, or inflammation of the chest wall. Therefore, an accurate diagnosis is important in providing proper treatment to patients with chest pain. The diagnosis and treatment of angina is discussed below, as well as the diagnosis of other causes of chest pain that can mimic angina.

Angina *(angina pectoris - Latin for squeezing of the chest) is the chest discomfort that occurs when the blood oxygen supply to an area of the heart muscle does not meet the demand.* In most cases, the lack of blood supply is due to a narrowing of the coronary arteries as a result of arteriosclerosis (see below). Angina is usually felt as a squeezing, pressure, heaviness, tightening, or aching across the chest, particularly behind the breastbone. This pain often radiates to the neck, jaw, arms, back, or even the teeth. Patients may also complain of indigestion, heartburn, weakness, sweating, nausea, cramping, and shortness of breath. Angina usually occurs during exertion, severe emotional stress, or after a heavy meal. During these periods, the heart muscle demands more blood oxygen than the narrowed coronary arteries can deliver. Angina typically lasts from 1 to 15 minutes and is relieved by rest or by placing a nitroglycerin tablet under the tongue. Nitroglycerin relaxes the blood vessels and lowers blood pressure. Both resting and nitroglycerin decrease the heart muscles demand for oxygen, thus relieving angina.

The most common cause of angina is coronary artery disease. A less common cause of angina is spasm of the coronary arteries. Coronary arteries supply oxygenated blood to the heart muscle. Coronary artery disease develops as cholesterol is deposited in the artery wall, causing the formation of a hard, thick substance called cholesterol plaque. The accumulation of cholesterol plaque over time causes narrowing of the coronary arteries, a process called arteriosclerosis. Arteriosclerosis can be accelerated by smoking, high blood pressure, elevated cholesterol, and diabetes. When coronary arteries become narrowed by more than 50% to 70%, they can no longer meet the increased blood oxygen demand by the heart muscle during exercise or stress. Lack of oxygen to the heart muscle causes chest pain (angina).

CONGENITAL HEART FAILURE

Tasks:

1. Read, translate and discuss the text.

Signs and Symptoms

• Swelling (edema) in the ankles; if bedridden, swelling in lower portions of back

• Breathlessness
• Weakness and fatigue

Congestive heart failure is a serious condition in which your heart loses its pumping efficiency. At times this can be life-threatening. In the most common forms, the heart fails to pump blood effectively. This decreases blood flow to tissues and organs throughout the body.

With failure of the left side of the heart, blood backs up into the lungs, which causes them to become congested with fluid. This congestion is responsible for the sensation of breathlessness which is common in congestive heart failure.

If the right side of the heart fails, blood backs up into the legs and into the liver, which becomes congested. This produces a swelling (edema) that usually is most obvious in the lower legs and ankles. Often both left and right sides of the heart fail simultaneously.

Lack of adequate blood flow to the kidneys leads to accumulation of excess fluid and water in your body, an additional factor that increases the edema. Inadequate blood flow to the muscles reduces endurance. Therefore, people with congestive heart failure often experience early fatigue when they exert themselves physically.

The loss of pumping efficiency of the heart in congestive heart failure may be the result of weakened muscle tissue in the heart due to damage from a heart attack, of diseases directly affecting the heart muscle, of a mechanical problem in the valves of the heart, of prolonged high blood pressure, or of external constriction of the heart.

DISORDERS OF HEART RATE AND RHYTHM

Tasks:

1. *Skim through the text and define its main idea, choose the key sentences.*

The pumping of your heart must be constant and continuous; if the process becomes disordered or interrupted, your heart may fail to deliver the blood your tissues require for life.

Your heart itself is essentially two pumps, each of which consists of a pair of hollow chambers formed of involuntary muscle. The contraction of the muscle causes blood to be pumped.

The control mechanism for the heart rate involves electrical impulses. One of the four chambers of the heart, the right atrium, contains a group of cells called the sinus node. The sinus node acts as a pacemaker, producing electrical impulses that signal the muscle of the heart to contract in the pumping cycle.

Your heart rate varies depending on your activity at any given moment. When you are at rest, your heart pumps more slowly and at a regular rate, about 60 to 80 beats a minute. When you run, climb stairs, or otherwise exert yourself, the sinus node issues electrical "instructions" to increase the pace of your heart in order to provide your muscles and other tissues with the necessary additional blood

and its supply of oxygen. Your heart rate may increase up to 200 beats a minute if you exert yourself strenuously.

If something goes wrong with the functioning of the sinus node and the normal pacing of your heart is disturbed, one of a number of rhythmic disorders of the heart may occur. Too rapid a heartbeat is termed tachycardia; too slow a heart rate is bradycardia (брадикардия, пониженная частотность сердечных сокращений).

Your heart rate may be affected by various factors including tobacco use, caffeine-containing foods, alcohol, and a number of drugs, both prescription and nonprescription. In addition, the cardiac disorders discussed in the following pages may produce heart rate problems.

HEART ARRHYTHMIAS

Tasks:

1. *Read and translate the following text. Make up a dialog according to and get ready to act in a part of Doctor or Patient the text.*

Signs and Symptoms

- None
- Palpitations or skipped heartbeats
- Spells of light-headedness or unconsciousness
- Chest discomfort
- Shortness of breath

If the rhythm of the beat of the heart is disturbed, the problem is termed arrhythmia. Depending on the nature of the arrhythmia, the symptoms vary. You may be entirely unaware of the problem or you may experience one or more of the symptoms listed above.

Almost everyone experiences an occasional skipped heartbeat or minor palpitation. In general, such an event is not an indication of a problem. However, if the discomfort is great or if the problem recurs, consult your physician. The problem may be quite minor or it may be serious; no treatment may be necessary, or a regimen of medication or other intervention may be required. Your physician's approach will depend on your age, physical condition, presence of underlying heart disease, and the precise nature of the disorder.

Ectopic Atrial Heartbeat

Greek *ektopos* for "misplaced"). This problem involves a small variation in an otherwise normal pulse. In fact, the old cliche "my heart skipped a beat" may well have been coined to describe an ectopic heartbeat.

An ectopic atrial heartbeat is often termed extrasystole. The extrasystole may show up on a routine electrocardiogram.

DISORDERS OF THE HEART

Tasks:

1. *Write a translation without using a dictionary.*

The human heart consists of four chambers and four valves. Two of the valves (the mitral and tricuspid valves) regulate the flow of blood from the upper chambers (the atria) to the ventricles (the pumping chambers); the other two valves (aortic and pulmonary valves) regulate the flow of blood out of the ventricles for circulation to other parts of the body. The valves allow blood to flow in only one direction.

The mitral valve links the atrium to the ventricle on the hearts left side; also on the left the aortic valve opens to allow blood into the main artery for the body, the aorta. On the right side, it is the tricuspid valve that regulates flow from the atrium to the ventricle and the pulmonary valve that allows blood to exit from the heart to the lungs via the pulmonary artery.

Each valve consists of two or three thin folds of tissue. When closed, the valve prevents blood from flowing to the next chamber or from returning to the previous one.

When the valve opening becomes narrowed and flow through it is limited, the condition is termed stenosis. Each of the heart's valves may be subject to stenosis or obstruction. In some cases, a valve will lose its shape and begin to sag (prolapse) or will fail to dose completely, causing a backflow of blood (regurgitation).

Valve problems may occur as a result of infection, congenital abnormality, or other causes. In the following pages, we will discuss a range of such disorders.

PROGRESSIVE OF ATHEROSCLEROSIS SLOWER IN CARDIOVASCULARLY FIT MEN

Tasks:

1. *Read the text and discuss it.*

NEW YORK, Jan 10 (Praxís Press). A prospective, population-based study finds that atherosclerosis progresses more slowly in middle-aged men who have a high baseline level of cardiorespiratory fitness. Lakka and colleagues measured maximal oxygen uptake and collected information about physical activity level in 854 men aged 42 to 60 years; they evaluated the extent of atherosclerosis in these men at baseline and 4 years later using B-mode ultrasonography of the carotid arteries. The data were adjusted for potential confounding factors, including age, technical covariates (including the sonographer, pravastatin treatment, and follow-up time), and cigarette smoking. Baseline maximal oxygen uptake was inversely association with 4-year increases in maximal intima-media thickness (IMT), plaque height, surface roughness, and mean IMT. When the data were further adjusted for systolic blood pressure, serum apolipoprotein B levels, diabetes, and plasma fibrinogen levels, maximal oxygen uptake was still significantly associated with 4-year increases in maximal IMT, plaque height, and surface roughness. Men

in the lowest quartile of maximal oxygen uptake (<26.1 mL/kg per minute) had larger increases in maximal IMT (23% greater), surface roughness (31% greater), and mean IMT (100% greater) when compared with men in the highest quartile (>36.2 mL/kg per minute). Interestingly, none of the components of baseline physical activity (total activity, conditioning activity, nonconditioning activity, and walking or cycling to work) were significantly associated with the 4-year progression of atherosclerosis. These findings suggest that cardiorespiratory fitness has independent prognostic value in middle-aged men with early atherosclerosis.
The walls of the arteries are surrounded by muscle fibers. Rapid contraction of these muscle fibers causes a sudden narrowing (spasm) of the arteries. A spasm of the coronary arteries reduces blood to the heart muscle and causes angina. Angina as a result of a coronary artery spasm is called "variant" angina or Prinzmetal angina. Prinzmetal angina typically occurs at rest, usually in the early morning hours. Spasms can occur in normal coronary arteries as well as in those already narrowed by arteriosclerosis.

Angina is usually a warning sign of the presence of significant coronary artery disease. Patients with angina are at risk of developing a heart attack (myocardial infarction). A heart attack is the death of heart muscle precipitated by the complete blockage of a diseased coronary artery by a blood clot.

During angina, the lack of oxygen (ischemia) to the heart muscle is temporary and reversible. The lack of oxygen to the heart muscle resolves and the chest pain disappears when the patient rests. The muscle damage in a heart attack is permanent. The dead muscle turns into scar tissue with healing. A scarred heart cannot pump blood as efficiently as a normal heart, and can lead to heart failure.
Up to 25% of patients with significant coronary artery disease have no symptoms at all, even though they clearly lack adequate blood and oxygen supply to the heart muscle. These patients have "silent" angina. They have the same risk of heart attack as those with symptoms of angina.

The resting electrocardiogram (EKG) is a recording of the electrical activity of the heart muscle, and can detect heart muscle which is in need of oxygen. The resting EKG is useful in showing the changes which are caused by a heart attack. It is less useful in patients with angina, since the chest pain and lack of oxygen supply to the heart only become evident during exertion or excitement.

In patients with a normal resting EKG, exercise treadmill or bicycle testing can be useful screening tools for coronary artery disease. During an exercise treadmill test, EKG recordings of the heart are performed continuously as the patient undergoes increasing levels of exercise. The occurrence of chest pain during exercise can be correlated with changes on the EKG which demonstrate the lack of oxygen to the heart muscle. When the patient rests, the angina and the changes on the EKG which indicate lack of oxygen to the heart can both disappear. The accuracy of exercise treadmill tests in the diagnosis of significant coronary artery disease is 60% to 70%.

A newly developed computerized x-ray scan (ultrafast CT scan) is highly accurate in detecting small amounts of calcium in the plaque of coronary arteries. If an ultrafast CT scan shows no calcium in the arteries, atherosclerotic coronary

artery disease is unlikely. Therefore, ultrafast CT scanning is useful in evaluating chest pain in younger patients (men under 40 and women under 50 years old). Since young people do not normally have significant coronary artery plaque, a negative ultrafast CT scan makes the diagnosis of coronary artery disease unlikely. However, finding calcium by this method is less meaningful in older patients who are likely to have mild plaquing simply from the aging process.

Even though an ultrafast CT scan is useful in detecting calcium in plaque, it cannot determine whether the calcium-laden plaque actually causes artery narrowing and reduces blood flow. For example, a patient with a densely calcified plaque causing minimal or no artery narrowing will have a strongly positive ultrafast CT scan but a normal exercise treadmill test. In most patients who are suspected of having angina due to coronary artery disease, an exercise treadmill study is usually the first step in determining whether any plaque is clinically significant.

Magnetic resonance imaging (MRI), using magnetism and radio waves, can be used to image (produce a likeness of) the blood vessels. Currently, the larger vessels, such as the carotid arteries in the neck, can be imaged using this technique. Over the next 5 to 10 years, software and hardware improvements may allow screening of the heart's arteries with magnetic resonance testing.

2. *Answer the following questions:*

1. What is angina?
2. What causes angina?
3. Why is it important to establish the diagnosis of angina?
4. How is angina diagnosed?
5. What are other causes of chest pain?
6. How does the doctor make a diagnosis in patients with chest pain?
7. What are the treatment options for angina patients?
8. What's new in the evaluation of angina?

CHEST X-RAY

Tasks:

1. *Read the text and translate it.*

A **chest x-ray** is a radiology test that involves exposing the chest briefly to radiation to produce an image of the chest and the internal organs of the chest. An x-ray film is positioned against the body opposite the camera, which sends out a very small dose of a radiation beam. As the radiation penetrates the body, it is absorbed in varying amounts by different body tissues. Bones, for example, absorb much of the x-ray radiation while lung tissue absorbs very little, allowing most of the x-ray beam to pass through the lung. Due to the differences in their composition (and, therefore, varying degrees of penetration of the x-ray beam), the lungs, heart, aorta, and bones of the chest each can be distinctly visualized. The x-

ray film records these differences to produce an image of body tissue structures. A chest x-ray can be used to define abnormalities of the lungs such as excessive fluid, pneumonia, bronchitis, asthma, cysts, and cancers. Heart abnormalities, including fluid around the heart (pericardial effusion), an enlarged heart, heart failure, or abnormal anatomy of the heart can be revealed on the films. Certain bony structures of the chest, and broken bones or abnormalities of the bones of the spine (vertebrae) in the chest can often be seen. A chest x-ray is a safe procedure which is commonly used both in annual physical exams and evaluations of patients before certain surgical operations.

Patients obtaining a chest x-ray will often be requested to use an x-ray gown, and extra metallic objects such as jewelry are removed from the chest and/or neck areas. These objects can block x-ray penetration, making the result less accurate. Patients may be asked to take a deep breath and hold it during the chest x-ray in order to inflate the lungs to their maximum, which increases the visibility of different tissues within the chest. The chest x-ray procedure often involves a view from the back to the front of the body as well as a view from the side. Occasionally, different angles are added in order for the radiologist to interpret certain specific areas of the chest. The radiology technologist is a trained, certified assistant to the radiologist who will help the patient during the x-ray and actually perform the x-ray test. After the chest x-ray is taken and recorded on the x-ray film, the film is placed into a developing machine, and this picture (which is essentially a photographic negative) is examined and interpreted by the radiologist.

Chest x-rays expose the patient briefly to a minimum amount of radiation. Any radiation exposure has some risk to the tissues of the body. The radiation exposure in a chest x-ray is minimized by the type of x-ray high-speed film, which does not require as much radiation exposure as in the past. The radiology technician is guided by technique standards which have been established by national and international guidelines. These guidelines are designed and reviewed by both the Department of Health and Human Services and national and international radiology protection councils. Women who are pregnant, especially in early pregnancy, should notify their physicians, as the fetus is at risk for harm with any radiology technique.

A radiologist is a physician specialist trained to interpret images of the body produced on film. After the radiologist reviews the chest x-ray, occasionally further images or angles are necessary and obtained. Once all the films have been reviewed by the radiologist, a report is generated which is transmitted to the ordering practitioner. The practitioner then can review the results of the chest x-ray with the patient as it relates to their particular symptoms or condition.

2. *Retell the text according to the plan:*

- A chest x-ray is most commonly used to detect abnormalities in the lungs, but can also detect abnormalities in the heart, aorta, and the bones of the thoracic area.

- Extra metallic objects, such as jewelry are removed from the chest and neck areas for a chest x-ray to avoid interference with x-ray penetration and improve accuracy of the interpretation.

3. *Answer the following questions:*

1. What is a chest x-ray?
2. How is the procedure performed?
3. What are the risks of a chest x-ray?
4. How does the patient obtain the results of the x-ray?

HEART ATTACK PATHOLOGY
(Photo Essay)

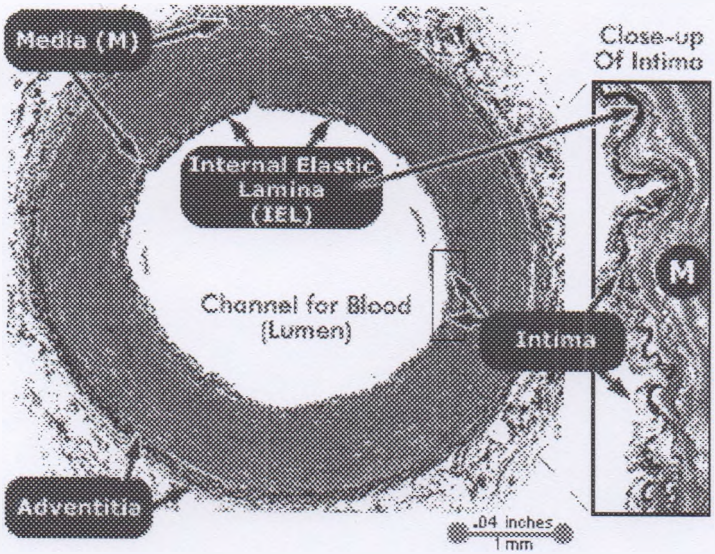
Tasks:

1. *Read the following text, translate it. Speak about the most serious complications after heart attack . Write the key sentences out and get ready answer them.*

A heart attack is a layperson's term for a sudden blockage of a coronary artery. This blockage, which doctors call a coronary artery occlusion, may be fatal, but most patients survive it. Death can occur when the occlusion leads to an abnormal heartbeat (severe arrhythmia) or death of heart muscle (extensive myocardial infarction). In both of these situations, the heart can no longer pump blood adequately to supply the brain and other organs of the body. Almost all heart attacks occur in people who have coronary artery disease (coronary atherosclerosis). So, this photo essay will review the structure (anatomy) of the normal coronary artery, the structural abnormalities (pathology) of the coronary artery in atherosclerosis, and the effect of these abnormalities on the heart.

The coronary arteries carry blood to the heart to supply oxygen and necessary nutrients. As seen in **Figure 1,** the wall of a coronary artery has 3 distinct layers: the inner (intima), middle (media), and outer (adventitia) layers. The wall of the artery surrounds the lumen of the artery, which is the channel through which blood flows.

Figure 1: Normal Coronary Artery
Cross-sectional Microscopic View



In **Figure 1,** smooth muscle is red, and connective (supporting) tissue is black (elastic) or blue (collagen).

The **intima** is best seen in the **close-up view in Figure 1.** It is composed of a layer of so-called endothelial cells that covers the artery's inner (lumenal) surface, connective (supporting) tissue (collagen and elastin), and a layer of compact elastic tissue called the internal elastic lamina (IEL). In the past, the intima was thought to be simply a passive layer whose major purpose was to serve as a barrier. Now, however, we know that the endothelial cells actually keep track of the pressure, flow, and "health" of the artery. Moreover, endothelial cells secrete chemicals that can adjust the function of the artery (e.g., vasodilator chemicals to widen and vasoconstrictors to narrow it) and growth of the artery wall (e.g., growth factors). T he **media** (M) is a layer made up primarily of smooth muscle cells (SMCs). The muscle can contract and relax to control the blood pressure and flow in the artery. Elastic tissue and collagen in the media, along with elastic tissue in the IEL, increase the elasticity and strength of the wall of the artery, as the artery contracts and relaxes. The adventitia is a layer of connective tissue and cells (e.g., SMCs) that produce this connective tissue.

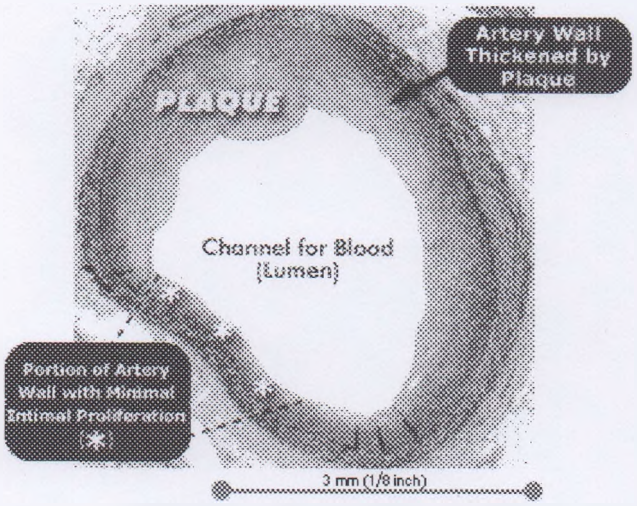
The **adventitia** contains potent factors, including one called tissue thromboplastin, that promote blood clotting. The clots are useful when the artery becomes injured because they can limit excessive bleeding from the injured artery. In coronary artery disease (coronary atherosclerosis), injury to the intima of the artery leads to the formation of plaques, which are regions of thickening on the inner lining of the artery. How then do the plaques form? In response to the injury, the smooth muscle cells (SMCs) from the media and perhaps from the adventitia move (migrate) into the intima. In the intima, these SMCs reproduce themselves (divide) and make (synthesize) connective tissue. These processes of migration, division, and synthesis, which collectively are referred to as intimal proliferation (buildup), cause thickening of the intima. When cholesterol, other fats, and inflammatory cells, such as white blood cells, enter the proliferating, thickened intima, the result is an atherosclerotic plaque. Then, as these plaques grow, they

accumulate scar (fibrous) tissue and abundant calcium. (Calcium is the hard material in our teeth and bones.) Hence, the plaques are often hard, which is why atherosclerosis is sometimes referred to as "hardening of the arteries."

Most adults have some plaques (atherosclerosis) on the inner (lumenal) surface of their coronary arteries. Even young adults in their 20s usually have coronary arteries that exhibit localized (focal) thickening of the intima. This thickening is the beginning of intimal proliferation and plaque formation. The distribution, severity (amount of plaque), and rate of growth of the plaques in the coronary arteries vary greatly from person to person. **Figure 2** shows a coronary artery with an uneven (asymmetric), stable atherosclerotic plaque. A stable plaque may grow slowly, but has an intact inner (lumenal) surface with no clot (thrombus) on this surface.

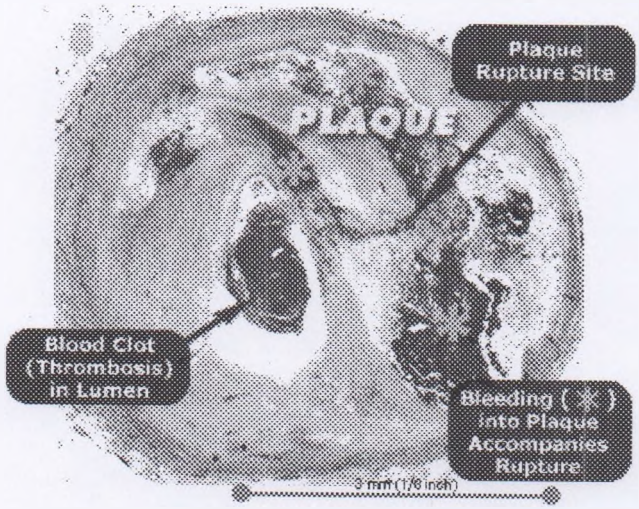
Figure 2: Coronary Artery with Stable Atherosclerotic Plaque

Cross-sectional Microscopic View



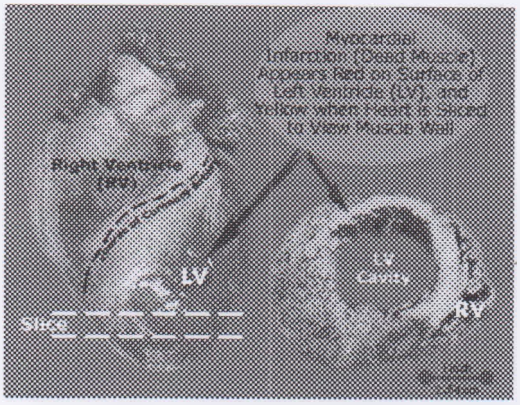
Rupture of a stable plaque in a coronary artery is the initial pathological event leading to a heart attack. When the rupture occurs, a clot suddenly forms in the lumen (channel) of the artery at the site of the rupture. Bleeding into the plaque often accompanies the rupture. The clot then blocks (occludes) the artery and thereby decreases the blood flow to the heart. This sequence of events in the coronary arteries is the basic problem in over 75% of people who suffer a heart attack. **Figure 3** shows an atherosclerotic plaque rupture and a clot in a coronary artery.

Figure 3: Rupture of Atherosclerotic Plaque in Coronary Artery
Cross-sectional Microscopic View



According to medical studies, 50% to 75% of people survive their first heart attack The others die during the heart attack because the decreased coronary blood flow causes a severe abnormal heart rhythm or extensive death of heart muscle. **Figure 4** shows the heart of a patient who died 5 days after a heart attack. The photos show his myocardial infarction as it appears on the surface of the left ventricle and when the heart is sliced to view the muscle wall. About 90% of myocardial infarctions involve only the left ventricle (LV), which pumps oxygen-rich blood that comes from the lungs to the entire body. The other 10% also involve the right ventricle (RV), which pumps the blood to the lungs.

Figure 4: Myocardial Infarction Caused by Heart Attack
Views of Heart Surface and Slice Across Heart

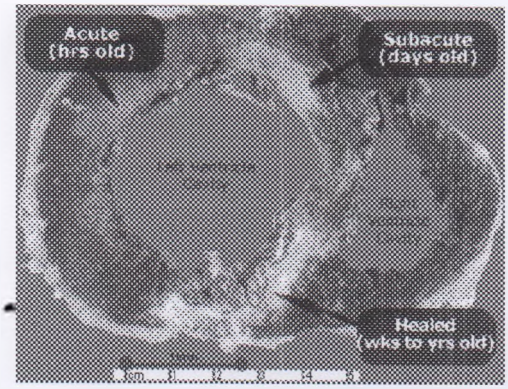


If a person survives a heart attack, the heart muscle may return to normal or become a region of dead heart muscle (the myocardial infarction). The amount and health of the remaining heart muscle is the major determinant of the future quality of life and longevity for a patient after a heart attack. A heart attack can interrupt the normal electrical wiring of the heart, leading to abnormal heart rhythms. The heart attack can also weaken the pumping action of the heart causing shortness of breath due to heart failure. Each of these complications of a heart attack can occur at any time during the recovery period as a result of dead, dying, or scarring heart muscle.

Yes. Not uncommonly, people with coronary artery disease have more

than one heart attack over the years. In fact, by looking at the heart tissue at autopsy, pathologists can tell when myocardial infarctions occurred. Thus, very recent (acute, hours old) infarctions may appear as a pale brown region, infarctions days old (subacute) appear yellow, and healed (weeks to years old) infarctions appear as white scars in the heart muscle. **Figure 5** shows three myocardial infarctions of different ages in the muscle of a left ventricle.

Figure 5: Three Myocardial Infarctions of Different Ages Slice Across Heart Ventricles



2. *Give a short summary of the text paying attention to the following questions:*

1. What is a Heart Attack?
2. What are the structures and functions of a normal coronary artery?
3. What happens to the coronary artery in atherosclerosis?
4. Who gets coronary artery plaques and what happens to the plaques?
5. What causes a Heart Attack?
6. What happens to the heart muscle after a person survives a Heart Attack?
7. Can a person have more than one Heart Attack?

HEART ATTACK

Tasks:

1. *Read the text and make up 6-8 questions on it and get ready to answer them.*

2. *Write the most common symptoms out of Heart Attack .*

Coronary artery disease is atherosclerosis (in lay terms, "hardening of the arteries") of the blood vessels that feed blood to the heart. Coronary artery disease leads to heart attacks and is the leading killer in the United States. The primary risk factors for coronary artery disease are diabetes, male gender, family history of coronary disease at an early age, smoking, elevated blood pressure (hypertension), high LDL cholesterol, and low HDL cholesterol. The control of diabetes and blood pressure has resulted in a small benefit in preventing heart attacks. On the other

hand, stopping smoking has resulted in a significant reduction in heart attack risk. Additionally, the treatment of elevated cholesterol, particularly with the statin class of drugs such as pravastatin (Pravachol), lovastatin (Mevacor), and others, has significantly reduced the rate of death from heart disease. However, these factors do not fully account for all of the risks for coronary disease since some patients without any of the above risk factors may develop heart attacks. In recent years, other risk factors that increase the risk for coronary artery disease have been identified. These include a high serum homocysteine level and certain subtypes of LDL cholesterol. Attention has focused on the treatment of those risk factors that can be improved. Following is a comprehensive review of causes and prevention of atherosclerosis and heart attacks.

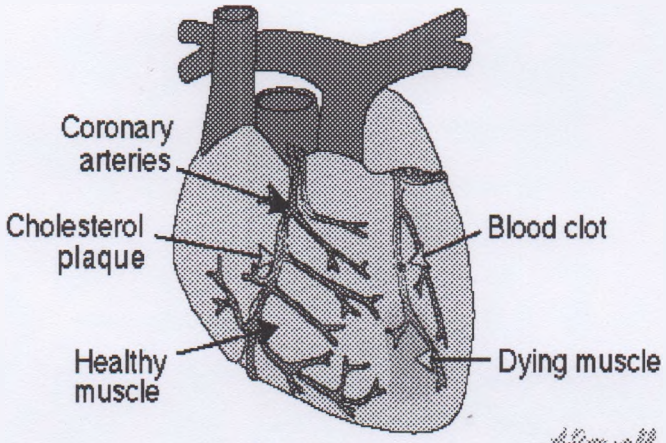
Atherosclerosis is a gradual process whereby hard cholesterol substances (plaques) are deposited in the walls of the arteries. Cholesterol plaques cause hardening of the artery walls and narrowing of the inner channel (lumen) of the artery. Arteries carry blood that is enriched with oxygen and nutrients to the vital organs such as the brain, heart, kidneys, and liver. Arteries also transport blood to other tissues such as the fingers, toes, nerves, bones, skin, and muscles. Healthy arteries can deliver an ample supply of blood to the organs and tissues. In contrast, arteries that are narrowed by atherosclerosis have difficulty delivering blood to the parts of the body they supply. For example, atherosclerosis of the arteries in the legs causes poor circulation in the lower extremities. Poor circulation in the lower extremities can lead to pain while walking or exercising, deficient wound healing, and/or leg ulcers. Atherosclerosis can also cause the complete blockage of an artery from a blood clot. Complete blockage of an artery interrupts oxygen supply, resulting in tissue injury or death. Thus, the blockage of an artery that furnishes blood to the brain can lead to stroke (death of brain tissue), and the blockage of the arteries to the heart can result in a heart attack (death of heart muscle), also called myocardial infarction, or MI. Coronary atherosclerosis refers to the hardening and narrowing of the coronary arteries. Coronary arteries supply the blood that carries oxygen and nutrients to the heart muscle. When coronary arteries are narrowed or blocked by atherosclerosis, they cannot deliver an adequate amount of blood to the heart muscle. Disease caused by the lack of blood supply to heart muscle is called coronary artery disease. Coronary artery disease (CAD) includes heart attacks, sudden unexpected death, chest pain (angina), abnormal heart rhythms, and heart failure due to weakening of the heart muscle.

Angina pectoris is chest pain or pressure that occurs when the oxygen supply to the heart muscle cannot keep up with demand. Most commonly, the inadequate supply of oxygen is due to narrowing of the coronary arteries by atherosclerosis. When coronary arteries are narrowed by more than 50% to 70%, the arteries cannot increase the supply of blood to the heart muscle during exertion or other periods of high oxygen demand. An insufficient supply of oxygen to the heart muscle causes chest pain (angina). Chest pain that occurs with exercise or exertion is called exertional angina. Exertional angina usually feels like a pressure, heaviness, squeezing, or aching across the chest. This pain may travel to the neck, jaw, arms, back, or even the teeth, and may be accompanied by shortness of breath,

nausea, or a cold sweat. Exertional angina typically lasts from 1 to 15 minutes and is relieved by rest or by placing a nitroglycerin tablet under the tongue. Both resting and nitroglycerin decrease the heart muscle's demand for oxygen, thus relieving angina. Exertional angina may be the first warning sign of advanced coronary atherosclerosis. Some individuals experience angina at rest. Angina at rest may be due to a spasm of the coronary arteries (a condition called Prinzmetal's angina). It can also indicate a critical narrowing of the coronary arteries since the heart is not receiving enough oxygen even at rest. Unlike a heart attack, there is no permanent muscle damage with brief angina episodes of either type. A heart attack (myocardial infarction) is the death of heart muscle due to the sudden and complete blockage of a coronary artery by a clot. A coronary artery blockage usually occurs in arteries that contain cholesterol plaques. A plaque can rupture and initiate the formation of a blood clot next to it. A blood clot can completely block blood flow through a coronary artery and deprive the heart muscle of needed nutrients and oxygen. The heart muscle then dies, which produces a heart attack.

Tasks:

1. *Give the definition for the following terms: heart attack; angina pectoris; atherosclerosis; cholesterol; oxygen; blood clot; pain; chest; pressure; cholesterol plaque; coronary arteries; muscle; to cause; to damage; to remove.*



The most common symptom of a heart attack is pain and pressure in the chest that is unrelieved by rest or nitroglycerin. The pain may not be in the chest, but may be felt only in one or both arms, the neck or jaw. Occasionally a heart attack may only manifest as sudden shortness of breath, or may be accompanied by nausea or a cold sweat. In some individuals, a heart attack may be "silent," which means the person does not experience chest pain or pressure and is unaware they are having a heart attack. In survivors of silent heart attacks, doctors can usually detect evidence of prior heart muscle damage by EKG and echocardiogram studies.

We can reduce our risks for atherosclerosis and heart attack by:

- Controlling high blood pressure and diabetes mellitus
- Stopping cigarette smoking
- Exercising regularly
- Losing excess weight
- Lowering blood level of LDL cholesterol
- Increasing blood level of HDL cholesterol
- Lowering blood levels of Lp(a) cholesterol and triglyceride
- Increasing LDL cholesterol particle sizes
- Anti-platelet medications (such as low dose aspirin) to prevent blood clots
- Antibiotics to eradicate chronic infection
- Antioxidants to prevent blood vessel damage
- Folic acid and other B vitamins to decrease blood levels of homocysteine
- Ace inhibitors (such as ramipril, Altace) to prevent arthrosclerosis

Cholesterol *is a fatty substance (a lipid) that is an important part of the outer lining (membrane) of cells in the body of animals.* Cholesterol is also found in the blood circulation of humans. The cholesterol in a person's blood originates from two major sources, dietary intake and liver production. Dietary cholesterol comes mainly from meat, poultry, fish, and dairy products. Organ meats, such as liver, are especially high in cholesterol content, while foods of plant origin contain no cholesterol. After a meal, cholesterol is absorbed by the intestines into the blood circulation and is then packaged inside a protein coat. This cholesterol-protein coat complex is called a chylomicron. The liver is capable of removing cholesterol from the blood circulation as well as manufacturing cholesterol and secreting cholesterol into the blood circulation. After a meal, the liver removes chylomicrons from the blood circulation. In between meals, the liver manufactures and secretes cholesterol back into the blood circulation. Cholesterol, like oil, cannot dissolve in the blood unless it is combined with special proteins called lipoproteins. (Without combining with lipoproteins, cholesterol in the blood will turn into a solid substance.) The cholesterol that is secreted by the liver into the blood is combined either with very low-density lipoproteins (VLDL) or high-density lipoproteins (HDL). VLDL cholesterol is then metabolized in the bloodstream to produce LDL cholesterol. The cholesterol combined with low-density lipoprotein is called LDL cholesterol, and the cholesterol combined with high-density lipoproteins is called HDL cholesterol.

LDL cholesterol is called "bad" cholesterol, because elevated LDL cholesterol is associated with an increased risk of coronary heart disease. LDL lipoprotein deposits cholesterol on the artery walls, causing the formation of a hard, thick substance called cholesterol plaque. Over time, cholesterol plaque causes thickening of the artery walls and narrowing of the arteries, a process called atherosclerosis. Arteries that supply blood and oxygen to the heart muscles are called coronary arteries. When coronary arteries are narrowed by atherosclerosis, they are incapable of supplying enough blood and oxygen to the heart muscle during exertion. Lack of oxygen (ischemia) to the heart muscle causes chest pain, also formation of a blood clot in the artery can clause complete blockage of the

artery, leading to death of heart muscle (heart attack). Atherosclerotic disease of coronary arteries (coronary heart disease) is the most common cause of death in the United States, accounting for about 600,000 deaths annually.

MYOCARDITIS

Myocarditis is inflammation of heart muscle.

Myocarditis can be caused by a variety of conditions such as a virus, sarcoidosis, and immune diseases (such as systemic lupus, etc.), pregnancy, and others. The most common cause of myocarditis is infection of the heart muscle by a virus. Doctors believe that viruses cause the initial muscle inflammation. After the initial viral infection subsides, the body's immune system continues to inflict inflammatory damage on the heart muscles, prolonging the myocarditis, a process termed auto-immunity.

Myocarditis can be mild and cause virtually no noticeable symptoms. When it is more serious, it leads to weakening of the heart muscle. Myocarditis can then cause heart failure (with symptoms of shortness of breath, fatigue, fluid accumulation in the lungs, etc.) as well as heart rhythm irregularities from inflammation and/or scarring of the electrical system of the heart.

The prognosis for longterm damage is not predictable and only becomes evident as the patient is followed by the doctor over time. After the initial phase of myocarditis, some patients can experience significant recovery, others may develop chronic heart failure, and a few patients can develop fulminant heart failure, a fatal condition without heart transplant.

Patients who have had myocarditis are at some risk for sudden unexpected, potentially fatal, heart rhythm abnormalities.

Except in systemic sarcoidosis and immune inflammation (such as from systemic lupus) where myocarditis can respond to corticosteroids, no proven effective medications are currently available for treating myocarditis. Current treatment of myocarditis mainly involves alleviating heart failure (salt restriction, water pills, ACE inhibitors, etc.) and treating as well as monitoring heart rhythm abnormalities.

Tasks:

1. *Answer the following questions:*

1. What is myocarditis?
2. What causes myocarditis?
3. What are symptoms of myocarditis?
4. What is the prognosis (outlook) for patients with myocarditis?
5. How is myocarditis treated?

PALPITATION

Tasks:

1. *Write a translation using a dictionary:*

Palpitations are unpleasant sensations of irregular and/or forceful beating of the heart. In some patients with palpitations, no heart disease or abnormal heart rhythms can be found. Reasons for their palpitations are unknown. In others, palpitations result from abnormal heart rhythms (arrhythmias). Arrhythmias refer to heartbeats that are too slow, too rapid, irregular, or too early. Rapid arrhythmias (greater than 100 beats per minute) are called tachycardias. Slow arrhythmias (slower than 60 beats per minute) are called bradycardias. Irregular heart rhythms are called fibrillations (as in atrial fibrillation). When a single heartbeat occurs earlier than normal, it is called a premature contraction. Abnormalities in the atria, the ventricles, the SA node, and the AV node of the heart can lead to arrhythmias. The atria (right atrium and left atrium) are the upper chambers of the heart. The right atrium receives venous blood from the body and pumps it into the right ventricle. The left atrium receives oxygenated blood from the lung and pumps it to the left ventricle. The ventricles are lower chambers of the heart. Each heart has two ventricles (right and left ventricles). The right ventricle pumps venous blood to the lung, and the left ventricle pumps oxygenated blood to the rest of the body.

The SA node is the pacemaker of the heart and is located in the right atrium. The electrical signals initiated in the SA node are transmitted to the atria and the ventricles to stimulate heart muscle contractions (heartbeats). The AV node is specialized heart tissue which acts as an electrical relay station between the atria and the ventricles. Electrical signals from the SA node and the atria must pass through the AV node to reach the ventricles. When rapid arrhythmias (tachycardias) and premature contractions occur because of abnormal electrical activity of the atria, they are called atrial tachycardias and premature atrial contractions (PACs). When tachycardias and premature contractions occur because of abnormal electrical activity of the ventricles, they are called ventricular tachycardias and premature ventricular contractions (PVCs). Slow arrhythmias (bradycardias) can occur because of slowing of the electrical signals initiated by the SA node, a condition called sinus bradycardia. Bradycardias can also result from varying degrees of "heart block," wherein certain medications or diseases in the electrical conduction system of the heart impedes the transmission of signals from the atria to the ventricles. Premature contractions are isolated heartbeats that occur earlier than expected. The premature contraction is followed by a pause, as the heart electrical system "resets" itself. The contraction following the pause is usually more forceful than normal contractions. The patients frequently perceive these more forceful contractions as palpitations.

The normal resting adult heart beats regularly at an average rate of 60 times per minute. How fast the heart beats (heart rate) is governed by the speed of electrical signals originating from the pacemaker of the heart, the SA node. The

electrical signals from the SA node travel across the atria and cause these two upper heart chambers to contract, delivering blood into the lower heart chambers, the ventricles. These electrical signals then pass through the AV node to reach the ventricles. Electrical signals reaching the ventricles cause these chambers to contract, pumping blood to the rest of the body, generating the pulse. During rest, the speed of electrical signals originating from the SA node is slow, thus the heart beats slowly. During exercise or excitement, the speed of signals from the SA node increases, and heartbeat quickens.

Tachycardia occurring because of rapid firing by the SA node is called sinus tachycardia. Sinus tachycardia is usually a rapid contraction of a normal heart responding to a condition or disease state. Sinus tachycardias can cause palpitations. Causes of sinus tachycardia include pain, fever, excessive thyroid hormone, exertion, excitement, low blood oxygen level (hypoxia), caffeine, and drugs such as cocaine and amphetamines. Under these circumstances, sinus tachycardia represent "appropriate" responses of the heart to stress and stimulation, and do not reflect underlying diseases of the heart muscle, heart valves and electrical conduction system. In some other patients, however, sinus tachycardia may be a symptom of heart failure or significant heart valve disease.

Arrhythmias are pattern and/or speed changes from the normal heart rhythm. Some patients are totally unaware of their arrhythmias. Others may report symptoms, such as palpitations, skipping or fluttering sensations, dizziness, fainting, shortness of breath, or chest pain.

In both tachycardias and bradycardias, lack of blood flow to the brain, the coronary arteries, or the rest of the body can occur. Lack of blood flow to the brain can cause dizziness or loss of consciousness (syncope). Lack of blood supply to the coronary arteries can cause chest pain or pressure (angina). Inadequate blood supply to the rest of the body can cause weakness and shortness of breath.

In some patients, arrhythmias are caused by diseases of the heart muscle, valves or coronary arteries. In others, arrhythmias can reflect disease of the electrical system of the heart only, while the rest of the heart is healthy. Other causes of arrhythmias include medications, alcohol excess, excessive levels of thyroid hormone, low blood oxygen levels, stress, and cigarette smoking.

ATRIAL TACHYCARDIAS

Tasks:

1. *Read and translate the f9ollowing text:*

Examples of atrial tachycardias include atrial fibrillation, atrial flutter, and paroxysmal atrial tachycardia (PAT). These arrhythmias occur because of electrical disturbances in the atria and/or the AV node, leading to fast heart beats.

Atrial fibrillation is a common atrial tachycardia. In atrial fibrillation, multiple, rapid, and chaotic electrical signals are firing rapidly from different areas

in the atria, rather than from one single area pacemaker at the SA node. These signals in turn cause rapid irregular contractions of the ventricles. Causes of atrial fibrillation include heart attack, high blood pressure, heart failure, mitral valve diseases (such as mitral valve prolapse), overactive thyroid, blood clots in the lung (pulmonary embolism), alcohol excess, emphysema, and inflammation of heart lining (pericarditis). Atrial flutter is a more regular version of atrial fibrillation. Conditions that cause atrial fibrillation can also cause atrial flutter. Treatment of atrial flutter and atrial fibrillation are also similar (see below). Paroxysmal atrial tachycardia (PAT) represent bouts of rapid, regular heart beating originating in the atrium. Patients with PAT are believed to have abnormalities in the AV node "relay station" that lead to rapid firing of the electrical impulses from the atrium which bypass the AV node under certain conditions. These conditions include alcohol excess, stress, caffeine, overactive thyroid or excessive thyroid hormone intake, and certain drugs. PAT is an example of an arrhythmia where the abnormality is in the electrical system of the heart, while the heart muscle and valves may be normal.

Ventricular Arrhythmias

Ventricular arrhythmias *are rapid arrhythmias that originate in the lower chambers of the heart (the ventricles).* Ventricular arrhythmias include ventricular tachycardia and ventricular fibrillation. Ventricular tachycardia is a rapid regular arrythmia which originates from an area of the ventricle. Ventricular fibrillation is an irregular arrhythmia which is a result of multiple rapid and chaotic electrical signals firing from many different areas in the ventricles. Ventricular tachycardias and fibrillation are life threatening arrhythmias most commonly associated with heart attacks or scarring of the heart muscle from previous heart attack. Less common causes of ventricular arrhythmias include severe heart muscle failure (cardiomyopathy), medication toxicity (such as digoxin toxicity), medication side effects, and blood electrolyte disturbances (such as low potassium level). Ironically, some medications used in treating heart arrhythmias can cause ventricular tachycardias (see the treatment section below).

Bradycardias

Diseases of the SA node, the AV node, and the conduction system in the ventricles can lead to slow arrhythmias (bradycardias). Calcium channel blockers, such as verapamil (Calan), beta-blockers, such as propanolol (Inderal), and digoxin (Lanoxin) can also cause bradycardias. These medications can also seriously aggravate bradycardias in patients with existing diseases of the SA node, AV node and other parts of the conduction system.

Premature Contractions

Early heartbeats that don't originate from the SA node pacemaker are called

premature contractions. Premature atrial contractions (PACs) and premature ventricular contractions (PVCs) can be caused by stress, caffeine, cigarette smoking, and excessive alcohol intake. Generally, PACs and PVCs are not associated with significant heart disease.

The first step in the evaluation of patients with palpitations is to determine whether their symptoms are due to arrhythmias. Because the treatment of varying types of arrhythmias can differ, it is also important to determine the type of arrhythmias involved. Since arrhythmias can be related to underlying disease of the heart valves, heart muscle, and coronary arteries, tests are often performed to exclude heart abnormalities. Blood tests are also obtained to measure blood sodium, potassium, calcium, magnesium, thyroid hormone levels, and medication levels (such as digoxin levels). Tests for arrhythmias include resting electrocardiogram (EKG), 24-hour rhythm monitoring (Holter), and a treadmill exercise test.

A resting EKG is a short recording of the heart's electrical activity, usually performed in the doctor's office. An EKG is useful only if the arrhythmia causing the palpitations is occurring when the EKG is being recorded. Oftentimes, the resting EKG cannot catch the arrhythmias, and a 24 hour Holter monitor is required. The 24 hour Holter is a cassette tape worn by the patient continuously while carrying out his/her usual activities. The patient simultaneously keeps a diary of palpitations or other symptoms during the recording period. Symptoms of palpitations can later be correlated with the presence or absence of arrhythmias on the Holter tape. If suspected arrhythmias causing palpitations still cannot be captured by the 24 hour Holter, a small patient-activated event monitor is worn by the patient for 1 to 2 weeks. When the patient experiences palpitation, he/she presses a button to record the heart rhythm prior to, during, and after the episode. The recordings can be analyzed by a doctor at a later date.

In some patients, exercise treadmill is used to detect arrhythmias that occur only with exertion. Exercise treadmill is a continuous EKG recording of the heart as the patient performs increasing levels of exercise. In addition to detecting arrhythmias, exercise treadmill is an useful screening test for the presence of narrowed coronary arteries that can limit supply of oxygenated blood to the heart muscle during exercise. Echocardiography uses ultrasound waves to obtain images of the heart chambers, valves and surrounding structures.

Echocardiography is useful in detecting diseases of the heart valves, such as mitral valve prolapse, mitral stenosis, and aortic stenosis (examples of valve diseases that can cause arrhythmias and palpitations). Echocardiography is also useful in evaluating the size of heart chambers, as well as the health and contractions of the muscle of the ventricles. Combining echocardiography with exercise stress testing (stress echocardiography) is an accurate screening test for significant coronary artery disease. The portion of the ventricles supplied by the narrowed arteries does not contract as well as the rest of the ventricles during exercise.

Occasionally, cardiac catheterization with angiography is performed to detect disease in the coronary arteries or in the heart valves which is triggering an

arrhythmia. Coronary arteries supply oxygenated blood from the aorta to the heart muscle. During this procedure, a small hollow plastic tube is advanced under x-ray guidance from an artery in the groin to the openings of the 2 main coronary arteries located above the aortic valve. A contrast agent, made of iodine, is then injected into the arteries while x-ray pictures are recorded. It is an accurate test in detecting, mapping, and assessing the extent and severity of coronary artery disease. Blood tests are performed to measure the levels of thyroid hormone, potassium, magnesium, and medications, such as digoxin. Excess thyroid hormone can lead to rapid arrhythmias, such as atrial fibrillation. Low blood levels of potassium and magnesium can lead to other arrhythmias. Digoxin (Lanoxin) toxicity can cause serious arrhythmias, such as bradycardia, and ventricular tachycardias. Digoxin toxicity can be enhanced by low blood levels of potassium and magnesium.

Palpitations without associated arrhythmias and heart diseases may not require specific treatment. Patients are often advised simply to reduce emotional and physical stress while monitoring their symptoms.

Palpitations resulting from premature contractions (PACs and PVCs) often require no specific treatment. The frequency of premature contractions can be reduced by stress reduction, stopping cigarettes, and reducing caffeine and alcohol consumption. High blood adrenaline levels can lead to premature contractions, while stress reduction helps to lower blood adrenaline levels. For patients with persistent palpitations and premature contractions, medications, such as beta-blockers, can be used to block the effect of adrenaline on the heart, thus reducing premature contractions. Examples of beta-blockers include propranolol (Inderal), metoprolol (Lopressor), and atenolol (Tenormin). Side effects of beta blockers include worsening of asthma, excessive lowering of heart rate and blood pressure, depression, fatigue, and impotence.

Atrial tachycardias (atrial fibrillation, atrial flutter, and PAT) are managed with calcium channel blockers such as verapamil (Calan), beta blockers such as propranolol (Inderal), and digoxin (Lanoxin). The goal of treatment is to slow down the rate of ventricular contractions (which are responding to the abnormal atrial signals), and to convert heart rhythm back to normal sinus rhythm. In patients with atrial tachycardias resistant to above medications, quinidine, procainamide (Pronestyl), or disopyramide (Norpace) are added. Quinidine, Pronestyl, and Norpace can themselves cause serious ventricular tachycardias.

The most important causes of ventricular arrhythmias (ventricular tachycardias and fibrillations) are heart attack, inadequate oxygenated blood to the heart muscle (ischemia), and scars from previous heart attacks. Therefore, treatment of the coronary heart disease is important in managing patients with ventricular arrhythmias. For patients with persistent ventricular tachycardias, medications such as propanolol (Inderal), sotolol (Betapace), and amiodarone (Cardarone) are used. In patients with life threatening ventricular fibrillations, implantable defibrillators are considered. Implanted defibrillators can sense the onset of ventricular fibrillation, and deliver a jolt of electrical impulse to the heart to convert it back to normal rhythm.

In patients with arrhythmias associated with significant heart muscle or valve disease, correction of the underlying heart disease is important. Patients with severe aortic stenosis can develop heart failure as well as serious ventricular arrhythmias. Treatment of the aortic stenosis by valve repair surgery (valvuloplasty), and/or by surgical valve replacement can alleviate these problems.

Some patients who suffer palpitations also have periods of dizziness or loss of consciousness (syncope). These patients are sometimes evaluated by heart electrical specialists called "electrophysiologists." A more detailed study of the heart's electrical system can be performed by these specialists who use devices to stimulate areas of the heart to detect abnormal electrical pathways.

Tasks:

1. *Discuss: "Atrial", "Ventricular Arrhythmias".*
2. *Answer the following questions:*

1. What are palpitations?
2. What is the normal heartbeat?
3. What are symptoms of arrhythmias?
4. What are the causes of arrhythmias?
5. How are palpitations evaluated?
6. How are palpitations managed?

PERICARDITIS

Pericarditis *is an inflammation of the lining sac (pericardium) which surrounds the heart.* It can be associated with a collection of fluid (pericardial effusion) in the space between the heart and the pericardium. Pericarditis accounts for approximately 1 in 1,000 hospital admissions. It is found in about 5% of patients at autopsy. This implies that many cases of pericarditis occur without symptoms severe enough to come to medical attention.
In most patients with pericarditis, no specific cause can be found, and the condition is termed idiopathic pericarditis. Scientists now believe that many cases of idiopathic pericarditis are probably due to undiscovered viruses, such as the common cold virus, which infects and damages the pericardium.

Specific diseases known to cause pericarditis are listed below. These diseases damage the pericardium, thereby triggering the body's immune defenses to attack the pericardium tissue and cause pericarditis. These diseases include:

- Infections (virus, bacteria, fungus, and tuberculosis)
- Heart attack that damages the whole thickness of the heart muscle wall
- Kidney failure
- Cancer (usually lung, breast, and lymphoma)
- Radiation therapy to the chest
- Trauma involving the chest

- Drugs, including hydralazine (Apresoline), procainamide (Procan SR), and phenytoin (Dilantin)
- Diseases of connective tissue (lupus and rheumatoid arthritis)

Tasks:

1. *List the symptoms of Pericarditis.*

Chest pain is the most common symptom. Chest pain is usually felt behind the breast bone (sternum). The pain is described as sharp, often aggravated by deep breathing or coughing, and worsened by lying down. Unlike the chest pain experienced with coronary insufficiency (angina), the pain of pericarditis is constant and unrelated to exertion. Patients often report shortness of breath, in part due to their shallow breathing to minimize chest pain. Patients may also notice weakness, fever, and chills. Additional symptoms are often due to the underlying disease process.

Some patients with pericarditis develop fast heart rhythms (tachycardias). Rare patients develop rapid accumulation of fluid in the pericardial sac. This fluid causes compression of the heart muscle chambers, thereby limiting the amount of blood pumped to the rest of the body, and causing shock. This life-threatening condition, called pericardial tamponade, can occur in up to 15% of patients with pericarditis.

The doctor notes the symptoms of chest pain and examines the chest area. Further evaluation can include chest x-ray, EKG, and echocardiogram, as well as consideration of any underlying predisposing disease processes.

When a stethoscope is placed on the chest, a scratchy, rubbing sound (pericardial rub) can sometimes be heard with each heart beat. This is believed to come from the friction of the inflamed pericardial sac rubbing against the beating heart. A pericardial rub can be heard in about 50 to 75% of patients with pericarditis. However, this rubbing sound can come and go during the course of pericarditis, and therefore cannot be relied upon as the sole criterion for diagnosis. When a sizable fluid collection (pericardial effusion) is present, the chest x-ray shows an enlarged heart shadow, often with a more circular configuration than normal.

An electrocardiogram (EKG) is a recording of the heart's electrical activity. Certain characteristic changes in the EKG tracings can be seen in up to 90% of patients with pericarditis. Therefore, an EKG can be valuable in diagnosing pericarditis.

An echocardiogram uses ultrasound waves to make images of the heart chambers and pericardial space. This test is useful in detecting and measuring the amount of fluid around the heart, and assessing the effect of this fluid on the heart chambers. Since not all patients with pericarditis develop pericardial fluid, an echocardiogram cannot be used alone in making the diagnosis.

Blood tests for underlying diseases, such as lupus and rheumatoid arthritis are evaluated. Skin tests can be performed to detect tuberculosis and other fungal infections.

When pericardial tamponade causes low blood pressure or shock, a needle can be used to withdraw fluid from the pericardial space (pericardiocentesis). Removal of the fluid relieves pericardial tamponade, reverses shock, and improves blood pressure. The aspirated fluid can be examined for infection and cancer.

When the cause of the pericarditis is known, treatment is directed toward the underlying disease. For example, if bacteria are found in the pericardial fluid, intravenous antibiotics are given. If certain medications are thought to be causing the pericarditis, their use may be discontinued. When systemic diseases such as lupus and rheumatoid arthritis are responsible for the pericarditis, anti-inflammatory drugs and medications that suppress the immune system.

Idiopathic pericarditis and pericarditis following heart surgery usually respond to nonsteroidal antiinflammatory drugs such as aspirin, ibuprofen (Motrin), or indomethacin (Indocin). When the pain is not controlled with these drugs, corticosteroids (Deltasone, Prednisone) can be used and are generally effective. Corticosteroids have powerful anti-inflammatory effects. Unfortunately, long term use of corticosteroids can lead to side effects such as bone thinning, high blood pressure, increased blood sugar, necrosis of hip joints, swelling of the facial cheeks, and an impaired ability to fight infection. For treatment of pericarditis, corticosteroids are usually given in large doses daily until symptoms resolve, and then rapidly tapered over 7 to 14 days.

When the treatment of pericarditis is successful, the inflammation and any pericardial fluid usually resolve over 2 to 6 weeks. Patients are often initially hospitalized for 24 to 48 hours to exclude a possible heart attack or infectious condition, and to observe for a potential development of heart compression by excess fluid, tamponade.

Blood thinning medications (anticoagulants) are generally avoided in patients with pericarditis in order to minimize the risk of bleeding into the pericardial sac, thereby causing tamponade.

Recurrent pericarditis can occur weeks to months after the first episode in up to 20% of patients. Most patients will respond to the same therapy as was given for the original episode of pericarditis. Occasionally, patients develop resistant pericarditis and are placed on chronic low dose corticosteroids every other day. Using low dose corticosteroids every other day helps to minimize the long-term side effects. Colchicine, a drug normally used to treat attacks of gout (excess uric acid causing joint inflammation), can sometimes be useful in treating patients with resistant pericarditis.

Even though pericardial fluid is common in pericarditis, most patients do not develop enough fluid around the heart to cause the feared complication of pericardial tamponade. Therefore, in most patients, pericardiocentesis (described above in Diagnosis section) is not necessary. In rare cases, scarring of the pericardial sac around the heart causes constrictive pericarditis. In this condition, the scarred pericardial sac causes constriction of heart chambers, leading to

impaired heart pumping similar to tamponade. Surgical removal of the constricting pericardial sac may be needed to improve symptoms.

2. *Answer the following questions:*

1. What is pericarditis?
2. What causes pericarditis?
3. What are the symptoms of pericarditis?
4. How is pericarditis diagnosed?
5. How is pericarditis treated?

DIGESTIVE SYSTEM

Tasks:

1. *Read the text: "Digestive system", "Esophagus", "Liver" and write out the* medical terms.

The digestive system is a group of organs that work like wrecking equipment to break down the chemical components of food, through the use of digestive juices, into tiny nutrients which can be absorbed to generate energy for the body. This system also builds and replaces cells and tissues, which are constantly dying. Digestion begins in the mouth with the teeth, which grind the food into small particles; the tongue, a powerful muscle which detects "good" and "bad" flavors in food and manipulates the food between the teeth for chewing, and saliva, a watery fluid which lubricates chewing and swallowing and begins the process of digestion. The digestive system begins in the mouth, continues in the pharynx (throat) and esophagus and into the "gut" region: the stomach, small and large intestines, the rectum and the anus. Food is chewed, pulped and mixed with saliva to become a soft mass which will easily travel down the esophagus. The tongue traps the food and forces it into the throat, which is a mass of muscles and tissues which transports food into the gut system for final processing and distribution. The throat closes the top of the breathing pipes, but if the food accidentally enters these pipes, it goes down the "wrong way" and must be coughed up before the body chokes or asphyxiates. As food passes through the body, it is mixed with an unbelievable amount of chemicals, which break it down into small units that can be absorbed into the blood and lymph systems. Some is used for energy, some as building blocks for tissues and cells, and some is stored for future or emergency use. The liver and the pancreas also secrete digestive juices that break down food as it passes through the digestive ducts. Not all that we eat can be digested, so the waste must be disposed of in an efficient way. It may not be a savory ending for the food or drink we thought was so delicious in the mouth, but it is just as important for our health.

ESOPHAGUS

The esophagus is a muscular tube which carries food and liquids from the throat to the stomach for digestion after it has been chewed and chemically softened in the mouth. Food is forced downward to the stomach (or upwards, if one is standing on his head) by powerful waves of muscle contractions passing through the walls of the esophagus. Because these contractions are so strong in the throat and the esophagus, we can swallow in any position - even upside-down! If the food is bad, poison, or more than we can "stomach," it may travel back by the same force to be thrown out through the mouth, which is called vomiting. The esophagus has a ring of muscle at the top and at the bottom. These rings close or contract after the food passes through and enters the stomach, where there is an abundance of churning acid waiting to digest the food. If the bottom muscle weakens, stomach contents, along with the stomach acid, may return to the esophagus and cause an uncomfortable, burning sensation known as "heartburn", although it is not connected with the heart at all, but be careful next time you are forced to swallow your pride.

LIVER

Thirty per cent of the blood pumped through the heart in one minute passes through the body's chemical factory, which is called the liver. The liver cleanses the blood and processes nutritional molecules, which are distributed to the tissues. The liver also receives bright red blood from the lungs, filled with vital oxygen to be delivered to the heart. The only part of the body which receives more blood than the liver is the brain. The liver is located at the top of the abdomen, just below the diaphragm and has two main lobes. It is the largest gland in the body, weighing 2.5 to 3.3 pounds. When we eat, more blood is diverted to the intestines to deal with digestive processes; when not eating, three-fourths of the blood supply to the liver comes from the intestines. It also produces about two and one-half pints of bile in its ducts, which is delivered to the gallbladder through a small tube called the "cystic duct" for storage. "Liver" is probably an appropriate name for this gland, which makes the important decision as to whether incoming substances are useful to the body or whether they are waste. The liver is an extremely important organ and has multiple functions. The liver detoxifies blood cells by mixing them with bile and by chemical alteration to less toxic substances, such as the alteration of ammonia to urea. Many chemical compounds are inactivated by the liver through modification of chemical structures. The liver converts glucose to a storage form of energy called glycogen, and can also produce glucose from sugars, starches, and proteins. The liver also synthesizes triglycerides and cholesterol, breaks down fatty acids, and produces plasma proteins necessary for the clotting of blood, such as clotting factors I, III, V, VII, IX and XI. The liver also produces bile salts and excretes bilirubin. A "lily-livered coward" was someone whose liver contained no blood. The Greeks and Romans sacrificed animals to the gods before going into battle. When the liver was examined, if it was healthy and the blood was bright

red, a victory was promised; if it was diseased or the blood was pale, defeat was predicted.

STOMACH

Tasks:

1. *Look through the text and write shortly about the stomach.*

A hollow, sac-like organ connected to the esophagus and the duodenum (the first part of the small intestine), the stomach consists of layers of muscle and nerves that continue the breakdown of food which begins in the mouth. It is also a storage compartment, which enables us to eat only two or three meals a day. If this weren't possible, we would have to eat about every twenty minutes. The average adult stomach stretches to hold from two to three pints and produces approximately the same amount of gastric juices every twenty-four hours. The stomach has several functions: (1) as a storage bin, holding a meal in the upper portion and releasing it a little at a time into the lower portion for processing; (2) as a food mixer, the strong muscles contract and mash the food into a sticky, slushy mass; (3) as a sterilizing system, where the cells in the stomach produce an acid which kills germs in "bad" food; (4) as a digestive tub, the stomach produces digestive fluid which splits and cracks the chemicals in food to be distributed as fuel for the body. The process of digestion is triggered by the sight, smell or taste of food, so that the stomach is prepared when the food arrives. Every time you pass a bakery shop or smell your mother's good cooking, the body begins a digestive process. If the stomach is not filled, these gastric juices begin eroding the stomach lining itself.

GALLBLADDER

Tasks:

1. *Read and discuss: "Gallbladder", "Small intestine", "Large intestine". Make up 3-4 questions on the each text.*

The gallbladder is an active storage shed, which absorbs mineral salts and water received from the liver and converts it into a thick, mucus substance called "bile," to be released when food is present in the stomach. The gallbladder is a small, pear-shaped sac which is situated just below the liver and is attached to it by tissues. It stores bile and then releases it when food passes from the stomach to the duodenum (the first part of the small intestine) to help in the process of digestion. It has a capacity of around one and one-half fluid ounces. When food leaves the stomach, a secretion causes the gallbladder to contract and expel its contents into the duodenum, where the bile disperses the fats in the food into liquid. Pythagoras, the 6th Century BC Greek mathematician, believed that life is based on the four elements of earth, air, fire and water which correspond to the body's "humors":

blood (hot and moist), phlegm (cold and moist), yellow bile (hot and dry) and black bile (cold and dry). The perfect or imperfect balance of these humors supposedly determined one's health and intelligence. We still speak in terms of "melancholia" (excess black bile, leading to depression) and "phlegmatic" (sluggish or impassive) and scientists have named the heavy mucus secreted in the respiratory passages - phlegm. Pythagoras was kind of a "square". Oh, come on; where's your sense of "humor"?

SMALL INTESTINE

If the small intestine were not looped back and forth upon itself, it could not fit into the abdominal space it occupies. It is held in place by tissues which are attached to the abdominal wall and measures eighteen to twenty-three feet in the average adult, which makes it about four times longer than the person is tall. It is a three-part tube of about one and one-half to two inches in diameter and is divided into three sections: (1) the duodenum, a receiving area for chemicals and partially digested food from the stomach; (2) the jejunum, where most of the nutrients are absorbed into the blood and (3) the ileum, where the remaining nutrients are absorbed before moving into the large intestine. The intestines process about 2.5 gallons of food, liquids and bodily waste every day. In order for enough nutrients to be absorbed into the body, it must come in contact with large numbers of intestinal cells which are folded like gathered skirts. Each of these cells contains thousands of tiny finger-like projections called "villi," and each villus contains microscopic "microvilli". In one square inch of small intestine, there are about 20,000 villi and ten billion microvilli. Each villus brings in fresh, oxygenated blood and sends out nutrient-enriched blood. The villi sway constantly to stir up liquefied food and remove the nutrients which can be absorbed and then passed through the membranes of the villi into the blood and lymph vessels. The fatty nutrients go to the lymph vessels, and glucose and amino acids go to the blood and on to the liver. The muscles which encircle this tube constrict about seven to twelve times a minute to move the food back and forth, to churn it, knead it, and to mix it with gastric juices. The small intestine also makes waves which move the food forward, but these are usually weak and infrequent to allow the food to stay in one place until the nutrients can be absorbed. If a toxic substance enters the small intestine, these movements may be strong and rapid to expel the poisons quickly.

LARGE INTESTINE

The large intestine, or colon, consists of ascending, transverse, descending, and sigmoid portions. The ascending portion extends from the cecum superiorly along the right abdominal wall to the inferior surface of the liver and bends sharply at a right angle to the left at a curve called the hepatic flexure. From there, it crosses the abdominal cavity as the transverse colon to the left abdominal wall at the splenic flexure and begins the descending colon which traverses inferiorly along the left abdominal wall to the pelvic region. The colon then forms

an angle medially from the pelvis to form an s-shaped curve called the sigmoid colon. The last few inches of the colon is the rectum which is a storage site for solid waste which leaves the body by way of an external opening called the anus, controlled by muscles called sphincters. Substances which have not been absorbed in the small intestine enter the large intestine in the form of liquid and fiber. The large intestine or "bowel" is sometimes called the "garbage dump" of the body, because the materials that reach it are of very small use to the body and are sent on to be disposed of. The first half of the colon absorbs fluids and recycles them into the blood stream. The second half compacts the wastes into feces, secretes mucus which binds the substances, and lubricates it to protect the colon and ease its passage. Of the two to two and one-half gallons of food and liquids taken in by the average adult, only about twelve ounces of waste enters the large intestine. Feces are comprised of about three quarters water. The remainder is protein, fat, undigested food roughage, dried digestive juices, cells shed by the intestine, and dead bacteria. A common disorder of the large intestine is inflammation of the appendix, or appendicitis. Waste that accumulates in the appendix cannot be moved easily by peristalsis since the appendix has only one opening. The symptoms of appendicitis include muscular rigidity, localized pain in the right lower quarter of the abdomen, and vomiting. The chief danger of appendicitis is that is may rupture and empty its contents of fecal matter and waste into the abdominal cavity producing an extremely serious condition called peritonitis.

APPENDIX

Tasks:

1. *Find English equivalents for the following words: пищеварение, функция, происходить, толстый кишечник, слякотный.*

Digestion takes place almost continuously in a watery, slushy environment. The large intestine absorbs water from its inner contents and stores the rest until it is convenient to dispose of it. Attached to the first portion of the large intestine a troublesome pouch is called the (vermiform) appendix. The appendix has no function in modern humans, however it is believed to have been part of the digestive system in our primitive ancestors.

RECTUM

Tasks:

1. *Read and translate the text.*

The rectum is a short, muscular tube that forms the lowest portion of the large intestine and connects it to the anus. Feces collects here until pressure on the rectal walls cause nerve impulses to pass to the brain, which then sends messages to the voluntary muscles in the anus to relax, permitting expulsion.

APPENDICITIS

Tasks:

1. *Read the text, translate it, choose the medical terms and get ready to speak on the structure of digaestive system.*

Appendicitis is the most common atraumatic surgical emergency. Annually, in the U.S. there is an incidence of 1.1 cases per 1,000 people. During a lifetime 7% of us will be affected by this infection, most commonly between ages 11 and 20 years. Two-thirds of cases occur before age 30, however appendicitis can happen at any age. In pregnant women and the elderly, it is commonly missed, as it isn't the first thought of cause for abdominal discomfort. Certain independent factors increase the risk of appendicitis, including family history and seasonal variations. Up to two-thirds of cases occur in the months of October and May, probably since this is a common time for stomach and intestinal infections. The appendix is a remnant of a lymphatic organ that has functions in such lower animals as chickens. It is a thin diverticulum (out-pouching tube-like structure) arising from the end of the small intestines (cecum).

Size wise it averages 10 cm in length, however ranges from 0.5 cm to 23 cm. The lining of the human appendix is made up of lymphoid follicles, these follicles, it is believed participate in the making of immunoglobulin. They reach maximum potential at the age we see the most cases of inflamed appendixes (appendicitis). Postulated is that swelling and trapping of bacteria cause an obstruction. Also infections that cause a lymphoid proliferation (as a defense) e.g. measles, mononucleosis, amebiasis, gastroenteritis, Chron's Disease or frequent respiratory infections, will set up potential or this are to become swollen and close off its opening into the cecum. Also implicated as culprits are ingested foreign bodies (bones, wood, metal, plastic, barium, or chewing gum), hard stool that creates a blocked appendix (fecalith). Once blocked, this small out-pouching swells and blood flow to it becomes cut-off. If allowed to continue, an abscess forms and once a certain point is reached this inflamed tissue bursts! Recognition of the situation developing allows for removal, before leakage of bacteria and stool occurs causes infection inside the abdomen.

How to know a surgical emergency is brewing? Not simple at all, not everyone reads the textbook and has the classic 'findings'. For the sake of order, I'll address the classical symptoms and signs that suggest the cause is an appendix becoming inflamed. Early on pain or discomfort around the umbilicus (belly-button) followed by nausea and loss of appetite. Some my develop fever, vomiting as the pain travels to the right lower part of your abdominal wall. Do note that pain in the central abdomen is present only in 25-35% of patients with appendicitis. Also 50% of cases do not have pain that travelled to the right lower abdominal area. Nausea is found in 67-95% of cases of appendicitis, but it is also found in 70-78% of patients with other causes of abdominal pain. When vomiting occurs (49-64%) it almost universally follows the onset of abdominal pain by several hours. If you are tender in the right lower abdomen just inside your pelvic bone (iliac crest)

and walking, bumps on the drive to the physician, hurts, you will most probably get a work-up for appendicitis. After being questioned (taking a history) you'll be examined and laboratory studies and X- Rays ordered to assist in the correct diagnosing of this emergency that requires surgery. The laboratory studies include a white blood cell count (WBC), usually it is elevated (70-90%) in acute appendicitis cases, however other illnesses can have same effect. In the first 24 hours of the illness, the WBC can be normal. A shift of white cells types, to any increase in neutrophiles is also a help in diagnosing.

A urine analysis may be of help in ruling in or out other causes, although a small amount of red blood cells may be present from the irritation of the inflamed appendix on the ureter that is right next to it. In the past plain X-ray films were used, today other modalities are being explored for their accuracy. A plain film can be helpful if you're one of the 2-15% of persons that have a calcified stool (fecalith) as the cause of the appendix becoming inflamed by blockage. Women may be examined in the pelvic are, to be sure a cyst on the ovary or an infection in that area is not masquerading as appendicitis. There are a few individuals whose anatomy has the appendix lying in a different position or angle- these will have 'atypical features' to their presentation. These patients present with less dramatic complaints findings. And as you can guess are more likely to be misdiagnosed. There are those that have chronic and recurrent inflammation of the appendix, and are uncomfortably for two-three weeks at a time. Appendicitis in older individuals (over 60) represents 5-10% of all cases, yet account for 50% of all deaths from this disease. They do not describe the classical complaints. The presence of other diseases, decrease immune function and social issues (e.g. cost, fear, dislike of hospitals, cause delay in seeking medical help). Nearly 20% of the elderly with appendicitis were initially misdiagnosed and treated outpatient for minor illness.

Pregnant women are at particular risk of being misdiagnosed, during pregnancy the appendix rotates counterclockwise, resulting in a position over the right kidney. Further in pregnancy the body has an increase of serum steroids, hence the inflammatory response is potentially masked. The incidence of appendicitis is 1 in every 1, 400 to 1, 5000 pregnancies.

This is a relatively common surgical emergency that can be easily cured, so if you suspect that the cause of abdominal pain might be appendicitis, don't ask your friend what his/hers felt like-your might and probably will be different.

Appendicitis and Appendectomy

Tasks:

1. *Translate the text in written form. Write the key sentences out of the text.*

The appendix is a closed-ended, narrow tube that attaches to the cecum (the first part of the colon) like a worm. (The anatomical name for the appendix, vermiform appendix, means worm-like appendage.) The inner lining of the

appendix produces a small amount of mucus that flows through the appendix and into the cecum. The wall of the appendix contains lymphatic tissue that is part of the immune system for making antibodies. Like the rest of the colon, the wall of the appendix also contains a layer of muscle.

Appendicitis is inflammation of the appendix. It is thought that appendicitis begins when the opening from the appendix into the cecum becomes blocked. The blockage may be due to a build-up of thick mucus within the appendix or to stool that enters the appendix from the cecum. The mucus or stool hardens, becomes rock-like, and blocks the opening. This rock is called a fecalith (literally, a rock of stool). At other times, the lymphatic tissue in the appendix may swell and block the appendix. Bacteria which normally are found within the appendix then begin to invade (infect) the wall of the appendix. The body responds to the invasion by mounting an attack on the bacteria, an attack called inflammation. (An alternative theory for the cause of appendicitis is an initial rupture of the appendix followed by spread of bacteria outside the appendix.. The cause of such a rupture is unclear, but it may relate to changes that occur in the lymphatic tissue that line the wall of the appendix.)

If the inflammation and infection spread through the wall of the appendix, the appendix can rupture. After rupture, infection can spread throughout the abdomen; however, it usually is confined to a small area surrounding the appendix (forming a peri-appendiceal abscess).

Sometimes, the body is successful in containing ("healing") the appendicitis without surgical treatment if the infection and accompanying inflammation do not spread throughout the abdomen. The inflammation, pain and symptoms may disappear. This is particularly true in elderly patients and when antibiotics are used. The patients then may come to the doctor long after the episode of appendicitis with a lump or a mass in the right lower abdomen that is due to the scarring that occurs during healing. This lump might raise the suspicion of cancer.

The most frequent complication of appendicitis is perforation. Perforation of the appendix can lead to a peri-appendiceal abscess (collection of infected pus) or diffuse peritonitis (infection of the entire lining of the abdomen and the pelvis). The major reason for appendiceal perforation is delay in diagnosis and treatment.

A less common complication of appendicitis is blockage of the intestine. Blockage occurs when the inflammation surrounding the appendix causes the intestinal muscle to stop working, and this prevents the intestinal contents from passing. If the intestine above the blockage begins to fill with liquid and gas, the abdomen distends and nausea and vomiting may occur. It then may be necessary to drain the contents of the intestine through a tube passed through the nose and esophagus and into the stomach and intestine.

A feared complication of appendicitis is sepsis, a condition in which infecting bacteria enter the blood and travel to other parts of the body. This is a very serious, even life-threatening complication. Fortunately, it occurs infrequently.

The main symptom of appendicitis is abdominal pain. The pain is at first diffuse and poorly localized, that is, not confined to one spot. (Poorly localized

pain is typical whenever a problem is confined to the small intestine or colon, including the appendix.) The pain is so difficult to pinpoint that when asked to point to the area of the pain, most people indicate the location of the pain with a circular motion of their hand around the central part of their abdomen.

As appendiceal inflammation increases, it extends through the appendix to its outer covering and then to the lining of the abdomen, a thin membrane called the peritoneum. Once the peritoneum becomes inflamed, the pain changes and then can be localized clearly to one small area. Generally, this area is between the front of the right hip bone and the belly button. The exact point is named after Dr. Charles McBurney--McBurney's point. If the appendix ruptures and infection spreads throughout the abdomen, the pain becomes diffuse again as the entire lining of the abdomen becomes inflamed.

Nausea and vomiting also occur in appendicitis and may be due to intestinal obstruction.

The diagnosis begins with a thorough history and physical examination. Patients often have an elevated temperature, and there usually will be moderate to severe tenderness in the right lower abdomen when the doctor pushes there. If inflammation has spread to the peritoneum, there is frequently rebound tenderness. This means that when the doctor pushes on the abdomen and then quickly releases his hand, the pain becomes suddenly but transiently worse.

2. *List the symptoms of appendicitis.*

WHITE BLOOD CELL COUNT

1. *Read the following text: "WBCC", "Urinalysis", Abdominal X-ray", Ultrasound", Barium Enema", "CT Scan" closely, define the nain thoughts of each text. Compose*
2. *Make 2 questions to each paragraph and get ready to answer them.*

The white blood cell count in the blood usually becomes elevated with infection. In early appendicitis, before infection sets in, it can be normal, but most often there is at least a mild elevation even early. Unfortunately, appendicitis is not the only condition that causes elevated white blood cell counts. Almost any infection or inflammation can cause this count to be abnormally high. Therefore, an elevated white blood cell count alone cannot be used as a sign of appendicitis.

Urinalysis

Urinalysis is a microscopic examination of the urine that detects red blood cells, white blood cells and bacteria in the urine. Urinalysis usually is abnormal when there is inflammation or stones in the kidneys or bladder which sometimes can be confused with appendicitis. Therefore, an abnormal urinalysis suggests that there is a kidney or bladder problem while a normal urinalysis is more characteristic of appendicitis.

Abdominal X-Ray

An abdominal x-ray may detect the fecalith (the hardened and calcified, pea-sized piece of stool that blocks the appendiceal opening) that may be the cause of appendicitis. This is especially true in children.

Ultrasound

An ultrasound is a painless procedure that uses sound waves to identify organs within the body. Ultrasound can identify an enlarged appendix or an abscess. Nevertheless, during appendicitis, the appendix can be seen in only 50% of patients. Therefore, not seeing the appendix during an ultrasound does not exclude appendicitis. Ultrasound also is helpful in women because it can exclude the presence of conditions involving the ovaries, fallopian tubes and uterus that can mimic appendicitis.

Barium Enema

A barium enema is an x-ray test where liquid barium is inserted into the colon from the anus to fill the colon. This test can, at times, show an impression on the colon in the area of the appendix where the inflammation from the adjacent inflammation impinges on the colon. Barium enema also can exclude other intestinal problems that mimic appendicitis, for example Crohn's disease.

CT Scan

In patients who are not pregnant, a CT Scan of the area of the appendix is useful in diagnosing appendicitis and peri-appendiceal abscesses as well as in excluding other diseases inside the abdomen and pelvis that can mimic appendicitis.

LAPAROSCOPY

Tasks:

1. *Read the text. Write the key sentences out of the text and translate them.*

Laparoscopy is a surgical procedure wherein a small fiberoptic tube with a camera is inserted into the abdomen through a small puncture made on the abdominal wall. Laparoscopy allows a direct view of the appendix as well as other abdominal and pelvic organs. If appendicitis is found, the inflamed appendix can be removed at the same time. The disadvantage of laparoscopy compared to ultrasound and CT scanning is that it requires a general anesthetic.

There is no one test that will diagnose appendicitis with certainty. Therefore, the approach to suspected appendicitis may include a period of observation, tests as previously discussed, or surgery.

It can be difficult to diagnose appendicitis. The position of the appendix in the abdomen may vary. Most of the time the appendix is in the right lower

abdomen, but the appendix, like other parts of the intestine, has a mesentery. This mesentery is a sheet-like membrane that attaches the appendix to other structures within the abdomen. If the mesentery is large, it allows the appendix to move around. In addition, the appendix may be longer than normal. The combination of a large mesentery and a long appendix allows the appendix to dip down into the pelvis (among the pelvic organs in women). It also may allow the appendix to move behind the colon (called a retro-colic appendix). In either case, inflammation of the appendix may act more like the inflammation of other organs, for example, a woman's pelvic organs.

The diagnosis of appendicitis also can be difficult because other inflammatory problems may mimic appendicitis. Therefore, it is common to observe patients with suspected appendicitis for a period of time to see if the problem will resolve on its own or develop characteristics that more strongly suggest appendicitis or, perhaps, another condition.

The surgeon faced with a patient suspected of having appendicitis always must consider and look for other conditions that can mimic appendicitis. Among the conditions that mimic appendicitis are:

- **Meckel's diverticulitis.** A Meckel's diverticulum is a small outpouching of the small intestine which usually is located in the right lower abdomen near the appendix. The diverticulum may become inflamed or even perforate (break open or rupture). If inflamed and/or perforated, it usually is removed surgically.
- **Pelvic inflammatory disease.** The right fallopian tube and ovary lie near the appendix. Sexually active women may contract infectious diseases that involve the tube and ovary. Usually, antibiotic therapy is sufficient treatment, and surgical removal of the tube and ovary are not necessary.
- **Inflammatory diseases of the right upper abdomen.** Fluids from the right upper abdomen may drain into the lower abdomen where they stimulate inflammation and mimic appendicitis. Such fluids may come from a perforated duodenal ulcer, gallbladder disease, or inflammatory diseases of the liver, e.g., a liver abscess.
- **Right-sided diverticulitis.** Although most diverticuli are located on the left side of the colon, they occasionally occur on the right side. When a right-sided diverticulum ruptures it can provoke inflammation they mimics appendicitis.
- **Kidney diseases.** The right kidney is close enough to the appendix that inflammatory problems in the kidney—for example, an abscess—can mimic appendicitis.

Once a diagnosis of appendicitis is made, an appendectomy usually is performed. Antibiotics almost always are begun prior to surgery and as soon as appendicitis is suspected.

There is a small group of patients in whom the inflammation and infection of appendicitis remain mild and localized to a small area. The body is able not only to contain the inflammation and infection but to resolve it as well. These patients usually are not very ill and improve during several days of observation. This type of appendicitis is called "confined appendicitis" and may be treated with antibiotics alone. The appendix may or may not be removed at a later time.

On occasion, a person may not see their doctor until appendicitis with rupture has been present for many days or even weeks. In this situation, an abscess usually has formed, and the appendiceal perforation may have closed over. If the abscess is small, it initially can be treated with antibiotics; however, the abscess usually requires drainage. A drain usually is inserted with the aid of an ultrasound or CT scan that can determine the exact location of the abscess. The appendix is removed several weeks or months after the abscess has resolved. This is called an interval appendectomy and is done to prevent a second attack of appendicitis.

During an appendectomy, an incision two to three inches in length is made through the skin and the layers of the abdominal wall in the area of the appendix. The surgeon enters the abdomen and looks for the appendix, usually located in the right lower abdomen. After examining the area around the appendix to be certain that no additional problem is present, the appendix is removed. This is done by freeing the appendix from its attachment to the abdomen and to the colon, cutting the appendix from the colon and sewing over the hole in the colon. If an abscess is present, the pus can be drained with drains (rubber tubes) that go from the abscess and out through the skin. The abdominal incision then is closed.

Newer techniques for removing the appendix involve the use of the laparoscope. The laparoscope is a thin telescope attached to a video camera that allows the surgeon to inspect the inside of the abdomen through a small puncture wound (instead of a larger incision). If appendicitis is found, the appendix can be removed with special instruments that can be passed into the abdomen, just like the laparoscope, through small puncture wounds. The benefits of the laparoscopic technique include less post-operative pain (since much of the post-surgery pain comes from incisions) and a speedier recovery. An additional advantage of laparoscopy is that it allows the surgeon to look inside the abdomen to make a clear diagnosis in cases in which the diagnosis of appendicitis is in doubt. For example, laparoscopy is especially helpful in menstruating women in whom a rupture of an ovarian cysts may mimic appendicitis.

If the appendix is not ruptured (perforated) at the time of surgery, the patient generally is sent home from the hospital in one or two days. Patients whose appendix has perforated generally are sicker than patients without perforation. After surgery, their hospital stay often is prolonged (four to seven days), particularly if peritonitis has occurred. Intravenous antibiotics are given in the hospital to fight infection and assist in resolving any abscess.

Occasionally, the surgeon may find a normal-appearing appendix and no other cause for the patient's problem. In this situation, the surgeon may remove the appendix. The reasoning in these cases is that it is better to remove a normal-appearing appendix than to miss and not treat appropriately an early or mild case of appendicitis.

The most common complication of appendectomy is infection of the wound, that is, of the surgical incision. Such infections vary in severity from mild, with only redness and perhaps some tenderness over the incision, to moderate, requiring only antibiotics, to severe, requiring antibiotics and surgical treatment. Occasionally, the inflammation and infection of appendicitis are so severe that the

surgeon will not close the incision at the end of the surgery because of concern that the wound is already infected. Instead, the surgical closing is postponed for several days to allow the infection to subside with antibiotic therapy and make it less likely for infection to occur within the incision.

Another complication of appendectomy is an abscess, a collection of pus in the area of the appendix. Although abscesses can be drained of their pus surgically, there are also non-surgical techniques, as previously discussed.

It is not clear if the appendix has an important role in the body in older children and adults. There are no major, long-term health problems resulting from removing the appendix although a slight increase in some diseases has been noted, for example, Crohn's disease.

2. *Answer the questions:*

1. What is the appendix?
2. What is appendicitis?
3. What are the complications of appendicitis?
4. What are the symptoms of appendicitis?
5. How is appendicitis diagnosed?
6. Why can it be difficult to diagnose appendicitis?
7. What other conditions mimic appendicitis?
8. How is appendicitis treated?
9. How is an appendectomy done?
10. What are the complications of appendectomy?
11. Are there long-term consequences of removing the appendix?

ULCERATIVE COLITIS

Tasks:

1. *Give Russian equivalents for the following words and word combinations: inflammation; intestine; abdominal pain; contagious; immune system; to be composed of; proteins; cell; harmful bacteria; fungus; foreign invaders; affecting; fatigue; to suffer; procedure.*

2. *Write symptoms of ulcerative colitis.*

Ulcerative colitis is a chronic inflammation of the large intestine (colon). The colon is the part of the digestive system where waste material is stored. The rectum is the end of the colon adjacent to the anus. In patients with ulcerative colitis, ulcers and inflammation of the inner lining of the colon lead to symptoms of abdominal pain, diarrhea, and rectal bleeding.

Ulcerative colitis is closely related to another condition of inflammation of the intestines called Crohn's disease. Together, they are frequently referred to as inflammatory bowel disease (IBD). Ulcerative colitis and Crohn's diseases are chronic conditions that can last years to decades. They affect approximately 500,000 to 2 million people In the United States. Men and women are affected

equally. They most commonly begin during adolescence and early adulthood, but they also can begin during childhood and later in life.

It is found worldwide, but is most common in the United States, England, and northern Europe. It is especially common in people of Jewish descent. Ulcerative colitis is rarely seen in Eastern Europe, Asia, and South America, and is rare in the black population. For unknown reasons, an increased frequency of this condition has been recently observed in developing nations.

The causes of ulcerative colitis and Crohn's disease are unknown. To date, there has been no convincing evidence that these two diseases are caused by infection. Neither disease is contagious.

Ulcerative colitis and Crohn's disease are caused by abnormal activation of the immune system in the intestines. The immune system is composed of immune cells and the proteins that these cells produce. These cells and proteins serve to defend the body against harmful bacteria, viruses, fungi, and other foreign invaders. Activation of the immune system causes inflammation within the tissues where the activation occurs. (Inflammation is, in fact, an important mechanism of defense used by the immune system.) Normally, the immune system is activated only when the body is exposed to harmful invaders. In patients with Crohn's disease and ulcerative colitis, however, the immune system is abnormally and chronically activated in the absence of any known invader. The continued abnormal activation of the immune systems causes chronic inflammation and ulceration. The susceptibility to abnormal activation of the immune system is genetically inherited. First degree relatives (brothers, sisters, children, and parents) of patients with IBD are thus more likely to develop these diseases.

Common symptoms of ulcerative colitis include rectal bleeding and diarrhea, but there is a wide range of symptoms among patients with this disease. Variability of symptoms reflects differences in the extent of disease (i.e., the amount of the colon and rectum that are inflamed) and the intensity of inflammation. Generally, patients with inflammation confined to the rectum and a short segment of the colon adjacent to the rectum have milder symptoms and a better prognosis than patients with more widespread inflammation of the colon. The different types of ulcerative colitis are classified according to the location and the extent of inflammation:

1. Ulcerative proctitis refers to inflammation that is limited to the rectum. In many patients with ulcerative proctitis, mild intermittent rectal bleeding may be the only symptom. Other patients with more severe rectal inflammation may, in addition, experience rectal pain, urgency (sudden feeling of having to defecate and a need to rush to the bathroom for fear of soiling), and tenesmus (ineffective, painful urge to move one's bowels).
2. Proctosigmoiditis involves inflammation of the rectum and the sigmoid colon (a short segment of the colon contiguous to the rectum). Symptoms of proctosigmoiditis, like that of proctitis, include rectal bleeding, urgency, and tenesmus. Some patients with proctosigmoiditis also develop bloody diarrhea and cramps.
3. Left-sided colitis involves inflammation that starts at the rectum and extends up the left colon (sigmoid colon and the descending colon).

Symptoms of left-sided colitis include bloody diarrhea, abdominal cramps, weight loss, and left-sided abdominal pain.

4. Pancolitis or universal colitis refers to inflammation affecting the entire colon (right colon, left colon, transverse colon and the rectum). Symptoms of pan colitis include bloody diarrhea, abdominal pain and cramps, weight loss, fatigue, fever, and night sweats. Some patients with pan colitis have low-grade inflammation and mild symptoms that respond readily to medications. Generally, however, patients with pan colitis suffer more severe disease and are more difficult to treat than those with more limited forms of ulcerative colitis.
5. Fulminant colitis is a rare but severe form of pan colitis. Patients with fulminant colitis are extremely ill with dehydration, severe abdominal pain, protracted diarrhea with bleeding, and even shock. They are at risk of developing toxic megacolon (marked dilatation of the colon due to severe inflammation) and colon rupture (perforation). Patients with fulminant colitis and toxic megacolon are treated in the hospital with potent intravenous medications. Unless they respond to treatment promptly, surgical removal of the diseased colon is necessary to prevent colon rupture.

Standard surgery involves the removal of the entire colon, including the rectum. A small opening is made in the abdominal wall. and the end of the small intestine is attached to the skin of the abdomen to form an ileostomy. Stool collects in a bag that is attached over the ileostomy. Recent improvements in the construction of ileostomies have allowed for continent ileostomies. A continent ileostomy is a pouch created from the intestine. The pouch serves as a reservoir similar to a rectum, and is emptied on a regular basis with a small tube. Patients with continent ileostomies do not need to wear collecting bags.

More recently, a surgery has been developed which allows stool to be passed normally through the anus. In an ileo-anal anastomosis, the large intestine is removed and the small intestine is attached just above the anus. Only the diseased lining of the anus is removed and the muscles of the anus remain intact. In this "pull- through" procedure, the normal route of stool elimination is maintained.

Research in ulcerative colitis is very active, and many questions remain to be answered. The cause, mechanism of inflammation, and optimal treatments have yet to be defined. Researchers have recently identified genetic differences among patients which may allow them to select certain subgroups of patients with ulcerative colitis who may respond differently to medications. Newer and safer medications are being developed. Improvements in surgical procedures to make them safer and more effective continue to emerge.

3. *Write a short summary according to the following questions:*

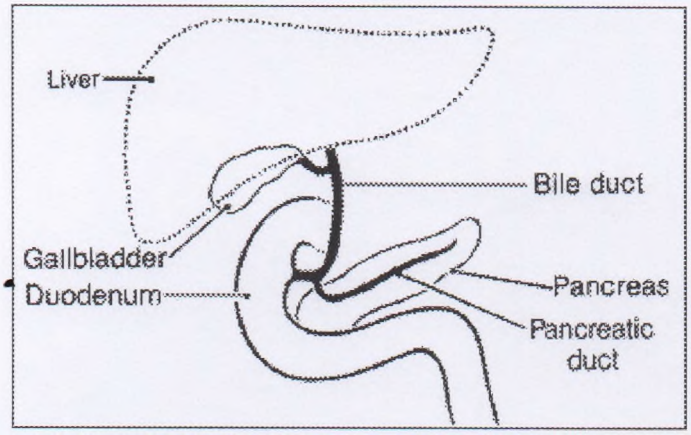
1. What is ulcerative colitis?
2. What causes ulcerative colitis?
3. What are the symptoms of ulcerative colitis?
4. How is the diagnosis of ulcerative colitis made?

PANCREATITIS

Tasks:

1. *Make up a written translation, using the dictionary. Write out new medical terms.*

Your pancreas is a large gland behind your stomach and close to your duodenum. The pancreas secretes powerful digestive enzymes that enter the small intestine through a duct. These enzymes help you digest fats, proteins, and carbohydrates. The pancreas also releases the hormones insulin and glucagon into the bloodstream. These hormones play an important part in metabolizing sugar.



Pancreatitis is a rare disease in which the pancreas becomes inflamed. Damage to the gland occurs when digestive enzymes are activated and begin attacking the pancreas. In severe cases, there may be bleeding into the gland, serious tissue damage, infection, and cysts. Enzymes and toxins may enter the bloodstream and seriously injure organs, such as the heart, lungs, and kidney. There are two forms of pancreatitis. The acute form occurs suddenly and may be a severe, life-threatening illness with many complications. Usually, the patient recovers completely. If injury to the pancreas continues, such as when a patient persists in drinking alcohol, a chronic form of the disease may develop, bringing severe pain and reduced functioning of the pancreas that affects digestion and causes weight loss.

An estimated 50,000 to 80,000 cases of acute pancreatitis occur in the United States each year. This disease occurs when the pancreas suddenly becomes inflamed and then gets better. Some patients have more than one attack but recover fully after each one. Most cases of acute pancreatitis are caused either by alcohol abuse or by gallstones. Other causes may be use of prescribed drugs, trauma or surgery to the abdomen, or abnormalities of the pancreas or intestine. In rare cases, the disease may result from infections, such as mumps. In about 15 percent of cases, the cause is unknown.

Acute pancreatitis usually begins with pain in the upper abdomen, that may last for a few days. The pain is often severe. It may be constant pain, just in the abdomen, or it may reach to the back and other areas. The pain may be sudden and intense, or it may begin as a mild pain that is aggravated by eating and slowly grows worse. The abdomen may be swollen and very tender. Other symptoms may

include nausea, vomiting, fever, and an increased pulse rate. The person often feels and looks very sick. About 20 percent of cases are severe. The patient may become dehydrated and have low blood pressure. Sometimes the patient's heart, lungs, or kidneys fail. In the most severe cases, bleeding can occur in the pancreas, leading to shock and sometimes death.

During acute attacks, high levels of amylase (a digestive enzyme formed in the pancreas) are found in the blood. Changes may also occur in blood levels of calcium, magnesium, sodium, potassium, and bicarbonate. Patients may have high amounts of sugar and lipids (fats) in their blood too. These changes help the doctor diagnose pancreatitis. After the pancreas recovers, blood levels of these substances usually return to normal.

The treatment a patient receives depends on how bad the attack is. Unless complications occur, acute pancreatitis usually gets better on its own, so treatment is supportive in most cases. Usually the patient goes into the hospital. The doctor prescribes fluids by vein to restore blood volume. The kidneys and lungs may be treated to prevent failure of those organs. Other problems, such as cysts in the pancreas, may need treatment too. Sometimes a patient cannot control vomiting and needs to have a tube through the nose to the stomach to remove fluid and air. In mild cases, the patient may not have food for 3 or 4 days but is given fluids and pain relievers by vein. An acute attack usually lasts only a few days, unless the ducts are blocked by gallstones. In severe cases, the patient may be fed through the veins for 3 to 6 weeks while the pancreas slowly heals. Antibiotics may be given if signs of infection arise. Surgery may be needed if complications such as infection, cysts, or bleeding occur. Attacks caused by gallstones may require removal of the gallbladder or surgery of the bile duct. Surgery is sometimes needed for the doctor to be able to exclude other abdominal problems that can simulate pancreatitis or to treat acute pancreatitis. When there is severe injury with death of tissue, an operation may be done to remove the dead tissue. After all signs of acute pancreatitis are gone, the doctor will determine the cause and try to prevent future attacks. In some patients the cause of the attack is clear, but in others further tests need to be done.

Ultrasound is used to detect gallstones and sometimes can provide the doctor with an idea of how severe the pancreatitis is. When gallstones are found, surgery is usually needed to remove them. When they are removed depends on how severe the pancreatitis is. If it is mild, the gallstones often can be removed within a week or so. In more severe cases, the patient may wait a month or more, until he improves, before the stones are removed. The CAT (computer axial tomography) scan may also be used to find out what is happening in and around the pancreas and how severe the problem is. This is important information that the doctor needs to determine when to remove the gallstones. After the gallstones are removed and inflammation subsides, the pancreas usually returns to normal. Before patients leave the hospital, they are advised not to drink alcohol and not to eat large meals.

Chronic pancreatitis usually follows many years of alcohol abuse. It may develop after only one acute attack, especially if there is damage to the ducts of the

pancreas. In the early stages, the doctor cannot always tell whether the patient has acute or chronic disease. The symptoms may be the same. Damage to the pancreas from .drinking alcohol may cause no symptoms for many years, and then the patient suddenly has an attack of pancreatitis. In more than 90 percent of adult patients, chronic pancreatitis appears to be caused by alcoholism. This is more common in men than women and often develops between 30 and 40 years of age. In other cases, pancreatitis may be inherited. Scientists do not know why the inherited form occurs. Patients with chronic pancreatitis tend to have three kinds of problems: pain, malabsorption of food leading to weight loss, or diabetes. Some patients do not have any pain but most do. Pain may be constant in the back and abdomen, and for some patients, the pain attacks are disabling. In some cases, the abdominal pain goes away as the condition advances. Doctors think this happens because pancreatic enzymes are no longer being made by the pancreas. Patients with this disease often lose weight, even when their appetite and eating habits are normal. This occurs because the body does not secrete enough pancreatic enzymes to break down food, so nutrients are not absorbed normally. Poor digestion leads to loss of fat, protein, and sugar into the stool. Diabetes may also develop at this stage if the insulin-producing cells of the pancreas (islet cells) have been damaged.

Diagnosis may be difficult but is aided by a number of new techniques. Pancreatic function tests help the physician decide if the pancreas still can make enough digestive enzymes. The doctor can see abnormalities in the pancreas using several techniques (ultrasonic imaging, endoscopic retrogradecholangiopancreatography (ERCP), and the CAT scan). In more advanced stages of the disease, when diabetes and malabsorption (a problem due to lack of enzymes) occur, the doctor can use a number of blood, urine, and stool tests to help in the diagnosis of chronic pancreatitis and to monitor the progression of the disorder.

The doctor treats chronic pancreatitis by relieving pain and managing the nutritional and metabolic problems. The patient can reduce the amount of fat and protein lost in stools by cutting back on dietary fat and taking pills containing pancreatic enzymes. This will result in better nutrition and weight gain. Sometimes insulin or other drugs must be given to control the patient's blood sugar. In some cases, surgery is needed to relieve pain by draining an enlarged pancreatic duct. Sometimes, part or most of the pancreas is removed in an attempt to relieve chronic pain. Patients must stop drinking, adhere to their prescribed diets, and take the proper medications in order to have fewer and milder attacks.

2. *Answer the questions:*

1. What is pancreatitis?
2. What are the causes of pancreatitis?
3. What are the symptoms of acute pancreatitis?
4. How is acute pancreatitis diagnosed?
5. Is there any treatment?
6. What if the patient has gallstones?

7. What is chronic pancreatitis?
8. How is chronic pancreatitis diagnosed?
9. How is chronic pancreatitis treated?

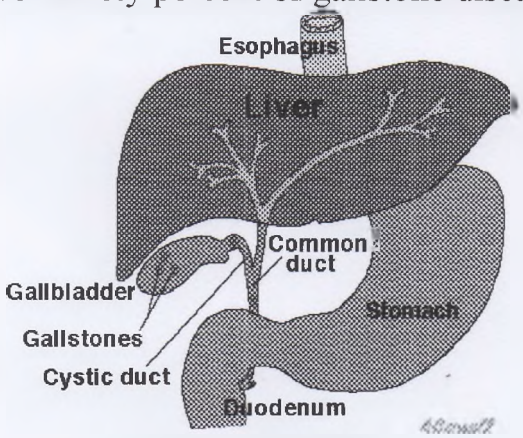
GALLSTONES

Tasks:

1. *Listen to the part of the text attentively and get ready to discuss the information.*

Gallstones *are "pebbles" within the gallbladder.* The gallbladder is a pear-shaped sac located under the liver. It stores the bile secreted by the liver. During a meal (especially one containing fat or protein), the gallbladder contracts, delivering the bile through the bile ducts into the intestines to help with digestion. Abnormal composition of bile leads to formation of gallstones (see below). Gallstone disease is a common cause of abdominal pain, inflammation, and infection of the gallbladder and the pancreas.

There are two types of gallstones; cholesterol and pigment stones. Cholesterol stones are composed of at least sixty percent cholesterol and are common in the United States and Western Europe. Pigment stones are brown or black owing to their high content of colored pigment (bilirubin), and account for over ninety percent of gallstone disease found in the Asia.



GALLSTONES

Gallstone disease is common. An estimated 20% of the world population will develop gallstones during their lives. The disease is most prevalent in Scandinavian countries, and the prevalence of gallstone disease in developing countries appears to be rising.

Bile is produced by the liver and stored in the gallbladder. The principle components in bile are bile salts, bilirubin, and cholesterol. Gallstones are thought to form as a result of an imbalance of these components. Cholesterol is normally kept in liquid form by the dissolving action of bile salts. An increased amount of cholesterol in the bile overwhelms the dissolving capacity of the bile salts, leading to the formation of cholesterol stones. Similarly, a decrease in the amount of bile

salts also promotes cholesterol stone formation. Impaired contraction and emptying of the gallbladder, commonly seen in pregnancy, is another important factor in cholesterol gallstone formation. Pigment stones are frequently associated with chronic infection in the bile. This is most commonly seen in certain Asian countries where parasitic infection of the bile ducts is common. Patients with certain blood diseases that cause excessive breakdown of red blood cells can have increased amounts of bilirubin (breakdown product of red cells) in the bile, thus causing bilirubin stone formation.

Multiple risk factors have been identified for cholesterol gallstone formation. Gallstones are uncommon before adolescence and the incidence increases significantly after age forty. Other risk factors for gallstone disease include womanhood, multiple pregnancies, use of birth control pills, high fat and low fiber diets, obesity, rapid weight loss, certain medications, intestinal diseases that deplete bile salts such as Crohn's disease, and genetics.

The risk of cholesterol gallstones is higher among women, especially in those with multiple pregnancies. The female hormone estrogen increases bile cholesterol and decreases gallbladder contraction. This estrogen effect may also explain the increased risk of gallstone disease in birth control pill users and in women receiving estrogen replacement therapy.

The role of diet in cholesterol gallstone formation is not clear. However, a high calorie, high fat, low fiber diet has been associated with an increased risk of developing cholesterol gallstones. Interestingly, a high serum cholesterol level may not indicate an increased risk whereas high serum triglycerides may. Obesity is associated with increased cholesterol secretion in the bile, thus an increased risk of cholesterol gallstones. When obese individuals undergo rapid weight loss, the risk of gallstone formation further increases. This appears to be a result of increased cholesterol and decreased bile salts in the bile of these patients during rapid weight loss programs.

Diseases that affect the small intestine can deplete bile salts in the body, and lead to cholesterol gallstone formation. This is most notably evidenced by the increased risk of gallstones in patients with Crohn's disease, an inflammatory disease of bowel. For more information, please read the Crohn's Disease article.
Medications prescribed to lower body lipids, such as clofibrate (Atromid-S), may increase cholesterol in the bile and lead to an increased risk of gallstones.

Genetics play a significant role. Gallstones are more common among family members. A striking example of this inheritance is observed in the Pima Indians of the American Southwest, where gallstone disease in young women may reach eighty percent.

Risk factors for pigment stones are less clear, but appear to be related to the increased presence of bilirubin pigment in bile. This is seen in diseases where there is an increased destruction of red blood cells, like sickle-cell disease or where there is underlying liver disease, such as cirrhosis.

The majority of people with gallstones have no symptoms and are unaware of their presence. Gallstones in these individuals are often found as a result of tests (e.g., ultrasound or X-ray examination of the abdomen) performed in evaluating

other medical conditions. However, symptoms can appear later in life. Over a period of five years, approximately ten percent of people with stones will develop symptoms. Once symptoms develop, they are likely to continue and

The most common symptom of gallbladder disease is called biliary colic (gallbladder attack). Biliary colic is a painful condition of the upper abdomen caused by a temporary obstruction of the outflow tract of the gallbladder by a stone. The painful attacks are sporadic and can occur suddenly at any time. In most instances, there is no clear triggering event. Pain attacks awakening the patients from sleep can occur in up to forty percent of those afflicted. The pain is typically felt in the middle or to the right of the upper abdomen, and may travel to the right shoulder, back or neck. The pain becomes intense quickly and resolves gradually over minutes to hours. At times, biliary colic can mimic symptoms of a heart attack. Frequently, the pain is severe and is sometimes associated with nausea and vomiting.

Some patients with gallstones report symptoms such as fatty food intolerance, frequent belching, fullness or a sense of excessive gas. It is unclear whether these symptoms are gallstone related. In these circumstances, it is important to exclude other disease conditions.

Although biliary colic is the most common symptom, other more serious complications can occur. Acute cholecystitis is a complication involving inflammation and infection of the gallbladder as a result of persistent obstruction by a gallstone. Typical symptoms include fever and persistent right upper abdominal pain aggravated by touching, deep breathing, or coughing. An elevated white blood cell count can indicate the presence of inflammation or infection in the gallbladder. Rarely, the gallbladder can perforate or rupture as a result of this inflammation.

When perforation occurs into an adjacent organ, such as the small intestine, a gallstone can migrate through the perforation into the intestine. The gallstone, if it is a large one, then can block (obstruct) the intestine causing a condition known as gallstone ileus (meaning gallstone obstructing the intestine). The intestinal blockage interferes with normal bowel function.

Gallstones may also migrate from the gallbladder to the bile ducts. Bile ducts are conduits which drain bile from the liver and the gallbladder into the intestines. Patients with gallstones in the bile ducts may have no symptoms. When the ducts become obstructed by gallstones, severe abdominal pain, yellowing of eyes and skin (jaundice), bile infection (cholangitis), and pancreatitis can occur. In addition to abdominal pain and jaundice, bile infection can result in high fever, shaking chills, and sometimes a life-threatening spread of bacterial infection into the blood stream (sepsis). Pancreatitis means inflammation of the pancreas, a very painful and potentially serious medical condition.

Prior to 1970, the only treatment for gallstone disease was removal of the gallbladder by surgery. Since that time, several medical alternatives have become available. Patients with stones, but without symptoms, can defer treatment until their stones cause symptoms. When symptoms occur, several options can be considered.

Patients with mild, infrequent symptoms and/or those for whom surgery poses a risk may be candidates for medicines that can dissolve cholesterol gallstones (oral dissolution therapy). Ursodeoxycholic acid (Actigal) is a bile salt that is used in dissolution therapy. Given in pill form over twelve months, it can decrease the amount of cholesterol in the bile. Unfortunately, many patients simply do not experience complete gallstone dissolution. For the few patients who do, fifty percent of them will have gallstones recur within five years. As a result, oral dissolution therapy is not widely used in the management of gallstone disease.

The use of shock waves, or "lithotripsy", has also been examined in the treatment of gallstones. In this method, gallstones are fragmented by shock waves delivered through water. Experience has shown that this may be effective in up to ninety percent of patients who have solitary gallstones. However, patients with solitary stones are a minority of those with gallstones. In addition, the risk of stone recurrence is similar to that seen with dissolution therapy. More recently, solvents have been directly instilled into the gallbladder by means of a small catheter placed through the skin. This has been shown to be very effective in dissolving cholesterol stones and the initial trials are encouraging. Further testing is currently ongoing.

In patients with frequent or severe pain, or with a history of acute cholecystitis, surgery is usually advised. Some otherwise healthy patients who have mild symptoms may also consider the option of surgery because their persistent symptoms have not resolved using other treatments. Traditionally, surgery is performed through an open technique requiring a standard skin incision and general anesthesia. This surgery is called cholecystectomy, and removes the entire gallbladder. In most patients, there appears to be no long term adverse health consequences of losing the gallbladder.

While standard open cholecystectomy is still commonly used, laparoscopic cholecystectomy has now become the preferred surgical technique. During laparoscopic cholecystectomy, a video guided operative system with a camera is inserted into the abdominal cavity. Only several puncture wounds (no open incision) are needed. Additional small incisions are made to allow the introduction of other necessary operating instruments. The gallbladder, containing the stones, is removed without open surgery. With this technique, patients often leave the hospital and return to regular activity within days. In experienced hands, the complication rate of laparoscopic cholecystectomy is low. However, rare complications of laparoscopic surgery can be serious. They include injury and obstruction of bile ducts, or leakage of bile into the abdomen, causing serious infection.

While most patients with gallstone symptoms have stones obstructing the outflow of the gallbladder, some patients also have stones in the bile ducts. In these patients, removal of the gallbladder alone will not cure their gallstone disease or symptoms. Endoscopic retrograde cholangiopancreatography (ERCP) with papillotomy is needed to remove these stones. During ERCP, a flexible tube is placed through the mouth and is advanced to the point where the bile empties into the intestine. A video chip on the end of the ERCP scope allows the entire procedure to be visualized on a television screen. A small catheter can be placed

into the opening of the bile duct through the tube and x-rays of the bile ducts can be performed. When stones are present, the opening of the bile duct can be enlarged (papillotomy) and the stones can be removed. The procedure requires no incisions on the skin and is done with the use of sedatives given in the vein, thereby eliminating the need for general anesthesia.

The treatment of gallstones has changed dramatically over the past twenty-five years. Several treatment options are now available. Although surgical management is most definitive, other non-surgical options are available where surgery is not absolutely necessary. The emergence of new medical modalities and surgical treatments is a result of a greater understanding of the mechanisms underlying gallstone formation. Future directions in gallstone treatment will depend upon improvement in non-surgical methods and refinement of surgical techniques. Most importantly, knowledge of the formation of gallstones can lead to strategies to prevent gallstone formation.

2. *Give Russian equivalents for the following words and word combinations:*

3. *Make up a summary according the following questions:*

1. What are gallstones?
2. Why do gallstones form?
3. Who is at risk for gallstone disease?
4. What are the symptoms of gallstone disease?
5. What are the complications of gallstone disease?
6. What treatments are available for gallstones?
7. What are the future directions in gallstone management?

DIARRHEA

Tasks:

1.*Translate the text in written form, using dictionaries.*

2. *Write out new medical terms and give them definitions.*

3. *Discuss the text.*

Diarrhea generally is defined as frequent and/or loose stools. Diarrhea can be either acute or chronic. Acute diarrhea resolves spontaneously in less than 2-3 weeks while chronic diarrhea lasts longer than 4 weeks.

Viral infections of the stomach and intestines (gastroenteritis) are a very common cause of diarrhea, abdominal cramps, vomiting, and sometimes fever and body- aches. Viral gastroenteritis usually resolves spontaneously after a few days to a week and is not helped by antibiotics. If the diarrhea is severe, prevention of dehydration and blood electrolyte disturbances is important, especially in infants and the elderly.

Food poisoning is a brief illness that is caused by toxins produced by bacteria. With some bacteria, the toxins are produced in the food before it is eaten, while with other bacteria, the toxins are produced in the intestine after the food is eaten. Symptoms usually appear within several hours when food poisoning is caused by toxins that are formed in the food before it is ingested. It takes longer for symptoms to develop when the toxins are formed in the intestine (because it takes time for the bacteria to produce toxins). Therefore, in the latter case, symptoms usually appear after 7-15 hours. When people ingest food that contains toxins or toxin- producing bacteria, they develop abdominal pain, diarrhea, and vomiting. The symptoms of food poisoning usually last less than 24 hours. Antibiotics are not effective for food poisoning. Correcting and preventing dehydration and electrolyte disturbances are the most important considerations.

Traveller's diarrhea is an acute diarrheal illness that is usually caused by infection of the intestines with a bacterium, E. coli. Tourists visiting foreign countries with warm climates and poor sanitation (Mexico, parts of Africa, etc.) can develop traveller's diarrhea. E. coli, the bacterium that causes the diarrhea, is usually found in foods such as fruits, vegetables, seafood, raw meat, water, and ice cubes. Toxins produced by the bacteria cause sudden onset of diarrhea, abdominal cramps, nausea, and sometimes vomiting. These symptoms usually occur 3-7 days after arrival in the foreign country and generally subside without treatment within several days to a week. Pepto-Bismol and antibiotics Cipro, Septra have been shown to reduce the severity and the duration of diarrhea. Correction and prevention of dehydration are the most important considerations. Occasionally, other bacteria or parasites cause traveller's diarrhea (for example, shigella, giardia, campylobacter, and others).

Bacterial enterocolitis refers to illnesses in which bacteria directly invade the inner lining of the small intestine and colon and cause inflammation. These bacteria include campylobacter jejuni, invasive E. coli species (such as EPEC), shigella, and salmonella. These illnesses usually are acquired by drinking contaminated water or eating contaminated foods such as vegetables, poultry, and dairy products. The symptoms and signs of infection include fever, abdominal cramps, urgency in the need to defecate, straining while defecating, and diarrhea that may contain pus and blood.

Bacterial enterocolitis usually subsides within several days to two weeks with or without antibiotics. Antibiotics shorten the duration of illness by only 1-2 days, but they may be prescribed when the infection is severe (high fever and/or abdominal pain, dehydration, and bloody diarrhea), prolonged (more than two weeks), or affects frail individuals (including the very young and the elderly).

C. Difficile is a bacterium that infects the colon. Instead of invading the colon, it produces a toxin that inflames the lining of the colon, thus causing fever, abdominal pain, and diarrhea. This type of infection most commonly occurs in patients who are either taking antibiotics or who have recently completed a course of antibiotics. Special antibiotics such as metronidazole Flagyl and vancomycin (Vancocin) are used to treat C. Difficile colitis.

Giardiasis is a diarrheal illness that is caused by a parasite, Giardia lamblia. It most commonly infects the small intestines of children, travelers, and hikers who drink from contaminated streams and ponds. It is a common cause of diarrhea for non-toilet trained children in day-care centers. Giardia causes acute diarrhea with upper abdominal pain, gas, and cramps. It can also cause chronic diarrhea with foul smelling stools, bloating, and weight loss.

Medications can be a precipitating cause of diarrhea. The medications that most frequently cause diarrhea are antacids and nutritional supplements that contain magnesium. Other classes of medication that cause diarrhea include nonsteroidal anti-inflammatory drugs NSAIDs, chemotherapy medications, antibiotics, medications to control irregular heartbeats (antiarrhythmics), and medications for high blood pressure. A few examples of specific medications that commonly cause diarrhea are misoprostol (Cytotec), quinidine, olsalazine, colchicine, metoclopramide (Reglan), and cisapride (Propulsid).

Carbohydrates that are poorly absorbed are another source of diarrhea. When carbohydrates are not absorbed from the intestines, they cause accumulation of fluid in the colon and provide "food" for bacteria in the colon to convert into gas. Thus excess amounts of poorly absorbed carbohydrates in the intestines can produce gas, cramps, and diarrhea. Lactose is a carbohydrate that is found in milk and other dairy products. Persons with lactose intolerance inadequately absorb lactose because their small intestines have low levels of the enzyme, lactase, which is necessary for the digestion of lactose. Another poorly absorbed carbohydrate is sorbitol, found in dietetic "sugar-free" gum and mints or foods. Fructose, which is found in fruits and soft drinks, is another poorly absorbed carbohydrate.

Many medical conditions can cause chronic diarrhea. Some examples include irritable bowel syndrome, bacterial overgrowth, Crohn's disease, ulcerative colitis, colon cancer, colon polyp (villous adenoma), celiac sprue, hyperthyroidism, Addison's disease, giardiasis and other parasites, medication side effects, laxative abuse, and lactose intolerance.

The major objectives in the treatment of acute diarrhea are:

1. Knowing when to call the doctor
2. Preventing and correcting dehydration
3. Decreasing the frequency and looseness of stools and relieving abdominal cramping with medications
4. Eliminating the infection with antibiotics (when indicated).

- For an infant or young child with acute diarrhea, the pediatrician should be consulted regarding the proper use of oral rehydration solutions in order to avoid an electrolyte (or mineral) imbalance. Oral rehydration is the replacement of body fluids that are lost through diarrhea and/or vomiting. Giving certain rehydration solutions too quickly can lead to abnormally high blood sodium levels and increase the risk of neurological complications

(such as seizures). Administering water or liquids that do not contain electrolytes can lead to equally dangerous low levels of sodium in the blood.

- Acute diarrhea in pregnant women.
- The development of diarrhea in patients who have chronic intestinal diseases such as ulcerative colitis or Crohn's disease. Diarrhea in these patients may represent a worsening of their underlying diseases and require special medications. In addition, certain anti-diarrhea medications available over-the-counter can aggravate moderate to severe ulcerative colitis.
- Diarrhea in persons with illnesses such as diabetes mellitus, heart disease, AIDS.
- Bloody diarrhea may indicate an infection with invasive bacteria, or may represent the development of ulcerative colitis and Crohn's disease.
- High fever (more than 101 degrees F).
- Moderate to severe abdominal tenderness and pain.
- Moderate to severe dehydration.
- Prolonged vomiting that prevents oral fluid intake.
- Diarrhea that occurs during or after completing a course of antibiotics may represent C. Difficile infection and require special antibiotics.
- Diarrhea after returning from developing countries or from camping in the mountains may be due giardiasis and require special treatment.
- Adults with severe, acute diarrhea who show no improvement after 48 hours.
- Children and adults with chronic diarrhea.

Dehydration occurs when there is an excessive loss of fluids and electrolytes (minerals) from the body. Dehydration is common among patients with acute diarrhea who have large amounts of stool and in infants and young children who develop viral gastroenteritis or bacterial infection. Patients with mild dehydration may experience only thirst and dry mouth. Moderate to severe dehydration can cause the following conditions: orthostatic syncope (fainting upon standing up due to a reduced volume of blood, which prompts a drop in blood pressure when standing); a diminished urine output; severe weakness; shock; kidney failure; confusion; acidosis (too much acid in the blood); and coma.

Oral rehydration solutions (ORS) are liquids that contain a carbohydrate (glucose or rice syrup) and electrolytes (sodium, potassium, chloride, and citrate or bicarbonate). Originally, the World Health Organization developed the WHO-ORS to rapidly rehydrate victims of cholera. The WHO-ORS solution contains glucose and electrolytes. The glucose in the solution is important because it induces the small intestines to quickly absorb the fluid and the electrolytes. The purpose of the electrolytes in the solution is the prevention and treatment of electrolyte imbalances. In the United States, convenient premixed commercial ORS products that are similar to the WHO-ORS are now available for rehydration and the prevention of dehydration. Examples of these products are Pedialyte, Rehydralyte, Infalyte, and Resol.

Most of the commercially available ORS products in the United States contain glucose. Infalyte is the only one that contains rice carbohydrate instead of glucose. Most doctors believe that there are no important differences in effectiveness between the glucose and rice carbohydrate.

Most acute diarrheas in infants and young children are due to viral gastroenteritis and are usually short-lived. Antibiotics are not routinely prescribed specifically for viral gastroenteritis. However, fever, vomiting, and loose stools can be symptoms of other childhood infections such as otitis media, pneumonia, urine infection, sepsis (infection in the blood) and meningitis. These illnesses may require early antibiotic treatment. Infants with acute diarrhea can also quickly become severely dehydrated and therefore need early rehydration. For these reasons, sick infants should be evaluated by their pediatricians to identify and treat underlying infections, as well as to provide instructions on the proper use of oral rehydration products.

Infants with moderate to severe dehydration are usually treated with intravenous fluids in the hospital. The pediatrician may decide to treat infants who are mildly dehydrated due to viral gastroenteritis at home with oral rehydration solutions.

Infants that are breast-fed should continue to receive breast milk during the rehydration phase of their illness. Formula feeding is generally discontinued until the vomiting has improved. During and for a short time after recovering from viral gastroenteritis, babies can be lactose intolerant due to a temporary deficiency of lactase enzymes (enzymes necessary to digest lactose in milk) in the small intestines. Patients with lactose intolerance can develop worsening diarrhea and cramps when dairy products are introduced. Therefore, after rehydration with ORS, an undiluted lactose-free formula and dilute juices are recommended. Milk products can be gradually increased as the baby improves.

During mild cases of diarrhea, dilute fruit juices, soft drinks containing sugar, sports drinks, such as Gatorade, and water can be used to prevent dehydration. Caffeine and lactose containing dairy products should be temporarily avoided since they can aggravate diarrhea. If there is no nausea and vomiting, solid foods should be continued. Foods that are usually well tolerated during a diarrheal illness include rice, cereal, bananas, potatoes, and lactose free products.

ORS can be used for moderately severe diarrhea that is accompanied by dehydration in children older than 10 years of age and in adults. These solutions are given at 50ml/kg over 4-6 hours for mild dehydration or 100ml/kg over 6 hours for moderate dehydration. After rehydration, the ORS solution can be used to maintain hydration at 100ml- 200ml/kg over 24 hours until the diarrhea stops. Follow the directions on the solution label for the amounts that are appropriate for your weight. After rehydration, older children and adults should resume solid food as soon as the nausea and vomiting subside. Feeding should begin with rice, cereal, bananas, potatoes, and lactose free and low fat products. Food choices can be expanded as the diarrhea subsides.

The three major types of anti-diarrhea medications that are available over-the-counter in the United States are:

1. Anti-peristaltic agents - such as loperamide (Imodium) and diphenoxylate (Lomotil)
2. Bismuth-based compounds - such as Pepto-Bismol
3. Absorbents - such as attapulgite (Kaopectate, Donnagel) and polycarbophil (Equalavtin)

Anti-peristaltic agents. Loperamide (Imodium) and diphenoxylate (Lomotil) contain anti-peristaltic agents. These agents are similar to opiates (such as codeine). Like opiates, they relax the muscles of the intestines and slow transit through the intestines so that there is more time for fluid to be absorbed from the intestine. This causes less fluid to be excreted in the stools. The relaxation of the intestinal muscles caused by these medications also decreases cramps.

The FDA approved loperamide (Imodium) in 1976 for the relief of acute diarrhea and the treatment of chronic diarrhea in patients with inflammatory bowel disease (Crohn's disease and ulcerative colitis). The effectiveness of loperamide is comparable to that of diphenoxylate (Lomotil). Although loperamide is related chemically to opiates such as codeine and morphine, it does not have the pain-relieving effects of opiates. Moreover, at the dosages used for diarrhea, loperamide is not believed to be addicting.

Lomotil is a combination of two drugs, diphenoxylate and atropine, and is used to treat acute diarrhea. Although diphenoxylate is a man-made opiate that is chemically related to meperidine (Demerol), it does not have pain- relieving actions of most other narcotics. In higher doses, however, as is the case with other opiates, diphenoxylate can cause euphoria (elevation of mood) and physical dependence. In order to prevent abuse of diphenoxylate for its mood-elevating effects, another drug, atropine, is added in small quantities. As a result, if Lomotil is taken in greater than the recommended doses, unpleasant side effects from too much atropine will occur.

When used according to their labeling, these two medications are safe and usually well tolerated. There are some precautions, however, as follows: 1) Loperamide and diphenoxylate with atropine should not be used without a doctor's permission to treat diarrheas that are caused by moderate to severe ulcerative colitis, C. difficile colitis, and enterocolitis caused by invasive bacteria. Using these medications in these situations can prolong the infection and/or aggravate the symptoms. 2) These medications should not be used in infants and children younger than 2 years of age. 3) These agents may cause drowsiness or dizziness, and caution should be used while driving or performing tasks that require alertness and coordination. 4) Most acute diarrheas should improve within 48 hours. If symptoms do not improve or worsen, the doctor should be called.

BISMUTH COMPOUNDS

Tasks:

1. *Give a summary of the text.*

Numerous types of bismuth preparations are available worldwide, such as bismuth subnitrate, bismuth subsalicylate, colloidal bismuth subcitrate, and others. Bismuth subsalicylate (Pepto-Bismol) is available over-the- counter (OTC) as liquids, caplets, or tablets in the United States. It contains two active ingredients; bismuth and salicylate (aspirin). The bismuth component is believed to bind to bacterial toxins and virus and possess antibiotic properties. The salicylate (aspirin) portion is believed to decrease inflammation. Pepto-Bismol is often used for treating acute diarrhea and for preventing and treating Traveler's diarrhea.

Pepto-Bismol generally is well tolerated. Minor side effects include darkening of the stool and tongue. Precautions include:

- Pepto-Bismol contains aspirin. Patients with a true allergy to aspirin should, therefore, not take Pepto- Bismol. A true allergy to aspirin is rare. Aspirin allergy induces hives, difficulty breathing, and shock within 3 hours of taking aspirin. Aspirin allergy is most common among individuals who have asthma, urticaria, and nasal polyps.
- Pepto-Bismol and aspirin products should not be given to children and teenagers with chicken pox, influenza, and other viral infections. Rare cases of Reye's syndrome have been associated with the use of aspirin in this population. Reye's syndrome is a serious illness that is characterized by liver damage, vomiting, and sometimes coma. It has a 50% mortality rate, and those who survive can be left with permanent brain damage.
- Pepto-Bismol should not be used together with other aspirin-containing medications since the combination can produce excessive blood levels of aspirin and symptoms of aspirin toxicity such as ringing in the ears.
- The aspirin in Pepto-Bismol can aggravate ulcer disease and disorders where there is a tendency to bleed.
- Pepto-Bismol should not be given to infants and children younger than 2 years of age.
- The aspirin in Pepto-Bismol can interact with other medications. An important example is the interaction with anticoagulants (Coumadin), where aspirin can increase the risk of bleeding.

ABSORBENDS

Tasks:

1. *Write a short summary of the text according to the question given under the text.*

Attapulgite is an oral, nonabsorbed medication that is used in the management of diarrhea. It works by adsorbing (binding) large numbers of bacteria and toxins and preventing the loss of water. Attapulgite reduces the number of bowel movements, solidifies loose or watery stools, and relieves the gastrointestinal cramping that often is associated with diarrhea. Examples of products containing attapulgite include Donnagel, Kaopectate, and Diasorb.

Polycarbophil (Equalavtin) is a synthetic resin that acts like an absorbent. It can absorb up to 60 times its weight in water.

Attapulgite and polycarbophil are not assimilated into the blood and, therefore, have no side effects outside of the gastrointestinal tract. They generally are well tolerated, although occasional constipation and bloating may occur. Absorbents can absorb prescribed medications and interfere with their absorption. Patients taking prescribed medications should consult their doctors or pharmacists regarding the timing of their doses of absorbents and other drugs to prevent the binding of these medications.

Most cases of bacterial enterocolitis are acute and self- limited and do not require antibiotics. Antibiotics, however, are often used in these situations: (1) patients with more serious and persistent symptoms; (2) patients who have additional debilitating diseases; (3) persons who have parasites; and (4) patients with C. difficile colitis.

1. What are causes of acute diarrhea?
2. What are causes of chronic diarrhea?
3. How is acute diarrhea treated?
4. When should the doctor be called for diarrhea?
5. How can dehydration be prevented or corrected?
6. How is dehydration treated in infants and young children?
7. How is dehydration treated in older children and adults?
8. What medications are used to treat diarrhea?
9. What is the role of antibiotics in treating diarrhea?

Tasks:

1. *Read the text and try to comprehend it.*
2. *Entitle the text.*
3. *Answer the question: What are the causes of acute diarrhea?*

Viral infections of the stomach and intestines (gastroenteritis) are a very common cause of diarrhea, abdominal cramps, vomiting, and sometimes fever and body- aches. Viral gastroenteritis usually resolves spontaneously after a few days to a week and is not helped by antibiotics. If the diarrhea is severe, prevention of dehydration and blood electrolyte disturbances is important, especially in infants and the elderly.

Food poisoning is a brief illness that is caused by toxins produced by bacteria. With some bacteria, the toxins are produced in the food before it is eaten, while with other bacteria, the toxins are produced in the intestine after the food is eaten. Symptoms usually appear within several hours when food poisoning is caused by toxins that are formed in the food before it is ingested. It takes longer for symptoms to develop when the toxins are formed in the intestine (because it takes time for the bacteria to produce toxins). Therefore, in the latter case, symptoms usually appear after 7-15 hours. When people ingest food that contains toxins or

toxin- producing bacteria, they develop abdominal pain, diarrhea, and vomiting. The symptoms of food poisoning usually last less than 24 hours. Antibiotics are not effective for food poisoning. Correcting and preventing dehydration and electrolyte disturbances are the most important considerations.

Traveller's diarrhea is an acute diarrheal illness that is usually caused by infection of the intestines with a bacterium, E. coli. Tourists visiting foreign countries with warm climates and poor sanitation (Mexico, parts of Africa, etc.) can develop traveller's diarrhea. E. coli, the bacterium that causes the diarrhea, is usually found in foods such as fruits, vegetables, seafood, raw meat, water, and ice cubes. Toxins produced by the bacteria cause sudden onset of diarrhea, abdominal cramps, nausea, and sometimes vomiting. These symptoms usually occur 3-7 days after arrival in the foreign country and generally subside without treatment within several days to a week. Pepto-Bismol and antibiotics Cipro, Septra have been shown to reduce the severity and the duration of diarrhea. Correction and prevention of dehydration are the most important considerations. Occasionally, other bacteria or parasites cause traveller's diarrhea (for example, shigella, giardia, campylobacter, and others).

Tasks:

1. *Read the text and translate.*

2. *Entitle the text.*

A hernia is an opening or weakness in the muscular structure of the wall of the abdomen. This defect causes a bulging of the abdominal wall. This bulging is usually more noticeable when the abdominal muscles are tightened, thereby increasing the pressure in the abdomen. Examples of activities that can worsen a hernia are lifting, coughing, or even straining to have a bowel movement. Imagine a barrel with a hole in its side and a balloon that is blown up inside the barrel. Part of the inflated balloon would bulge out through the hole. The balloon going through the hole is like the tissues of the abdomen bulging through a hernia.
Symptoms of a hernia include pain or discomfort and a localized swelling somewhere on the surface of the abdomen or in the groin area.

Serious complications from a hernia result from the trapping of tissues in the hernia -- a process called incarceration. Trapped tissues may have their blood supply cut off, leading to damage or death of the tissue. The treatment of incarceration requires surgery.

The most common location for hernias is the groin (or inguinal) area. There are several reasons for this tendency. First, there is a natural anatomical weakness in groin region, which results from incomplete muscle coverage. Second, the upright position of human posture results in a greater force occurs at the bottom of the abdomen (at the bottom of the barrel), thereby increasing the stress on these weaker tissues. The combination of these factors over time breaks down the support tissues enlarging any pre-existing hole, or leading to a tear, resulting in a

new hole. Several different types of hernia may occur, and frequently coexist, in the groin area. These include indirect, direct, and femoral hernias, which are defined by the location of the opening of the hernia from the abdomen to the groin. Another type of hernia, called a ventral hernia, occurs in the midline of the abdomen, usually above the navel (umbilicus). This type of hernia is usually painless. Hernias can also occur within the navel (umbilical hernia).

KIDNEY STONE

Tasks:

1. *Read the text, translate it.*
2. *Put 5-6 questions on the text and get ready to answer them.*

Cystine kidney stones: Cystine kidney stones are due to cystinuria, an inherited (genetic) disorder of the transport of an amino acid (a building block of protein) called cystine that results in an excess of cystine in the urine (cystinuria) and the formation of cystine stones.

Cystinuria is the most common defect in the transport of an amino acid. Although cystine is not the only overly excreted amino acid in cystinuria, it is the least soluble of all naturally occurring amino acids. Cystine tends to precipitate out of urine and form stones (calculi) in the urinary tract.

Small stones are passed in the urine. However, big stones remain in the kidney (nephrolithiasis) impairing the outflow of urine while medium-size stones make their way from the kidney into the ureter and lodge there further blocking the flow of urine (urinary obstruction).

Obstruction of the urinary tract puts pressure back up on the ureter and kidney. causing the ureter to widen (dilate) and the kidney to be compressed. Obstruction also causes the urine to be stagnant (not moving), an open invitation to repeated urinary tract infection. The pressure on the kidneys and the urinary infections results in damage to the kidneys. The damage can progress to renal insufficiency and end-stage kidney disease, requiring renal dialysis or a transplant. The stone are responsible for all the signs and symptoms of cystinuria, including:

- Hematuria -- blood in the urine;
- Flank pain -- pain in the side, due to kidney pain;
- Renal colic – intense, cramping pain due to stones in the urinary tract;
- Obstructive uropathy -- urinary tract disease due to obstruction; and
- Urinary tract infections.

*A **stone in the kidney** (or lower down in the urinary tract).*

Kidney stones are a common cause of blood in the urine and pain in the abdomen, flank, or groin. Kidney stones occur in 1 in 20 people at some time in their life.

The development of the stones is related to decreased urine volume or increased excretion of stone-forming components such as calcium, oxalate, urate, cystine, xanthine, and phosphate. The stones form in the urine collecting area (the pelvis) of the kidney and may range in size from tiny to staghorn stones the size of the renal pelvis itself.

The cystine stones (below) compared in size to a quarter (a U.S. $0.25 coin) were obtained from the kidney of a young woman by percutaneous nephrolithotripsy (PNL), a procedure for crushing and removing the dense stubborn stones characteristic of cystinuria.

The pain with kidney stones is usually of sudden onset, very severe and colicky (intermittent), not improved by changes in position, radiating from the back, down the flank, and into the groin. Nausea and vomiting are common.

Factors predisposing to kidney stones include recent reduction in fluid intake, increased exercise with dehydration, medications that cause hyperuricemia (high uric acid) and a history of gout.

Treatment includes relief of pain, hydration and, if there is concurrent urinary infection, antibiotics.

The majority of stones pass spontaneously within 48 hours. However, some stones may not. There are several factors which influence the ability to pass a stone. These include the size of the person, prior stone passage, prostate enlargement, pregnancy, and the size of the stone. A 4 mm stone has an 80% chance of passage while a 5 mm stone has a 20% chance. If a stone does not pass, certain procedures (usually by a urology specialist doctor) may be needed.

The process of stone formation is called nephrolithiasis or urolithiasis. "Nephrolithiasis" is derived from the Greek nephros- (kidney) lithos (stone) = kidney stone "Urolithiasis" is from the French word "urine" which, in turn, stems from the Latin "urina" and the Greek "ouron" meaning urine = urine stone. The stones themselves are also called renal calculi. The word "calculus" (plural: calculi) is the Latin word for pebble.

PEPTIC ULCER

Tasks:

1. *Read the text and translate it.*
2. *Put 5-6 questions on the text and get ready to answer them.*
3. *Write a comprehension of the text.*

A peptic ulcer is a hole in the gut lining of the stomach, duodenum, or esophagus. A peptic ulcer of the stomach is called a gastric ulcer; of the duodenum, a duodenal ulcer; and of the esophagus, an esophageal ulcer. An ulcer occurs when the lining of these organs is corroded by the acidic digestive juices which are secreted by the stomach cells. Peptic ulcer disease is common, affecting millions of Americans yearly. The medical cost of treating peptic ulcer and its complications runs in the billions of dollars annually. Recent medical advances have increased our understanding of ulcer formation. Improved and expanded treatment options are now available.

For many years, excess acid was believed to be the major cause of ulcer disease. Accordingly, treatment emphasis was on neutralizing and inhibiting the secretion of stomach acid. While acid is still considered significant in ulcer formation, the leading cause of ulcer disease is currently believed to be infection of the stomach by a bacteria called "Helicobacter pyloridus" (H. pylori). Another major cause of ulcers is the chronic use of anti-inflammatory medications, commonly referred to as NSAIDs (nonsteroidal anti-inflammatory drugs), including aspirin. Cigarette smoking is also an important cause of ulcer formation and ulcer treatment failure.

H. pylori bacteria is very common, infecting more than a billion people worldwide. It is estimated that half of the United States population older than age 60 has been infected with H. pylori. Infection usually persists for many years, leading to ulcer disease in 10 % to 15% of those infected. H. pylori is found in more than 80% of patients with gastric and duodenal ulcers. While the mechanism of how H. pylori causes ulcers is not well understood, elimination of this bacteria by antibiotics has clearly been shown to heal ulcers and prevent ulcer recurrence.
Symptoms of ulcer disease are variable. Many ulcer patients experience minimal indigestion or no discomfort at all. Some report upper abdominal burning or hunger pain one to three hours after meals and in the middle of the night. These pain symptoms are often promptly relieved by food or antacids. The pain of ulcer disease correlates poorly with the presence or severity of active ulceration. Some patients have persistent pain even after an ulcer is completely healed by medication. Others experience no pain at all, even though ulcers return. Ulcers often come and go spontaneously without the individual ever knowing, unless a serious complication (like bleeding or perforation) occurs.

The diagnosis of an ulcer is made by either a barium upper GI x-ray or an upper endoscopy (EGD-esophagogastroduodenoscopy) The barium upper GI x-ray is easy to perform and involves no risk or discomfort. Barium is a chalky substance

administered orally. Barium is visible on x- ray, and outlines the stomach on x-ray film. However, barium x-rays are less accurate and may not detect ulcers up to 20% of the time.

An upper endoscopy is more accurate, but involves sedation of the patient and the insertion of a flexible tube through the mouth to inspect the stomach, esophagus, and duodenum. Upper endoscopy has the added advantage of having the capability of removing small tissue samples (biopsies) to test for H. pylori infection. Biopsies can also be examined under a microscope to exclude cancer. While virtually all duodenal ulcers are benign, gastric ulcers can occasionally be cancerous. Therefore, biopsies are often performed on gastric ulcers to exclude cancer.

ABDOMINAL PAIN

Tasks:

1. *Read the text and translate it.*
2. *Write out new medical words and word combinations.*
3. *Answer the question:"How can you determine the cause of abdominal pain".*

Abdominal pain is pain that is felt in the abdomen. The abdomen is an anatomical area that is bounded by the lower margin of the ribs above, the pelvic bone (pubic ramus) below, and the flanks on each side. Although abdominal pain can arise from the tissues of the abdominal wall that surround the abdominal cavity (i.e., skin and abdominal wall muscles), the term abdominal pain generally is used to describe pain originating from organs within the abdominal cavity (i.e., beneath the skin and muscles). These organs include the stomach, small intestine, colon, liver, gallbladder, and pancreas. Occasionally, pain may be felt in the abdomen even though it is arising from organs that are close to but not within the abdominal cavity, for example, the lower lungs, the kidneys, and the uterus or ovaries. This latter type of pain is called "referred" pain because the pain, though originating outside the abdomen, is being referred to (felt) in the abdominal area.

Abdominal pain is caused by inflammation (e.g., appendicitis, diverticulitis, colitis), by stretching or distention of an organ (e.g., obstruction of the intestine, blockage of a bile duct by gallstones, swelling of the liver with hepatitis), or by loss of the supply of blood to an organ (e.g., ischemic colitis). To complicate matters, however, abdominal pain also can occur without inflammation, distention or loss of blood supply. An important example of this latter type of pain is the irritable bowel syndrome (IBS). It is not clear what causes the abdominal pain in IBS, but it is believed to be due either to abnormal contractions of the intestinal muscles (e.g., spasm) or abnormally sensitive nerves within the intestines that give rise to painful sensations inappropriately (visceral hyper-sensitivity).

Doctors determine the cause of abdominal pain by relying on 1) characteristics of the pain, 2) findings on physical examination, 3) laboratory, radiological, and endoscopic testing, and 4) surgery.

The following information, obtained by taking a patient's history, is important in helping doctors determine the cause of pain:

- **The way the pain begins.** For example, abdominal pain that comes on suddenly suggests a sudden event, for example, the interruption of the supply of blood to the colon (ischemia) or obstruction of the bile duct by a gallstone (biliary colic).
- **The location of the pain.** Appendicitis typically causes pain in the right lower abdomen, the usual location of the appendix. Diverticulitis typically causes pain in the left lower abdomen where most colonic diverticuli are located. Pain from the gallbladder (biliary colic or cholecystitis) typically is felt in the right upper abdomen where the gallbladder is located.
- **The pattern of the pain.** Obstruction of the intestine initially causes waves of crampy abdominal pain due to contractions of the intestinal muscles and distention of the intestine. Obstruction of the bile ducts by gallstones typically causes steady (constant) upper abdominal pain that lasts between 30 minutes and several hours. Acute pancreatitis typically causes severe, unrelenting, steady pain in the upper abdomen and upper back. The pain of acute appendicitis initially may start near the umbilicus, but as the inflammation progresses, the pain moves to the right lower abdomen. The character of pain may change over time. For example, obstruction of the bile ducts sometimes progresses to inflammation of the gallbladder with or without infection (acute cholecystitis). When this happens, the characteristics of the pain change to those of inflammatory pain. (See below.)
- **The duration of the pain.** The pain of IBS typically waxes and wanes over months or years and may last for decades. Biliary colic lasts no more than several hours. The pain of pancreatitis lasts one or more days.
- **What makes the pain worse.** Pain due to inflammation (appendicitis, diverticulitis, cholecystitis, pancreatitis) typically is aggravated by sneezing, coughing or any jarring motion. Patients with inflammation as the cause of their pain prefer to lie still.
- **What relieves the pain.** The pain of IBS and constipation often is relieved temporarily by bowel movements. Pain due to obstruction of the stomach or upper small intestine may be relieved temporarily by vomiting which reduces the distention that is caused by the obstruction. Eating or taking antacids may temporarily relieve the pain of ulcers of the stomach or duodenum because both food and antacids neutralize (counter) the acid that is responsible for irritating the ulcers and causing the pain.
- **Associated signs and symptoms.** The presence of fever suggests inflammation. Diarrhea or rectal bleeding suggests an intestinal cause of the pain. The presence of fever and diarrhea suggest inflammation of the intestines that may be infectious or non-infectious (ulcerative colitis or Crohn's disease).

PHYSICAL EXAMINATION

Tasks:

1. *Read the text and try to comprehend it.*
2. *Retell the physical examination of of the patient with abdominal pain.*
3. *What laboratory tests must the patient do to determine the disease?*
4. *Make up a dialogue and get ready to act in a part of Doctor and Patient.*

Examining the patient will provide the doctor with additional clues to the cause of abdominal pain. The doctor will determine:

1. The presence of sounds coming from the intestines that occur when there is obstruction of the intestines,
2. The presence of signs of inflammation (by special maneuvers during the examination),
3. The location of any tenderness
4. The presence of a mass within the abdomen that suggests a tumor or abscess (a collection of infected pus)
5. The presence of blood in the stool that may signify an intestinal problem such as an ulcer, colon cancer, colitis, or ischemia.

For example, finding tenderness and signs of inflammation in the left lower abdomen often means that diverticulitis is present, while finding a tender (inflamed) mass in the same area may mean that the inflammation has progressed and that an abscess has formed. Finding tenderness and signs of inflammation in the right lower abdomen often means that appendicitis is present, while finding a tender mass in the same area may mean that appendicle inflammation has progressed and become an abscess. Inflammation in the right lower abdomen, with or without a mass, also may be found in Crohn's disease. (Crohn's disease most commonly affects the last part of the small intestine, usually located in the right lower abdomen.) A mass without signs of inflammation may mean that a cancer is present.

Tests

While the history and physical examination are vitally important in determining the cause of abdominal pain, testing often is necessary to determine the cause.

Laboratory tests. Laboratory tests such as the complete blood count (CBC), liver enzymes, pancreatic enzymes (amylase and lipase), and urinalysis are frequently performed in the evaluation of abdominal pain. An elevated white count suggests inflammation or infection (as with appendicitis, pancreatitis, diverticulitis, or colitis). Amylase and lipase (enzymes produced by the pancreas) commonly are elevated in pancreatitis. Liver enzymes may be elevated with gallstone attacks.

Blood in the urine suggests kidney stones. When there is diarrhea, white blood cells in the stool suggest intestinal inflammation.

Plain x-rays of the abdomen. Plain abdominal x-rays of the abdomen also are referred to as a KUB (because they include the Kidney, Ureter, and Bladder). The KUB may show enlarged loops of intestines filled with copious amounts of fluid and air when there is intestinal obstruction. Patients with a perforated ulcer may have air escape from the stomach into the abdominal cavity. The escaped air often can be seen on a KUB on the underside of the diaphragm. Sometimes a KUB may reveal a calcified kidney stone that has passed into the ureter and resulted in referred abdominal pain

Radiographic studies. Abdominal ultrasound is useful in diagnosing gallstones, cholecystitis appendicitis, or ruptured ovarian cysts as the cause of the pain. Computerized tomography (CT) of the abdomen is useful in diagnosing pancreatitis, pancreatic cancer, appendicitis, and diverticulitis, as well as in diagnosing abscesses in the abdomen. Special CT scans of the abdominal blood vessels can detect diseases of the arteries that block the flow of blood to the abdominal organs. Magnetic resonance imaging (MRI) is useful in diagnosing gallstones that have passed out of the gallbladder and are obstructing the bile ducts. Barium x-rays of the stomach and the intestines (upper gastrointestinal series or UGI with a small bowel follow-through) can be helpful in diagnosing ulcers, inflammation, and blockage in the intestines.

Endoscopic procedures. Esophagogastroduodenoscopy or EGD is useful for detecting ulcers, gastritis (inflammation of the stomach), or stomach cancer. Colonoscopy or flexible sigmoidoscopy is useful for diagnosing infectious colitis, ulcerative colitis, or colon cancer. Endoscopic ultrasound (EUS) is useful for diagnosing pancreatic cancer or gallstones if the standard ultrasound or CT or MRI scans fail to detect them.

Surgery. Sometimes, diagnosis requires examination of the abdominal cavity either by laparoscopy or surgery.

Special problem in irritable bowel syndrome (IBS) of diagnosing the cause of abdominal pain .

As previously discussed, the pain of IBS is due either to abnormal intestinal muscle contractions or visceral hypersensitivity. Generally, abnormal muscle contractions and visceral hypersensitivity are much more difficult to diagnose than other diseases causing abdominal pain, particularly since there are no typical abnormalities of the physical examination or the usual tests. The diagnosis is based on the history (typical symptoms) and the absence of other causes of abdominal pain.

Modern advances in technology have greatly improved the accuracy, speed, and ease of establishing the cause of abdominal pain, but significant challenges remain. There are many reasons why diagnosing the cause of abdominal pain can be difficult. They are:

- **Symptoms may be atypical.** For example, the pain of appendicitis sometimes is located in the right upper abdomen, and the pain of diverticulitis on the right side. Elderly patients and patients taking

corticosteroids may have little or no pain and tenderness when there is inflammation, for example, cholecystitis or diverticulitis. This occurs because corticosteroids reduce the inflammation.

- **Tests are not always abnormal.** Ultrasound examinations can miss gallstones, particularly small ones. CT scans may fail to show pancreatic cancer, particularly small ones. The KUB can miss the signs of intestinal obstruction or stomach perforation. Ultrasounds and CT scans may fail to demonstrate appendicitis or even abscesses, particularly if the abscesses are small. The CBC and other blood tests may be normal despite severe infection or inflammation, particularly in patients receiving corticosteroids.
- **Diseases can mimic one another.** IBS symptoms can mimic bowel obstruction, cancer, ulcer, gallbladder attacks or even appendicitis. Crohn's disease can mimic appendicitis. Infection of the right kidney can mimic acute cholecystitis. A ruptured right ovarian cyst can mimic appendicitis, while a ruptured left ovarian cyst can mimic diverticulitis. Kidney stones can mimic appendicitis or diverticulitis.
- **The characteristics of the pain may change.** Examples discussed previously include the extension of the inflammation of pancreatitis to involve the entire abdomen and the progression of biliary colic to cholecystitis.

Before the visit, prepare written lists of:

- Medications you are currently taking, including herbs, vitamins, minerals, and food supplements.
- Your allergies
- The medications that you have tried for your abdominal pain.
- Important medical illnesses that you have such as diabetes, heart disease, etc..
- Previous surgeries such as appendectomy, hernia repairs, gallbladder removal, hysterectomy, etc..
- Previous procedures such as colonoscopy, laparoscopy, CAT scan, ultrasound, upper or lower barium x-rays, etc..
- Previous hospitalizations
- Ill family members who have symptoms similar to yours.
- Family members with gastrointestinal diseases (involving the esophagus, stomach, intestines, liver, pancreas, and gallbladder).
- Be candid with your doctor about your prior and current alcohol consumption and smoking habits, any history of chemical dependence.

Be prepared to tell your doctor:

- When the pain first started
- If there were previous episodes of similar pain.
- How frequently episodes of pain occur

- If each episode of pain starts gradually or suddenly
- The severity of the pain
- What causes the pain and what makes the pain worse
- What relieves the pain
- The characteristics of the pain. Is the pain sharp or dull, burning or pressure like? Is the pain jabbing and fleeting, steady and unrelenting or crampy (coming and going)?
- If the pain is associated with fever, chills, sweats, diarrhea, weight loss, constipation, rectal bleeding, loss of appetite, nausea or loss of energy?

After the visit, do not expect an instant cure or immediate diagnosis, and remember:

- Multiple office visits and tests (blood tests, radiographic studies, or endoscopic procedures) are often necessary to establish the diagnosis and/or to exclude serious illnesses.
- Doctors may start you on a medication before a firm diagnosis is made. Your response (or lack of response) to that medication sometimes may provide your doctor with valuable clues as to the cause of your abdominal pain. Therefore, it is important for you to take the medication that is prescribed.
- Notify your doctor if your symptoms are getting worse, if medications are not working, or if you think you are having side effects from the medication.
- Call your doctor for test results. Never assume that "the test must be fine since my doctor never called."
- Do not self medicate (including herbs, supplements) without discussing with your doctor.
- Even the best physician never bats 1000. Do not hesitate to openly discuss with your doctor referrals for second or third opinions if diagnosis cannot be firmly established and pain persists.
- Self education is important, but make sure what you read came from credible sources.

5. *Write a summary according to the following plan:*

1. What is abdominal pain?
2. What causes abdominal pain?
3. How is the cause of abdominal pain diagnosed?
4. Special problem in irritable bowel syndrome (IBS) of diagnosing the cause of abdominal pain
5. Why can diagnosis of the cause of abdominal pain be difficult?
6. How can I help my doctor to determine the cause of my abdominal pain?

UPPER ENDOSCOPY

Tasks:

1. *Read the text . Translate it.*
2. *Write out new medical terms and give their definitions.*
3. *Describe a procedure of upper endoscopy.*
4. *Put 6-7 questions on the text and get ready to answer them.*

It is a procedure that enables the examiner (usually a Gastroenterologist) to examine your esophagus (swallowing tube), stomach, and duodenum (first portion of small bowel) using a thin flexible tube that can be looked through or seen on a TV monitor.

To accomplish a safe and complete examination, the stomach should be empty. You will most likely be asked to have nothing to eat or drink for 6 hours, or more, before the procedure. Prior to the scheduling you should inform your physician of any medications you are taking, any allergies, and all your health problems. This information will remind your doctor whether you need any antibiotics prior to the test, what potential medications should not be used during the exam because of your allergies, and will give the scheduling individual an opportunity to instruct you whether any of your medications should be held or adjusted prior to the endoscopy. Knowledge whether you have any major health problems, such as heart or lung diseases, will alert the examiner of possible need for special attention during the procedure.

Esophagogastroduodenoscopy (EGD) is usually performed to evaluate possible problems with the esophagus, stomach or duodenum and evaluate symptoms such as upper abdominal pain, nausea or vomiting, difficulty in swallowing, anemia, etc. It is more accurate than x-ray for detecting inflammation or small lesions such as ulcers or tumors within the reach of the instrument. Its other major advantage over x-ray is the ability to perform biopsies (obtain small pieces of tissue) or cytology (obtain some cells with a fine brush) for microscopic examination to determine its nature and whether the lesion is benign or malignant (cancerous). Biopsies are taken for many reasons and may not mean that cancer is suspected. It can also be used to treat many conditions within its reach. The endoscope's channels permit passage of accessory instruments enabling the examiner to treat many of the conditions such as stretching areas of narrowing (strictures), removal of benign growths such as polyps or of accidentally swallowed objects, treating upper gastrointestinal bleeding as seen in ulcers or lining tears which, in the last two, has markedly reduced the need for transfusions or surgery.

It is most likely that before the procedure the doctor will discuss with you why the test is being ordered, whether there are alternative means to accomplish the same, and what possible complications may result from the endoscopy. Practices vary amongst physicians but you may have your throat sprayed with a

numbing solution and will probably be given a sedating and pain alleviating medication through the vein. While lying on your left side the flexible endoscope, the thickness of a finger, is passed through the mouth into the esophagus, stomach, and duodenum. This procedure will NOT interfere with your breathing. Most patients experience only minimal discomfort during the test and many sleep throughout the entire procedure.

After the test you will be observed and monitored by a qualified individual in the endoscopy or a recovery area until a significant portion of the medication has worn off. Occasionally a patient is left with a mild sore throat, which promptly responds to saline gargles, or a feeling of distention from the insufflated air that was used during the procedure. Both problems are mild and fleeting. When fully recovered you will be instructed when to resume your usual diet (probably within a few hours) and your driver will be allowed to take you home. (Because of the use of sedation, most facilities mandate that you be taken by a driver and not to drive or handle machinery for the remainder of the day.)

Under most circumstances the examining physician will inform you of the test results or the probable findings prior to your discharge from the recovery area. The results of biopsies or cytology usually take 72-96 hours and the doctor may only give you a presumptive diagnosis pending the definitive one, after the microscopic examination.

Endoscopy is a safe procedure and when performed by a physician with specialized training in these procedures, the complications are extremely rare. They may include localized irritation of the vein where the medication was administered, reaction to the medication or sedatives used, complications from pre-existing heart, lung or liver disease, bleeding may occur at the site of a biopsy or removal of a polyp (which if it occurs is almost always minor and rarely requires transfusions or surgery). Major complications such as perforation (punching a hole through the organ) are very rare and usually require surgical repair. If you still have any questions about your need for this exam, the cost of this procedure and whether it is covered by your insurance, methods of billing, or any hesitations about this exam, do not hesitate to speak to your doctor or his staff about your concerns. Most endoscopists are highly trained specialists and will be happy to discuss with you their qualifications and answer any questions you may have left.

UPPER GI SERIES

Tasks:

1. *Read the text and prove that : "Any X-ray test procedure involves some risk of radiation exposure".*

An upper GI (gastrointestinal) series, or barium swallow, is a radiology test which is used to visualize the structures of the upper digestive system (the

esophagus, stomach and duodenum). These structures are seen during the examination and the images are also saved for further review on x-ray film. The results of an upper GI series can reveal conditions such as ulcers, tumors, hiatal hernias, scarring, blockages, and abnormalities of the muscular wall of the gastrointestinal tissues.

Any x-ray test procedure involves some risk of radiation exposure. The radiation exposure is minimized by standard techniques that have been assigned and approved by national and international radiology committees and councils. Radiology technicians are certified by national certifying boards.

Patients who are or may be pregnant should notify the requesting practitioner and radiology staff, as there is potential risk of harm to the fetus with any radiation exposure.

A radiology technologist guides the patient through the upper GI series test along with a radiologist (a physician trained in performing and interpreting x-rays). Because an upper GI series involves interpreting images of the gastrointestinal system, it is important that any materials or objects internally or externally that could potentially interfere with interpretation of the x-ray film be avoided. Therefore, prior to an upper GI series, patients are requested not to eat or drink anything from four to eight hours before the procedure. Patients are also asked to remove extraneous clothing and all metallic objects, such as jewelry.

The patient will be positioned behind x-ray equipment called a fluoroscope for x-ray exposure. The patient is then asked to swallow a liquid which contains barium. The barium coats the lining of the intestinal tract which makes these organs visible. X-rays of the stomach and intestine done without barium provide very little detail and information by comparison. X-ray images are obtained at different angles through the upper chest and abdomen. The x-ray machine (fluoroscope) produces these images by sending x-ray radiation through the tissues of the body to a film on the opposite side of the body. As the radiation penetrates the body, it is absorbed in varying amounts by different body tissues. Due to differences in their composition, the different organs and certain abnormalities and conditions all become visible on the x-ray film, since they block the penetration of the x-ray beam to varying degrees. After development of the film, an image of the organs is revealed. The radiologist then examines the x-rays and can define various normal and abnormal structures of the gastrointestinal system. If needed, further enhancement of the different structures can be obtained by having air as well as barium in the stomach. This is accomplished by swallowing baking soda crystals.
As barium passes through the digestive system, constipation can result. Therefore, it is generally advisable that patients who undergo an upper GI series drink extra fluids after the test and consider a laxative to relieve the bowels of the barium. After passing in the stool, barium has a whitish appearance which may be noticed for several days after the test.

After the radiology technician develops the x-ray film, it is transferred to the radiologist physician. The radiologist interprets the body images produced on the x-ray film. The radiologist then generates a report that is transmitted to the practitioner physician who requested the test. The radiologist and the practitioner

often go over the findings together. The practitioner can review the results of the upper GI series with the patient and can proceed with therapy or discuss whether other tests may be necessary.

2. *Discuss the text according to the following plan:*

- An upper gastrointestinal series (barium swallow) is an x-ray test used to define the anatomy of the upper digestive tract.
- Women who are or may be pregnant should notify the doctor requesting the procedure and the radiology staff.
- An upper gastrointestinal series involves filling the esophagus, stomach, and small intestines with a white liquid material (barium).

NAUSEA, VOMITING, ANTIEMETICS

Tasks:

1. *Read the text and translate it.*
2. *Write out new medical words and word combinations .*
3. *What is the name of the remedies that are used to treat nausea and vomiting?*
4. *Get ready to speak on the structure of digestive system.*

***Nausea** and **vomiting** occur for many reasons.* The most common causes are motion sickness or self-limited illnesses that last a few hours to a few days. When nausea and/or vomiting are persistent or when they are accompanied by other severe symptoms such as abdominal pain, fever, jaundice, or bleeding, a physician should be consulted. Medical attention should also be sought for individuals with severe or ongoing vomiting who have other serious medical problems, are elderly, are very young, or are pregnant or nursing infants.

Viral infections can cause nausea and vomiting, which is sometimes associated with diarrhea, in individuals of all ages. Often, an "outbreak" can be identified with several cases occurring in the same household. Cases of "food poisoning," which are caused by bacteria, can cause similar symptoms. In both situations, the illnesses generally run their course over a period of several days and resolve without treatment.

Medications can cause nausea and even vomiting and should be suspected when the symptoms appear within a short time after starting a new medication. The prescribing physician should always be notified in such a situation.

Motion sickness may occur in many settings including travel by car, air, or boat. This may be the best setting for the use of over-the-counter medications for nausea and vomiting. Other inner ear problems that are related to motion sickness can create a feeling of nausea as well.

Remedies that are used to treat nausea and vomiting are called antiemetics. Many types of antiemetics can decrease the severity of nausea, although most

require a physician's prescription and, therefore, a medical evaluation. Medicines that are available over-the-counter are mainly recommended for use in motion sickness and for cases of mild nausea.

- **Meclizine hydrochloride** (Bonine) is an antihistamine that is effective in the treatment of nausea, vomiting, and dizziness associated with motion sickness. It should not be taken by people with lung diseases, glaucoma, or difficulty with urination due to an enlarged prostate unless recommended by a physician. Meclizine may cause drowsiness and should not be taken with other medicines having sedative side effects such as alcohol, tranquilizers, or sleeping pills. Due to drowsiness, persons using meclizine should not drive or operate dangerous machinery. Meclizine is not recommended in children under 12 or in pregnant or nursing females unless recommended by a doctor.
- **Dimenhydrinate** (Dramamine) also is an antihistamine. Its use should be limited to motion sickness. Due to the potential for causing drowsiness, dimenhydrinate should be avoided in the same situations as Meclizine. Several different formulations of Dimenhydrinate are available, including a children's liquid, which should be used according to the directions under the direction of a physician. Dramamine Less Drowsy Formula contains meclizine, like Bonine, and may have fewer sedative side effects. Both meclizine and dimenhydrinate are recommended to be taken about an hour before travel to prevent motion sickness.
- **Emetrol** is an oral solution designed to soothe the stomach when nausea and vomiting are caused by a viral or bacterial infection or overeating. Emetrol contains sugar and phosphoric acid. Diabetics should not use Emetrol without medical supervision because of the concentrated sugar. According to its manufacturer, Emetrol should not be taken for more than five doses in one hour without consulting a physician. A doctor should also be consulted when considering using this medicine for pregnant or nursing women and young children.
- **Pepto-Bismol** is a product containing bismuth subsalicylate, a chemical shown to be effective in relieving nausea and upset stomach. This remedy works by a direct effect on the stomach lining and has no known serious side effects. It may cause darkening of the stool color and of the tongue. Pregnant or nursing women should consult their doctors before using Pepto-Bismol since part of the active ingredient (the salicylate) is chemically similar to aspirin, which may be detrimental to infants and the fetus. Patients with an allergy to aspirin or related drugs also should not use Pepto-Bismol. It should also be used under the direction of a physician by patients who take anticoagulants (blood thinners) or those with diabetes or gout because the salicylate may further promote the anticoagulant effect.

THE LYMPHATIC SYSTEM

The lymphatic system and the cardiovascular system are closely related structures that are joined by a capillary system. This is important to the body's defense mechanisms. It filters out organisms that cause disease, produces certain white blood cells and generates antibodies. It is also important for the distribution of fluids and nutrients in the body, because it drains excess fluids and protein so that tissues do not swell up. "Lymph" is a milky body fluid that contains a type of white blood cells, called "lymphocytes," along with proteins and fats. Lymph seeps outside the blood vessels in spaces of body tissues and is stored in the "lymphatic" system to flow back into the bloodstream. Through the flow of blood in and out of arteries, and into the veins, and through the lymph nodes and into the lymph, the body is able to eliminate the products of cellular breakdown and bacterial invasion. Two very large areas are of significance in this system - the right lymphatic duct which drains lymph fluid from the upper right quarter of the body above the diaphragm and down the midline, and the thoracic duct, a structure roughly sixteen inches long located in the mediastinum of the pleural cavity which drains the rest of the body. It is through the actions of this system including the spleen, the thymus, lymph nodes and lymph ducts that our body is able to fight infection and to ward off invasion from foreign invaders. Lymph plays an important role in the immune system and in absorbing fats from the intestines. The lymphatic vessels are present wherever there are blood vessels and transport excess fluid to the end vessels without the assistance of any "pumping" action. There are more than 100 tiny, oval structures (called lymph nodes). These are mainly in the neck, groin and armpits, but are scattered all along the lymph vessels. They act as barriers to infection by filtering out and destroying toxins and germs. The largest body of lymphoid tissue in the human body is the spleen.

Thyroid & Iodine...What You Should Know - Part 1

Many of my patients ask questions or make comments about iodine use in thyroid disease. Examples are: " Should I increase the iodine in my diet if I'm hypothyroid?" "My mother had hyperthyroidism, and they told her it was because of a lack of iodine." " My sister has thyroid disease, and to avoid getting it, I'm taking Kelp tablets." "Can I eat sushi if I take Synthroid?"

Although these questions and comments are relevant, this subject is peppered with "old wives tales" and folklore. In the first part of this discussion, I'd like to focus on the role iodine in relation to the thyroid gland and its function.... a bit of physiology for the beginner. Later, I will discuss how an excess or deficiency of iodine can contribute to diseases of the thyroid gland.

The major function of the thyroid gland is to produce thyroid hormone in an amount sufficient to meet the body's needs. To make thyroid hormone, the thyroid uses iodine. If iodine is not available in the diet, the thyroid may produce an insufficient amount of hormone.

Areas in the United States where iodine deficiency occurs are scarce. In North America, iodine is added to salt and bread. It is also present in additives, water sources, medications, and dietary supplements. The daily iodine intake varies widely throughout the world. A minimum of 60 micrograms of elemental iodine per day is required to make thyroid hormone. The following lists examples of average iodine intake in various countries and the recommended amount of iodine consumption:

Typical Iodine Intakes

North America	200-700 micrograms/day
Germany	20-150 micrograms/day
Chile	50-150 micrograms/day
Switzerland	130-180 micrograms/day

Recommended Daily Intake

Adults	150 micrograms/day
Children	90-120 micrograms/day
Pregnant Women	200 micrograms/day

Thyroid & Iodine - Part II

Part I of this article focused on the mechanisms of iodine and iodide as related to thyroid hormone production. We outlined the amount of iodine needed for normal thyroid function and we discussed the availability and consumption of iodine throughout the world. In this section, we will discuss the effects of iodine deficiency and excess on thyroid function.

Iodine Deficiency

Most animals, including humans, have an ability to conserve the iodine within their bodies if there is a deficiency of iodine consumed in food. If an inadequate intake continues, however, the ability to make thyroid hormone is slowly depleted. Many cellular processes occur to keep the thyroid as efficient as possible and the thyroid gland often enlarges in an attempt to maintain function. Subsequently, a goiter may form as the thyroid is stimulated to try to make more thyroid hormone.Basically, the changes in hormone levels (namely T4, T3, and TSH) are similar to those that occur in patients who develop low thyroid hormone blood levels (hypothyroidism) from an underlying disease, such as Hashimoto's disease.

Iodine Excess

In making thyroid hormone, the body responds to increasing doses of iodine intake by first increasing hormone production and then decreasing production by blocking the incorporation of iodine into thyroid hormone. This blockage is protective. The body simply cannot allow all of the iodine received to turn into hormone without regulation. If this happened, there could be too much hormone produced, thereby resulting in toxic levels of thyroid hormone.

While this regulation is complicated, a decrease in the utilization of iodide is called the "Wolff-Chaikoff" effect. If a patient has an underlying problem with the thyroid gland, such as Hashimoto's disease or Graves' disease, this protective mechanism may actually be detrimental. In these cases, the gland already is diseased, and, on top of that, the Wolff-Chaikoff effect takes place. In such situations, a goiter can develop or hypothyroidism can occur if large amounts of iodide are given for long periods of time. The gland can sometimes overcome this effect by "escaping" or adapting in a successful way. In these cases, the blockage of hormone formation may be partially relieved and the patient can regain some thyroid function.

In large quantities, iodine can reduce the release of thyroid hormones from the thyroid gland. If the hormones are not released, their effects won't be seen. Occasionally, doctors use this mechanism to control very active thyroid glands that produce too much thyroid hormone. This type of therapy is difficult and is not used as commonly today. An excess of iodine also decreases the blood flow and growth of the thyroid gland, which is characteristic of Graves' disease. As a result, iodine may be used to reduce the thyroid hormone level in conjunction with surgery to remove some or all of the thyroid gland tissue and assure a good outcome.

Thyroid Blood Tests

The thyroid gland produces hormones that are essential for normal body metabolism. Blood testing is now commonly available to determine the adequacy of the levels of thyroid hormones. These blood tests can define whether the thyroid gland's hormone production is normal, overactive, or underactive.

Thyroid hormones are produced by the thyroid gland. This gland is located in the lower part of the neck, below the Adam's apple. The gland wraps around the windpipe (trachea) and has a shape that is similar to a butterfly - formed by two wings (lobes) and attached by a middle part (isthmus).

The thyroid gland uses iodine (mostly available from the diet in foods such as seafood, bread, and salt) to produce thyroid hormones. The two most important thyroid hormones are thyroxine (T4) and triiodothyronine (T3), which account for 99.9% and 0.1% of thyroid hormones present in the blood respectively. However, the hormone with the most biological activity is T3. Once released from the thyroid gland into the blood, a large amount of T4 is converted into T3 - the active hormone that affects the metabolism of cells.

Thyroid hormone regulation -- the chain of command

The thyroid itself is regulated by another gland that is located in the brain, called the pituitary. In turn, the pituitary is regulated in part by the thyroid (via a "feedback" effect of thyroid hormone on the pituitary gland) and by another gland called the hypothalamus.

The hypothalamus releases a hormone called thyrotropin releasing hormone (TRH), which sends a signal to the pituitary to release thyroid stimulating hormone (TSH). In turn, TSH sends a signal to the thyroid to release thyroid hormones. If a disruption occurs at any of these levels, a defect in thyroid hormone production may result in a deficiency of thyroid hormone (hypothyroidism).

Hypothalamus - TRH

↓

Pituitary- TSH

↓

- ***Thyroid- T4 and T3***

The rate of thyroid hormone production is controlled by the pituitary gland. If there is an insufficient amount of thyroid hormone circulating in the body to allow for normal functioning, the release of TSH is increased by the pituitary gland in an attempt to stimulate more thyroid hormone production. In contrast, when there is an excessive amount of circulating thyroid hormone, TSH levels fall as the pituitary attempts to decrease the production of thyroid hormone. In persons with hypothyroidism (thyroid hormone production is below normal), there is a continuously decreased level of circulating thyroid hormones. In persons with hyperthyroidism (thyroid hormone production is above normal), there is a continuously elevated level of circulating thyroid hormones. A diagnosis of hypothyroidism can be suspected in patients with fatigue, cold intolerance, constipation, and dry, flaky skin. A blood test is needed to confirm the diagnosis.

When hypothyroidism is present, the blood levels of thyroid hormones can be measured directly and are usually decreased. However, in early hypothyroidism, the level of thyroid hormones (T3 and T4) may be normal. Therefore, the main tool for the detection of hyperthyroidism is the measurement of the TSH, the thyroid stimulating hormone. As mentioned earlier, TSH is secreted by the pituitary gland. If a decrease of thyroid hormone occurs, the pituitary gland reacts by producing more TSH and the blood TSH level increases in an attempt to encourage thyroid hormone production. This increase in TSH can actually precede the fall in thyroid hormones by months or years (see the section on Subclinical Hypothyroidism below). Thus, the measurement of TSH should be elevated in cases of hypothyroidism. However, there is one exception. If the decrease in thyroid hormone is actually due to a defect of the pituitary or hypothalamus, then the levels of TSH are abnormally low. As noted above, this kind of thyroid disease is known as "secondary" or "tertiary" hypothyroidism. A special test, known as the TRH test, can help distinguish if the disease is caused by a defect in the pituitary or the

hypothalamus. This test requires an injection of the TRH hormone and is performed by an endocrinologist (hormone specialist).

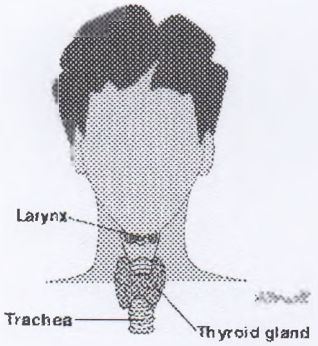
. Hyperthyroidism can be suspected in patients with tremors, excessive sweating, smooth, velvety skin, fine hair, a rapid heart rate and an enlarged thyroid gland. There may be puffiness around the eyes and a characteristic stare due to the elevation of the upper eyelids. Advanced symptoms are easily detected, but early symptoms, especially in the elderly, may be quite inconspicuous. In all cases, a blood test is needed to confirm the diagnosis.

The blood levels of thyroid hormones can be measured directly and are usually elevated with this disease. However, the main tool for detection of hyperthyroidism is measurement of the blood TSH level. As mentioned earlier, TSH is secreted by the pituitary gland. If an excess amount of thyroid hormone is present, TSH is " down-regulated" and the level of TSH falls in an attempt to control thyroid hormone production. Thus, the measurement of TSH should result in low or undetectable levels in cases of hyperthyroidism. However, there is one exception. If the excessive amount of thyroid hormone is actually due to a TSH secreting pituitary tumor, then the levels are abnormally high. This uncommon disease is known as "secondary hyperthyroidism."

The blood tests mentioned above can confirm the presence of deficiency or an excess of thyroid hormone and, therefore, be used to diagnose hypothyroidism or hyperthyroidism. They do not point to a specific cause. In order to determine a cause of the thyroid abnormality, the doctor will consider the patient's history, physical examination, and medical condition. Further testing might be used to isolate an underlying cause. These tests might include more blood testing for thyroid antibodies, nuclear medicine thyroid scanning, ultrasound of the thyroid gland, or others.

Thyroid Cancer

The thyroid is a butterfly-shaped gland located in the neck, below the Adam's apple. The thyroid makes and stores hormones that help regulate heart rate, blood pressure, body temperature, and the rate at which food is converted into energy. Thyroid hormones also help children grow and develop. The thyroid uses iodine, a mineral found in some foods and in iodized salt, to make several of its hormones.



Each year, more than 12,000 Americans find out they have thyroid cancer. This disease accounts for about 1 percent of all cancers. Thyroid cancer usually responds well to treatment, and many patients can be cured.

There are four major types of thyroid cancer: papillary, follicular, medullary, and anaplastic. Doctors can tell the type of cancer by the way the cells look under a microscope and by the way the tumor grows.

PAPILLARY TUMORS

Papillary tumors develop in cells that produce thyroid hormones containing iodine. The cancer cells, which grow very slowly, form many tiny, mushroom-shaped patterns in the tumor. Doctors usually can treat these tumors successfully, even when cells from the tumor have spread to nearby lymph nodes. Papillary tumors account for about 60 percent of all thyroid cancers.

FOLLICULAR THYROID TUMORS

Follicular thyroid tumors also develop in cells that produce iodine-containing hormones. These tumors have a thin layer of tissue around them, called a capsule. Many follicular tumors can be cured. However, the disease can be difficult to control if the tumor invades blood vessels or grows through the capsule into nearby structures in the neck. About 17 percent of all thyroid cancers are follicular tumors.

MEDULLARY TUMORS

Medullary tumors affect thyroid cells that produce a hormone that does not contain iodine. Although these tumors grow slowly, they may be harder to control than papillary and follicular tumors. The cancer cells tend to spread to other parts of the body. Only about 5 percent of all thyroid cancers are medullary tumors. It is estimated that 1 out of 10 medullary thyroid cancers is hereditary.

ANAPLASTIC TUMORS

Anaplastic tumors are the fastest growing thyroid tumors. The cancer cells, which are extremely abnormal, spread rapidly to other parts of the body. Anaplastic tumors make up about 18 percent of all thyroid cancers and usually occur in people over 60 years of age.

Doctors do not know what causes most cases of thyroid cancer. However, scientists have observed that thyroid cancer affects women two to three times as often as men and occurs more frequently in whites than in blacks. Scientists do not fully understand the reasons for these patterns; they continue to study thyroid cancer to try to learn what may increase a person's risk for this disease.

One known risk factor is exposure to radiation during childhood. Before doctors knew of its dangers, radiation therapy was used to treat acne and to reduce

swelling and infection in organs such as the thymus, tonsils, and lymph nodes. People who received radiation to the head and neck as children have a higher-than-average risk of developing thyroid cancer many years late. Scientists are doing studies to determine whether other types of radiation exposure also can cause thyroid cancer.

The National Cancer Institute recommends that anyone who received radiation to the head or neck in childhood be examined by a doctor every 1 to 2 years. Also, people should see a doctor if they have a family member with medullary thyroid cancer. The most important part of a checkup is the careful examination of the neck, feeling for lumps in the thyroid and enlargement of nearby lymph nodes. A thyroid scan (scintogram) or ultrasonography may be recommended for people at risk for thyroid cancer.

The most common symptom of thyroid cancer is a lump, or nodule, that can be felt in the neck. Other symptoms are rare. Pain is seldom an early warning sign of thyroid cancer. However, a few patients have a tight or full feeling in the neck, difficulty breathing or swallowing, hoarseness, or swollen lymph nodes. These symptoms can be caused by thyroid cancer or by other, less serious problems. If a person is experiencing symptoms, a doctor should be consulted.

The doctor can use several tests to learn the size and location of a thyroid nodule and/or to help determine whether a lump is benign (not cancerous) or malignant (cancerous. For example, the doctor may order blood tests to check how well the patient's thyroid is functioning. Also, a radioactive iodine scan can outline abnormal areas of the thyroid. For the scan, the patient is given a very small amount of a radioactive substance (usually iodine I-131 or technetium TC-99m), which collects in the thyroid. An instrument called a scanner can detect "cold spots" (areas in the thyroid that do not absorb iodine normally. Because cold spots can be benign or malignant, further tests are necessary.

Ultrasonography is another technique for producing a picture of the thyroid. In this procedure, high-frequency sound waves, which cannot be heard by humans, pass into the thyroid. The patterns of echoes produced by these waves are converted into a picture (sonogram) by a computer. Doctors can tell whether nodules are fluid-filled cysts, which are usually benign, or solid lumps that might be malignant.

The only sure way to tell whether a patient has thyroid cancer is to look at cells from the thyroid with a microscope. There are two ways to obtain a sample of thyroid tissue: by withdrawing cells using a needle (needle biopsy) or by surgically removing the tumor (surgical biopsy). In either case, a pathologist examines the tissue under a microscope to look for cancer cells

If the needle biopsy does not show cancer, the doctor may give the patient thyroid hormones. These hormones make it unnecessary for the thyroid to produce its own hormones, and the gland, including the nodule, shrinks and becomes inactive. If the needle biopsy is not conclusive or if the thyroid hormones are not effective, the patient usually has a surgical biopsy

When thyroid cancer is diagnosed, doctors may do more tests to learn about the stage (extent) of the disease. The results of these tests help doctors plan appropriate treatment.

Surgery is the most common form of treatment for thyroid cancer that has not spread to distant parts of the body. The surgeon usually removes part or all of the thyroid and any other affected tissue, such as lymph nodes. (If the patient has a surgical biopsy, the biopsy and the removal of the thyroid may be done in the same operation)

Patients with localized papillary or follicular thyroid cancer also may receive treatment with I-131 (a larger dose than that used in a thyroid scan). The patient swallows the iodine, which collects in any thyroid cancer cells that remain in the body after surgery. By damaging such cancer cells, the radioactive iodine helps prevent the disease from recurring. The patient must remain in the hospital for a few days while the radiation is most active. The treatment may be repeated at a later time.

Hormones usually are given to patients who have had surgery to remove the thyroid and/or treatment with radioactive iodine. The hormones replace those that are normally produced by the thyroid. This treatment also slows down the growth of any remaining thyroid cancer cells. The doctor may need to do follow-up tests to determine whether the patient is receiving the proper amount of the necessary hormones

Surgery may not be recommended when a patient is found to have thyroid cancer that has spread. Treatment usually includes some form of systemic therapy (treatment that can kill or slow the growth of thyroid cancer cells throughout the body), such as chemotherapy, radioactive iodine therapy, and/or hormone therapy

Regular follow-up is very important after treatment for thyroid cancer. Follow-up care may include periodic complete physician exams, x-rays, scans, and blood tests.

Answer the following questions:

1. What are the types of thyroid cancer?
2. What causes thyroid cancer?
3. Can thyroid cancer be detected early?
4. What are symptoms of thyroid cancer?
5. How is thyroid cancer diagnosed?
6. What treatment is there for thyroid cancer?

NERVOUS SYSTEM

The nervous system is the body's information gatherer, storage center and control system. Its overall function is to collect information about the external conditions in relation to the body's external state, to analyze this information, and to initiate appropriate responses to satisfy certain needs. The most powerful of these needs is survival. The nerves do not form one single system, but several

which are interrelated. Some of these are physically separate, others are different in function only. The brain and spinal cord make up the central nervous system. The peripheral nervous system is responsible for the body functions which are not under conscious control - like the heartbeat or the digestive system. The smooth operation of the peripheral nervous system is achieved by dividing it into sympathetic and parasympathetic systems. These are opposing actions and check on each other to provide a balance. The nervous system uses electrical impulses, which travel along the length of the cells. The cell processes information from the sensory nerves and initiates an action within milliseconds. These impulses travel at up to 250 miles per hour, while other systems such as the endocrines may take many hours to respond with hormones.

Peripheral nervous system (PNS): That portion of the nervous system that is outside the brain and spinal cord.

The peripheral nervous system (PNS) is one of the two major divisions of the nervous system. The other is the central nervous system (CNS) which is made up of the brain and spinal cord.

The nerves in the peripheral nervous system (PNS) connect the central nervous system (CNS) to sensory organs (such as the eye and ear), other organs of the body, muscles, blood vessels and glands.

The peripheral nerves include the 12 cranial nerves, the spinal nerves and roots, and what are called the autonomic nerves. The autonomic nerves are concerned with automatic functions of the body. Specifically, autonomic nerves are involved with the regulation of the heart muscle, the tiny muscles lining the walls of blood vessels, and glands.

"Peripheral" in anatomy and medicine (as elsewhere) is the opposite of "central." It means situated away from the center. The word "peripheral" comes from the Greek "peripheria" ("peri-", around or about + "pherein", to bear, carry). An IV (intravenous) catheter is a peripheral line.

Nervous system, central (CNS): That part of the nervous system that consists of the brain and spinal cord.

The central nervous system (CNS) is one of the two major divisions of the nervous system. The other is the peripheral nervous system (PNS), that part of the nervous system that lies outside the brain and spinal cord.

The peripheral nervous system (PNS) connects the central nervous system (CNS) to sensory organs (such as the eye and ear), other organs of the body, muscles, blood vessels and glands. The peripheral nerves include the 12 cranial nerves, the spinal nerves and roots, and what are called the autonomic nerves that are concerned specifically with the regulation of the heart muscle, the muscles in blood vessel walls, and glands.

Sympathetic nervous system: A part of the nervous system that serves to accelerate the heart rate, constrict blood vessels, and raise blood pressure. The sympathetic nervous system and the parasympathetic nervous system constitute the autonomic nervous system, the branch of the nervous system that performs involuntary functions.

Nervous system, autonomic: Part of the nervous system that was once thought to be functionally independent of the brain. The autonomic nervous system regulates key functions of the body including the activity of the heart muscle (see below), the smooth muscles (e.g., the muscles of the intestinal tract), and the glands.

The autonomic nervous system has two divisions: (1) the **sympathetic** nervous system that accelerates the heart rate, constricts blood vessels, and raises blood pressure; and (2) the **parasympathetic** nervous system slows the heart rate, increases intestinal and gland activity, and relaxes sphincter muscles.

The autonomic system, together with the SA (sinoatrial) and AV (atrioventricular) nodes, is a major element in the **cardiac conduction system**, the system that controls the heart rate. This stunningly designed system generates electrical impulses and conducts them throughout the muscle of the heart, stimulating the heart to contract and pump blood.

The **SA node** is the heart's natural pacemaker. The SA node consists of a cluster of cells that are situated in the upper part of the wall of the right atrium (the right upper chamber of the heart). The electrical impulses are generated there. The SA node is also called the sinus node.

The electrical signal generated by the SA node moves from cell to cell down through the heart until it reaches the **AV node**, a cluster of cells situated in the center of the heart between the atria and ventricles. The AV node serves as a gate that slows the electrical current before the signal is permitted to pass down through to the ventricles. This delay ensures that the atria have a chance to fully contract before the ventricles are stimulated. After passing the AV node, the electrical current travels to the ventricles along special fibers embedded in the walls of the lower part of the heart.

Autonomic nervous system controls the firing of the SA node to trigger the start of the cardiac cycle. The autonomic nervous system can transmit a message quickly to the SA node so it in turn can increase the heart rate to twice normal within only 3 to 5 seconds. This quick response is important during exercise when the heart has to increase its beating speed to keep up with the body's increased demand for oxygen.

Parasympathetic nervous system: A part of nervous system that serves to slow the heart rate, increase the intestinal and gland activity, and relax the sphincter muscles. The parasympathetic nervous system, together with the sympathetic nervous system (that accelerates the heart rate, constricts blood vessels, and raises blood pressure), constitutes the autonomic nervous system.

Human Nervous System...10 Billion Nerve Cells!

The nervous system of humans contains approximately 10 billion nerve cells (called neurons).

Neurons are the basic building blocks of the nervous system. Neurons consist of the nerve cell body and various extensions from the cell body. These extensions, or processes, are the dendrites (branches off the cell that receive

electrical impulses), the axon (the electrical wiring and conduit tube that conducts impulses), and specialized endings (terminal areas to transfer impulses to receivers on other nerves or muscles).

Brain

Together, the brain and spinal cord form the central nervous system. This complex system is part of everything we do. It controls the things we choose to do, like walk and talk, and the things our body does automatically, like breathe and digest food. The central nervous system is also involved with our senses; seeing, hearing, touching, tasting, and smelling, as well as our emotions, thoughts, and memory

The brain is a soft, spongy mass of nerve cells and supportive tissue. It has three major parts: the cerebrum, the cerebellum, and the brain stem. The parts work together, but each has special functions.

The cerebrum, the largest part of the brain, fills most of the upper skull. It has two halves called the left and right cerebral hemispheres. The cerebrum uses information from our senses to tell us what is going on around us and tells our body how to respond. The right hemisphere controls the muscles on the left side of the body, and the left hemisphere controls the muscles on the right side of the body. This part of the brain also controls speech and emotions as well as reading, thinking, and learning.

The cerebellum, under the cerebrum at the back of the brain, controls balance and complex actions like walking and talking.

The brain stem connects the brain with the spinal cord. It controls hunger and thirst and some of the most basic body function, such as body temperature, blood pressure, and breathing.

The brain is protected by the bones of the skull and by a covering of three thin membranes called meninges. The brain is also cushioned and protected by cerebrospinal fluid. This watery fluid is produced by special cells in the four hollow spaces in the brain, called ventricles. It flows through the ventricles and in spaces between the meninges. Cerebrospinal fluid also brings nutrients from the blood to the brain and removes waste products from the brain.

BRAIN ANEURYSM

A brain aneurysm is an abnormal widening of an artery or vein in the brain. Brain aneurysms are caused by a weakness in the wall of an artery or vein within the brain.

Brain aneurysms may result from a congenital malformation (birth defect) of a blood vessel, high blood pressure which damages the blood vessels, arteriosclerosis (build-up of fatty deposits in the arteries), or head trauma. Brain aneurysms can occur at any age. Although they are more common in adults, they can and do occur in children.

The onset of bleeding from a ruptured brain aneurysm is usually sudden and without warning. Sometimes, however, the individual may experience the sudden onset of symptoms such as severe headache, nausea, vision impairment, vomiting, and loss of consciousness before the aneurysm ruptures.

The rupture of a brain aneurysm is dangerous. It involves bleeding in the brain or in the area surrounding the brain which causes an accumulation of blood, usually clotted, within the skull (intracranial hematoma). Other complications of a rupture include repeated episodes of bleeding, hydrocephalus (the excessive accumulation of cerebrospinal fluid), and spasm of the blood vessels of the brain. The presence of one brain aneurysm may also be an indicator of multiple other brain aneurysms.

Emergency treatment for individuals with a ruptured cerebral aneurysm includes restoring deteriorating vital functions such as breathing and reducing pressure within the brain. Surgery may be performed, usually within the first 3 days to clip the ruptured aneurysm and reduce the risk of repeated episodes of bleeding. Other measures may include bed rest, drug therapy, or blood pressure control and fluids.

Endovascular treatment of brain aneurysm is a procedure whereby a catheter (tube) is inserted through the skin into a vessel and guided up to the brain. The catheter is used to deliver a material that travels through the blood vessel to clog or plug the blood vessel (embolize). This specialized catheter procedure, called transcatheter embolization, is a form of interventional radiology.

Metallic coils are among the newer methods for permanent embolization. For instance, the Gugliemi Detachable Coil (GDC) is made specifically to occlude (obstruct or plug) brain aneurysms. Precise placement of the microcoil is crucial. An advantage of the GDC coil is that it is "temporarily permanent." The coil can be repositioned if is it not placed correctly the first time. Microcatheters are an enabling technology in percutaneous (though- the-skin) embolization, since they allow access to the deep tortuous (winding or twisted) blood vessels of the brain and permit precise positioning of the embolic material. This precision minimizes interference with normal brain tissue.

The prognosis (outlook) for a patient with a ruptured brain aneurysm depends on the extent and location of the aneurysm, the person's age, their general health, and their neurological condition. Some individuals with a ruptured brain aneurysm die from the initial bleeding. Other individuals recover with little or no damage to the nervous system. Early diagnosis and treatment are important in preserving brain tissues from further injury.

Note that brain aneurysms are also called cerebral aneurysms and intracranial aneurysms.

Brain Aneurysm At A Glance

- A brain aneurysm is a weak spot in a blood vessel in the brain.
- A brain aneurysm is also called a cerebral aneurysm.
- A person of any age can have a brain aneurysm.

- The danger posed by a brain aneurysm is from rupture and bleeding into the brain.
- Brain aneurysms can rupture without warning.
- Warning signs of a rupture include the sudden onset of splitting headache, vision impairment, loss of consciousness, or nausea and vomiting.
- Prompt diagnosis and treatment of a brain aneurysm are important for survival and recover.

CANAVAN DISEASE

Canavan disease is a progressive fatal inherited (genetic) disorder of the central nervous system (CNS).

The signs of Canavan disease usually appear between 3 to 6 months of age. The signs include developmental delay (significant motor slowness), enlargement of the head (macrocephaly), loss of muscle tone (hypotonia), poor head control, and severe feeding problems.

As the disease progresses, convulsions (seizures), shrinkage of the nerve to the eye (optic atrophy) which often causes blindness, heartburn (gastrointestinal reflux), and deterioration of swallowing ability develop.

Most children with Canavan disease die before 10 years of age.

Currently, there is no effective treatment or cure for this lethal disease.

Canavan disease is caused by a deficiency of an enzyme (catalyst) called aspartoacylase. This deficiency leads to an increased excretion in the urine of the substance upon which this enzyme acts, called N-acetylaspartic acid (NAA). The diagnosis of Canavan disease is made by finding an increased level of urinary NAA (by organic acid analysis).

The abnormally high levels of NAA lead to loss of the insulation (demyelination) that normally surrounds nerve cells (neurons) and results in spongy degeneration of the brain. This causes the signs and symptoms of Canavan disease.

Like Tay-Sachs disease (another severe progressive genetic disorder of the CNS), Canavan disease is inherited as an autosomal (not linked to a sex chromosome) recessive condition. Both parents silently carry a single Canavan gene and each of their children has a 1 in 4 risk of receiving both of their Canavan genes and, therefore, having this dread disease.

Yes. As with Tay-Sachs disease, Canavan disease is more prevalent among individuals of Central and Eastern European (Ashkenazi) Jewish background than in the general population. Of the 6 million Jews in the U.S., at least 90% are Ashkenazi.

The frequency of Canavan carriers in the Ashkenazi Jewish population is about 1 in 40.

The risk of an child being born with Canavan disease in the Ashkenazi Jewish population is about 1 in 6,400 births.

Aside from Ashkenazi Jews, there do not appear to be any other high-risk ethnic populations. However, Canavan disease has been reported to occur

occasionally in individuals of non-Ashkenazi Jewish background. Molecular genetic (DNA) studies have revealed two specific changes (mutations) in the gene for aspartoacylase on chromosome 17. These two mutations account for approximately 97% of the mutations causing Canavan disease in the Ashkenazi Jewish population. (One is a mutation in codon 285 of the aspartoacylase gene, and the other is a mutation in codon 231.)

Genetic screening of Ashkenazi Jewish individuals for Canavan disease carriers can be done by checking for these two mutations. Screening for Canavan disease carriers requires molecular diagnostic methods. Simple enzyme tests such as those commonly used in Tay-Sachs screening, cannot be used for Canavan disease because the activity of the deficient enzyme, aspartoacylase, is not detectable in the blood.

Testing for the most common Canavan disease mutations will identify about 97% of Ashkenazi Jewish carriers (and 40-50% of the non-Jewish carriers). If a person is of Ashkenazi background or has a family history of Canavan disease, that parent should be screened. If that person is a carrier, then the other parent should also be screened.

When both parents are carriers of a Canavan disease gene, prenatal DNA diagnosis can be offered.

EPILEPSY
(Seizure Disorder)

Epilepsy, a physical condition caused by sudden, brief changes in how the brain works, is estimated to affect one percent of the U.S. population, about 2.5 million people. In about half of all cases no cause can be found, but head injuries, brain tumors, lead poisoning, problems in brain development before birth, and certain genetic and infectious illnesses can all cause epilepsy.

Epilepsy occurs when nerve cells in the brain fire electrical impulses at a rate of up to four times higher than normal. This causes a sort of electrical storm in the brain, known as a seizure. A pattern of repeated seizure is referred to as epilepsy. Medication controls seizure for the majority of patients, who are otherwise healthy and able to live full and productive lives. On the other hand, at least 200,000 Americans have seizure more than once a month. Their lives are devastated by frequent, uncontrollable seizure or associated disabilities.

This past decade has seen a dramatic increase in our knowledge about epilepsy, but there remains much tragedy in the lives of many people with the disorder. To brighten tomorrow's outlook for those who must live with seizure, the epilepsy research community continues to concentrate its efforts on:

Basic research aims to identify viral, genetic, or other factors that cause epilepsy. These findings provide the basis for developing new and improved methods of prevention and therapy.

Scientists are using promising new technologies such as positron emission tomography (PET) and magnetoencephalography to diagnose epilepsy and pinpoint seizure location.

The goal of modern neurological research is to develop safe, well-tolerated drugs that control seizure. Basic research has brought some of the now more commonly prescribed anticonvulsant drugs to the market. Scientists are also developing ways to test new and better drugs in patients.

IMPROVING AND DEVELOPING NEW SURGICAL TECHNIQUES

This form of treatment, performed at epilepsy clinical research centers, is now an option for more people with epilepsy, including children. For patients whose seizure cannot be controlled with drugs, surgery can turn the dream of a seizure-free life into a reality. Improved technology has made it possible to identify more accurately where seizure originate in the brain and to what extent surgery may affect vital functions, such as smell and speech. As a result, investigators estimate that 2,000 to 5,000 new patients in the United States might be suitable for surgery each year.

Hope for better treatments, a cure, and, ultimately, prevention of epilepsy lies in neurological research. The National Institute of Neurological Disorders and Stroke (NINDS), one of the 17 National Institutes of Health (NIH) located in Bethesda, Maryland, is the nation's largest supporter of research on the brain and nervous system and a lead agency for the congressionally designated Decade of the Brain. The Institute conducts and supports a broad program of basic and clinical investigations aimed at increasing our understanding of more than 600 neurological disorders, including epilepsy. The Institute also studies the structures, activities, and vulnerabilities of the human brain. Most NINDS-supported research is conducted by scientists at public and private institutions, such as universities, medical schools, and hospitals.

Epilepsy At A Glance

- Epilepsy occurs when nerve cells in the brain fire abnormal electrical impulses known as a seizure.
- In about half of all patients with epilepsy no cause can be found.
- Basic research aims to identify viral, genetic, or other factors that cause epilepsy.

Answer the following questions:

1. What is epilepsy?
2. What are the causes of epilepsy?
3. What are the newest means of diagnosis?
4. Is there any treatment?
5. What research is being done?

SKELETAL SYSTEM

The average human adult skeleton has 206 bones joined to ligaments and tendons to form a protective and supportive framework for the attached muscles and the soft tissues which underlie it. The skeleton has two main parts: the axial skeleton and the appendicular skeleton. The axial skeleton consists of the skull, the spine, the ribs and the sternum (breastbone) and includes 80 bones. The appendicular skeleton includes two limb girdles (the shoulders and pelvis) and their attached limb bones. This part of the skeletal system contains 126 bones, 64 in the shoulders and upper limbs and 62 in the pelvis and lower limbs. There are only minor differences between the skeletons of the male and the female: the men's bones tend to be larger and heavier than corresponding women's bones and the women's pelvic cavity is wider to accommodate childbirth. The skeleton plays an important part in movement by providing a series of independently movable levers, which the muscles can pull to move different parts of the body. It also supports and protects the internal body organs. The skeleton is not just a movable frame, however; it is an efficient factory which produces red blood cells from the bone marrow of certain bones and white cells from the marrow of other bones to destroy harmful bacteria. The bones are also a storehouse for minerals - calcium, for example - which can be supplied to other parts of the body. Babies are born with 270 soft bones - about 64 more than an adult; and many of these will fuse together by the age of twenty or twenty-five into the 206 hard, permanent bones.

MENDING BONES WITH BIOLOGICAL "GLUE"

If the flesh is weak, bones can be weak, too. Fractures are often painfully slow to heal, and bones degenerate with age. Doctors are attempting to repair severe breaks with bone taken from the patient's body, usually the hip, or with implants of new synthetic substances such as calcium tri phosphate. Such implants, however are either scarce or expensive. Now researchers have identified a biochemical substance that could speed up the process that makes bones mend — and might even make old bones strong again.

Collagen Corp., of Palo Alto, Calif., has isolated a hormone like protein that induces connective tissue cells surrounding bone to form cartilage, the tough white gristle (cartilage) from which bones are made. The protein, dubbed "cartilage inducting factor" (CIF), is present in human and animal bone, but in quantities that are too minute to heal major fractures quickly. Collagen has succeeded in extracting CIF from pulverized animal bone. By applying a mixture of CIF and other proteins to a fractured area, scientists hope to force cartilage — and, eventually, bone — to grow.

So far Collagen's scientists have used the method exclusively to heal animal fractures, employing CIF extracted from the bones of cows. With the help of molecular engineers at Monsanto Co., however, Collagen plans to apply recombinant DNA (deozyribonucleic acid) techniques to produce large quantities of CIF. Once CIF extracts are available, Collagen's researchers hope to use the material to do more than just knit together simple fractures. The protein, they

believe, can be utilized to replace bone tissue lost from gum disease, fuse spines, reconstruct cleft palates and correct other congenital defects.

ANKLE

The ankle is a "hinged" joint capable of moving in two directions; away from the body (plantar flexion), and toward the body (dorsiflexion). It is formed by the meeting of three bones. The end of the shin bone of the leg (tibia) and a small bone in the leg (fibula) meet a large bone in the foot called the talus to form the ankle. The end of the shin bone (tibia) forms the inner portion of the ankle, while the end of the fibula forms the outer portion of the ankle. The hard bony knobs on each side of the ankle are called the malleoli. These provide stability to the ankle joints, which function as a weight-bearing joints for the body during walking.

Ligaments on each side of the ankle also provide stability by tightly strapping the outside of the ankle (lateral malleolus) with the lateral collateral ligaments; and the inner portion of the ankle (medial malleolus) with the medial collateral ligaments. The ankle joint is surrounded by a fibrous joint capsule. Tendons which attach the large muscles of the leg to the foot wrap around the ankle both from the front and behind. The large tendon (Achilles tendon) of the leg calf muscle passes behind the ankle and attaches at the back of the heel. A large tendon of the leg muscle (posterior tibial tendon) passes behind the medial malleolus. The peroneal tendon passes behind the lateral malleolus to attach into the foot.

The normal ankle has the ability to move the foot, from the neutral right-angle position, to approximately 45 degrees of plantar flexion and to approximately 20 degrees of dorsiflexion. The powerful muscles that move the ankle are located in the front and back portions of the leg. These muscles contract and relax during walking.

Ankle Sprains

Ankle sprains are one of the most common musculoskeletal injuries. Sprains are injuries to the ligaments of the ankle causing them to partially or completely tear as a result of sudden stretching. They can occur on either or both of the inner and outer portions of the ankle joint. Ankle sprains more commonly happen when there is a preexisting muscle weakness in the ankle area or a history of previous ankle injuries. The typical injury occurs when the ankle is suddenly "twisted" in a sports activity or by stepping off an uneven surface. The pain is initially severe and can be associated with a "popping" sensation. Immediate swelling over the area of injury often occurs as the injured blood vessels leak fluid into the local tissue. Examination of the area may cause severe pain when the ankle is moved. The degree of pain may not necessarily indicate the degree of damage to the ligament(s). Ligament injuries are often graded from I to III, ranging from partial to complete tears. Partial tears retain some ankle stability, whereas complete tears lose stability because the strapping ligaments no longer brace the ankle joint. After

an examination, significant ankle sprains are commonly evaluated with an x-ray test. X-rays can determine whether there is an accompanying break (fracture) of the bone.

BURSITIS

A bursa is a closed fluid-filled sac that functions as a gliding surface to reduce friction between tissues of the body. "Bursae" is plural for "bursa." The major bursae are located adjacent to the tendons near the large joints, such as the shoulders, elbows, hips, and knees. When the bursa becomes inflamed, the condition is known as "bursitis." Most commonly, bursitis is caused by local soft tissue trauma or strain injury, and there is no infection (aseptic bursitis). On rare occasions, the bursa can become infected with bacteria. This condition is called septic bursitis.

The knee joint is surrounded by three major bursae. At the tip of the knee, over the kneecap bone, is the prepatellar bursa. This bursa can become inflamed (prepatellar bursitis) from direct trauma to the front of the knee. This commonly occurs with prolonged kneeling position. It has been referred to as "housemaid's knee," "roofer's knee," and "carpetlayer's knee," based on the patient's associated occupational histories. It can lead to varying degrees of swelling, warmth, tenderness, and redness in the overlying area of the knee. As compared with knee joint inflammation (arthritis), it is usually only mildly painful. It is usually associated with significant pain when kneeling and can cause stiffness and pain with walking. Also, in contrast to problems within the knee joint, the range of motion of the knee is frequently preserved.

Prepatellar bursitis can occur when the bursa fills with blood from injury. It can also be seen in rheumatoid arthritis and from deposits of crystals, as seen in patients with gouty arthritis and pseudogout. The prepatllar bursa can also become infected with bacteria (septic bursitis). When this happens, fever may be present. This type of infection usually occurs from breaks in the overlying skin or puncture wounds. The bacteria involved in septic bursitis of the knee are usually those that normally cover the skin, called staphylococcus. Rarely, a chronically inflamed bursa can become infected by bacteria traveling through the blood.

The treatment of any bursitis depends on whether or not it involves infection. Aseptic prepatellar bursitis can be treated with ice compresses, rest, and anti-inflammatory and pain medications. Occasionally, it requires aspiration of the bursa fluid. This procedure involves removal of the fluid with a needle and syringe under sterile conditions. It can be performed in the doctor's office. Sometimes the fluid is sent to the laboratory for further analysis. Noninfectious knee bursitis can also be treated with an injection of cortisone medication into the swollen bursa. This is sometimes done at the same time as the aspiration procedure.

FRACTURE

A fracture is a break in the bone or cartilage. It usually is a result of trauma. It can, however, be a result of disease of the bone that leads to weakening, such as

osteoporosis, or abnormal formation of the bone from congenital diseases at birth, such as osteogenesis imperfecta.

- Fractures are classified by their character and location. Examples of classification include: "spiral fracture of the femur," "greenstick fracture of the radius," "impacted fracture of the humerus," "linear fracture of the ulna," "oblique fracture of the metatarsal," "compression fracture of the vertebrae," and "depressed fracture of the skull." A "comminuted fracture" is a fracture in which bone is broken into a number of pieces. (This should be distinguished from the "compound fracture" as described below).

Fractures are also named by the trauma event that caused the bone breakage. Examples include: "boxer's fracture" of the metacarpal bone of the hand, "blowout fracture" of the bones behind the eye, and "stress fracture" of the bones of tibia." Some fractures are also named by conditions associated with the bone breakage. For example, a "compound fracture" is a fracture in which there is an associated open wound of the skin which leads directly to the broken bone.

The treatment of a fracture depends on the type of fracture, its severity and location, as well as the underlying condition of the patient. Fractures are treated with resting, non-weight bearing, splints, casting, and surgical procedures.

LOW BACK

The first step to understanding the various causes of low back pain is learning about the normal design (anatomy) of the tissues of this area. Important structures of the low back that can be related to symptoms there include the bony lumbar spine, discs between the vertebrae, ligaments around the spine and discs, spinal cord and nerves, muscles of the low back, internal organs of the pelvis and abdomen, and the skin covering the lumbar area.

The bony lumbar spine is designed so that vertebrae "stacked" together can provide a movable support structure while also protecting the spinal cord (nervous tissue that extends down the spinal column from the brain) from injury. Each vertebrae has a spinous process, a bony prominence behind the spinal cord, which shields the cord's nervous tissue. They also have a strong bony "body" in front of the spinal cord to provide a platform suitable for weight-bearing. The lumbar vertebrae stack immediately atop the sacrum bone in between the buttocks. On each side, the sacrum meets the iliac bone of the pelvis to form the sacroiliac joint of the buttocks.

The discs are pads that serve as "cushions" between each vertebral body which minimize the impact on the spinal column. Each disc is designed like a jelly donut with a central softer component (nucleus pulposus), which is capable of rupturing (herniating) through the surrounding outer ring (annulus fibrosus) and, thereby, irritating adjacent nervous tissue.

Ligaments are strong fibrous soft tissues that firmly attach bones to bones. Ligaments attach each of the vertebrae and surround each of the discs.

The nerves that provide sensation and stimulate the muscles of the low back as well as the lower extremities (the thighs, legs, feet, and toes) exit the spinal column through bony portals called "foramen."

Many muscle groups which are responsible for flexing, extending, and rotating the waist, as well as moving the lower extremities, attach to the lumbar spine through tendon insertions.

The aorta and blood vessels that transport blood to and from the lower extremities pass in front of the lumbar spine into the abdomen and pelvis. Surrounding these blood vessels are lymph glands and involuntary nervous system tissues, which are important in maintaining bladder and bowel control.

The uterus and ovaries are important pelvic structures in front of the lumbar area of women. The prostate gland is a significant pelvic structure in men. The kidneys are on either side of the back of the lower abdomen, in front of the lumbar spine.

Low Back Pain

Arthritis - The spondyloarthropathies are inflammatory types of arthritis that can affect the lower back and sacroiliac joints. Examples of spondyloarthropathies include Reiter's disease, ankylosing spondylitis, psoriatic arthritis, and the arthritis of inflammatory bowel disease. Each of these diseases can lead to pain and stiffness in the low back which is typically worse in the morning. These conditions usually begin in the second and third decades of life. They are treated with medications directed toward decreasing the inflammation.

Other causes of low back pain include kidney problems, pregnancy, ovary problems, and tumors.

1. **Kidney Problems**

   Kidney infections, stones, and traumatic bleeding of the kidney (hematoma) are frequently associated with low back pain. Diagnosis can involve urine analysis, soundwave tests, or radiological scanning of the abdomen.

2. **Pregnancy**

   Pregnancy commonly leads to low back pain by mechanically stressing the lumbar spine (changing the normal lumbar curvature) and by the positioning of the baby inside of the abdomen. Additionally, the effects of the female hormone estrogen, and the ligament-loosening hormone relaxin, may contribute to loosening of the ligaments and structures of the back. Pelvic tilt exercises are often recommended for this pain. Women are also recommended to maintain physical conditioning during pregnancy according to their doctors' advice.

3. **Ovary problems**

   Ovarian cysts, uterine fibroids and endometriosis not infrequently cause low back pain. For more information, please visit the Endometriosis article.

4. **Tumors**

Low back pain can be caused by tumors, either benign or malignant, that originate in the bone of the spine or pelvis and spinal cord (primary tumors) and those which originate elsewhere and spread to these areas (metastasize). Symptoms range from localized pain to radiating severe pain and loss of nerve and muscle function (even incontinence of urine and stool) depending on whether or not the tumors affect the nervous tissue. Tumors of these areas are detected using radiological tests, such as plain x-rays, nuclear bone scanning, and CAT and MRI scanning.

Uncommon causes of low back pain include Paget's disease of bone, bleeding or infection in the pelvis, infection of the cartilage and/or bone of the spine, aneurysm of the aorta, and shingles.

1. **Paget's Disease Of Bone:**

   Paget's disease of the bone is a condition of unknown cause in which the bone formation is out of synchrony with normal bone remodeling. This condition results in abnormally weakened bone and deformity, and can cause localized bone pain. Paget's disease is more common in people over the age of 50. Heredity (genetic background) and certain unusual virus infections have been suggested as causes. Thickening of involved bony areas of the lumbar spine can cause the radiating lower extremity pain of sciatica.

   Paget's disease can be diagnosed on plain x-rays. However, a bone biopsy is occasionally necessary to ensure the accuracy of the diagnosis. Bone scanning is helpful to determine the extent of the disease, which can involve more than one bone area. A blood test, alkaline phosphatase, is useful for diagnosis and monitoring response to therapy. Treatment options include aspirin, other anti-inflammatory medicines, pain medications, and medications that slow the rate of bone turnover, such as calcitonin (Calcimar, Miacalcin), etidronate (Didronel), alendronate (Fosamax), risedronate (Actonel), and pamidronate (Aredia).

2. **Bleeding Or Infection In The Pelvis:**

   Bleeding in the pelvis is rare without significant trauma and is usually seen in patients who are taking blood-thinning medications, such as coumadin (warfarin). In these patients, a rapid-onset sciatica pain can be a sign of bleeding in the back of the pelvis and abdomen which is compressing the spinal nerves as they exit to the lower extremities. Infection of the pelvis is infrequent, but can be a complication of conditions such as diverticulosis, Crohn's disease, ulcerative colitis, infection of the tubes or uterus, and even appendicitis. This is a serious complication of these conditions and is often associated with fever, lowering of blood pressure, and a life-threatening state.

3. **Infection Of The Cartilage And/Or Bone Of The Spine**:

   Infection of the discs (septic discitis) and bone (osteomyelitis) is extremely rare. These conditions lead to localized pain associated with fever. The bacteria found when these tissues are tested with laboratory cultures include Staphylococcus aureus and Mycobacterium tuberculosus (TB bacteria). TB infection in the spine is called Pott's disease. These are each

very serious conditions requiring long courses of antibiotics. The sacroiliac joints rarely become infected with bacteria. Brucellosis is a bacterial infection which can involve the sacroiliac joints, and is usually transmitted in goats' milk.

4. **Aneurysm Of The Aorta:**

   In the elderly, atherosclerosis can cause weakening of the wall of the large arterial blood vessel (aorta) in the abdomen. This weakening can lead to a bulging (aneurysm) of the aorta wall. While most aneurysms cause no symptoms, some cause a pulsating low back pain. Aneurysms of certain size, especially when enlarging over time, can require surgical repair with a grafting procedure.

5. **Shingles:**

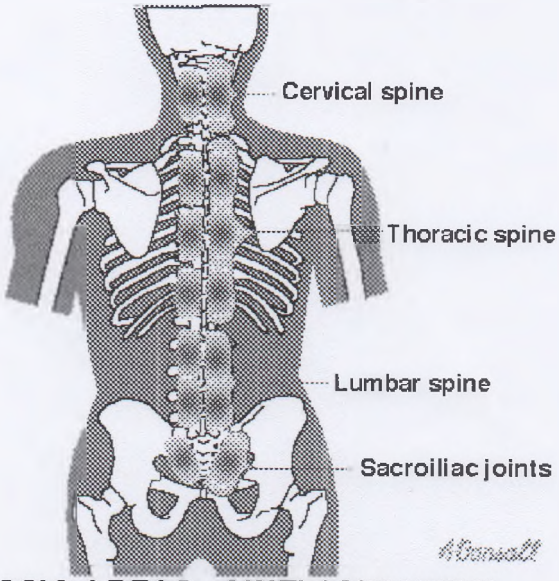
   Shingles (Herpes zoster) is an acute infection of the nerves that supply sensation to the skin, generally at one or several spinal levels and on one side of the body (right or left). Patients with shingles usually have had chicken pox earlier in life. The Herpes virus that causes chicken pox is believed to exist in a dormant state in the spinal nerve roots after the chicken pox resolves. In persons with shingles, this virus reactivates to cause infection along the sensory nerve, leading to nerve pain and usually an outbreak of shingles (tiny blisters on the same side of the body and at the same nerve level). The back pain in patients with shingles of the lumbar area can precede the skin rash by days. Successive crops of tiny blisters can appear for several days and clear in one to two weeks. Patients occasionally are left with a more chronic nerve pain (post-herpetic neuralgia). Treatment can involve symptomatic relief with lotions, such as calamine, or medications, such as Zovirax.

Exercise №1. Answer the questions:

1. What is the Anatomy of low back?
2. What are the causes of low back pain?
3. What are uncommon causes of low back pain?
4.

ARTHRITIS

Arthritis is a joint disorder featuring inflammation. A joint is an area of the body where two different bones meet. A joint functions to move the body parts connected by its bones. Arthritis literally means inflammation of one or more joints.



CLASSIC AREAS of INFLAMMATION
of
SPONDYLOARTHROPATHY

Arthritis is frequently accompanied by joint pain. Joint pain is referred to as arthralgia.

There are many forms of arthritis (over one hundred and growing). The forms range from those related to wear and tear of cartilage (such as osteoarthritis) to those associated with inflammation resulting from an over-active immune system (such as rheumatoid arthritis).

The causes of arthritis depend on the form of arthritis. Causes include injury (leading to osteoarthritis), abnormal metabolism (such as gout and pseudogout), inheritance, infections, and for unclear reasons (such as rheumatoid arthritis and systemic lupus erythematosus).

Arthritis is classified as one of the rheumatic diseases. These are conditions that are different individual illnesses, with differing features, treatments, complications, and prognosis. They are similar in that they have a tendency to affect the joints, muscles, ligaments, cartilage, tendons, and many have the potential to affect internal body areas.

Symptoms of arthritis include pain and limited function of joints. Inflammation of the joints from arthritis is characterized by joint stiffness, swelling, redness, and warm. Tenderness of the inflamed joint can be present. Many of the forms of arthritis, because they are rheumatic diseases, can involve symptoms affecting various organs of the body that do not directly involve the joints. Therefore, symptoms in some patients with arthritis can also include nonspecific fever, weight loss, fatigue, and feeling unwell. The first step in the diagnosis of arthritis is a meeting between the doctor and the patient. The doctor will review the history of symptoms, examine the joints for inflammation and deformity, as well as ask questions about or examine other parts of the body for inflammation or signs of diseases that can affect other body areas. Furthermore, certain blood, urine, joint fluid and/or x-ray tests might be ordered. The diagnosis will be based on the pattern of symptoms, the distribution of the inflamed joints,

and any blood and x-ray findings. Several visits may be necessary before the doctor can be certain of the diagnosis.

. Many forms of arthritis are more of an annoyance than serious. However, millions of patients suffer daily with pain and disability from arthritis or its complications.

Earlier and accurate diagnosis can help to prevent irreversible damage and disability. Properly guided programs of exercise and rest, medications, physical therapy, and surgery options can idealize long-term outcomes for arthritis patients. It should be noted that both before and especially after the diagnosis of arthritis communication with the treating doctor is essential for optimal health. This is important from the standpoint of the doctor, so that he/she can be aware of the vagaries of the patient's symptoms as well as their tolerance to and acceptance of treatments. It is important from the standpoint of patients, so that they can be assured that they have an understanding of the diagnosis and how the condition does and might affect them. It is also crucial for the safe use of medications. A rheumatologist is a medical doctor who specializes in the non-surgical treatment of rheumatic illnesses, especially arthritis.

Rheumatologists have special interests in unexplained rash, fever, arthritis, anemia, weakness, weight loss, fatigue, joint or muscle pain, autoimmune disease, and anorexia. They often serve as consultants, acting like detectives for other doctors.

Rheumatologists have particular skills in the evaluation of the over 100 forms of arthritis, and have special interest in rheumatoid arthritis, spondylitis, psoriatic arthritis, systemic lupus erythematosus, antiphospholipid syndrome, Still disease, dermatomyositis, Sjogren's syndrome, vasculitis, scleroderma, mixed connective tissue disease, sarcoidosis, Lyme disease, osteomyelitis, osteoarthritis, back pain, gout, pseudogout, relapsing polychondritis, Henoch- Schonlein purpura, serum sickness, reactive arthritis, Kawasaki disease, fibromyalgia, erythromelalgia, Raynaud's disease, growing pains, iritis, osteoporosis, reflex sympathetic dystrophy, and others.

Arthritis At A Glance

- Arthritis is inflammation of one or more joints.
- Symptoms of arthritis include pain and limited function of joints.
- Arthritis sufferers include men and women, children and adults.
- Earlier and accurate diagnosis can help to prevent irreversible damage and disability.
-

Answer the following questions:

1. What is arthritis?
2. What are symptoms of arthritis?
3. Who is affected by arthritis?
4. How is arthritis diagnosed and why is a diagnosis important?

5. What is the national financial impact of arthritis?
6. What is a rheumatologist?

BURSITIS OF THE HIP

Bursitis of the hip is the most common cause of hip pain. Bursitis of the hip is diagnosed based on the history of outer hip pain, specific areas of tenderness of the outside of the hip, and confirmed by relief with local injection of anesthetic in the doctor's office. Patients frequently notice pain in the outer hip with stair climbing or descending and tenderness of the hip when lying on the affected side at night. The doctor can localize the tender areas to the location of the bursae of the hip. Occasionally, x-ray tests of the hip are used to rule out other conditions of the bone and joints, such as arthritis. Sometimes, but not always, x-rays can highlight areas of calcium deposits in an inflamed bursa.

The treatment of any bursitis depends on whether or not it involves infection. Noninfectious or aseptic hip bursitis can be treated with ice compresses, rest, and antiinflammatory and pain medications. Occasionally, it requires aspiration of the bursa fluid. This procedure involves removal of the fluid with a needle and syringe under sterile conditions. It can be performed in the doctor's office. Sometimes the fluid is sent to the laboratory for further analysis. Frequently there is inadequate fluid accumulation for aspiration. Noninfectious hip bursitis can be treated with an injection of cortisone medication, often with an anesthetic, into the swollen bursa. This is sometimes done at the same time as the aspiration procedure.

Patients with hip bursitis can often benefit by weight reduction, stretching exercises, and proper footwear for exercise activities. Sometimes physical therapy programs can be helpful. Generally, patients should avoid hills and stairs and direct pressure on the affected hip (sleep on the other side), when possible, while symptoms are present.

Septic bursitis (again, uncommon in the hip) requires even further evaluation by a doctor. This is unusual in the hip bursa, but does occur. The bursal fluid can be examined in the laboratory for the microbes causing the infection. Septic bursitis requires antibiotic therapy, often intravenously. Repeated aspiration of the inflamed fluid may be required. Surgical drainage and removal of the infected bursa sac (bursectomy) may also be necessary.

Bursitis Of The Hip At A Glance

- A bursa is a fluid-filled sac that functions as a gliding surface to reduce friction between moving tissues of the body.
- There are two major bursae of the hip.
- Bursitis is usually not infectious, but the bursa can become infected.
- Treatment of non-infectious bursitis includes rest, ice, and medications for inflammation and pain. Infectious bursitis (uncommon) is treated with antibiotics, aspiration, and surgery.

- Bursitis of the hip is the most common cause of hip pain.
-

Answer the following questions:

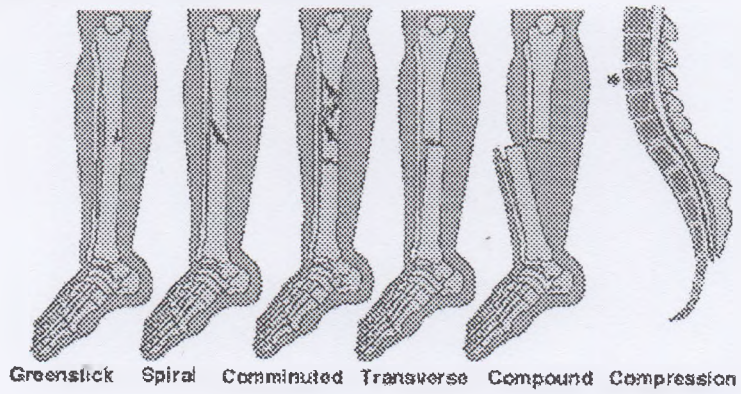
1. What is bursitis?
2. What is hip bursitis and what symptoms does it cause?
3. How is bursitis of the hip diagnosed?
4. How is bursitis of the hip treated?

FRACTURE OF BONE

A fracture is a break in the bone or cartilage. It usually is a result of trauma. It can, however, be a result of disease of the bone that leads to weakening, such as osteoporosis, or abnormal formation of the bone from congenital diseases at birth, such as osteogenesis imperfecta.

Fractures generally cause pain. Sometimes the pain is not elicited until the bone is stressed by use. Swelling, tenderness, discoloration, and inability to move the affected body part are common. Sometimes deformity of the affected body part is noted. The location and severity of the fracture determine the symptoms and

Fractures are classified by their character and location. Examples of classification include: "spiral fracture of the femur," "greenstick fracture of the radius," "impacted fracture of the humerus," "linear fracture of the ulna," "oblique fracture of the metatarsal," "compression fracture of the vertebrae," and "depressed fracture of the skull." A "comminuted fracture" is a fracture in which bone is broken into a number of pieces. (This should be distinguished from the "compound fracture" as described below).



TYPICAL BONE FRACTURES

Fractures are also named by the trauma event that caused the bone breakage. Examples include: "boxer's fracture" of the metacarpal bone of the hand, "blowout fracture" of the bones behind the eye, and "stress fracture" of the bones of tibia." Some fractures are also named by conditions associated with the bone breakage. For example, a "compound fracture" is a fracture in which there is an associated open wound of the skin which leads directly to the broken bone.

The treatment of a fracture depends on the type of fracture, its severity and location, as well as the underlying condition of the patient. Fractures are treated with resting, non-weight bearing, splints, casting, and surgical procedures.

Answer the following questions:

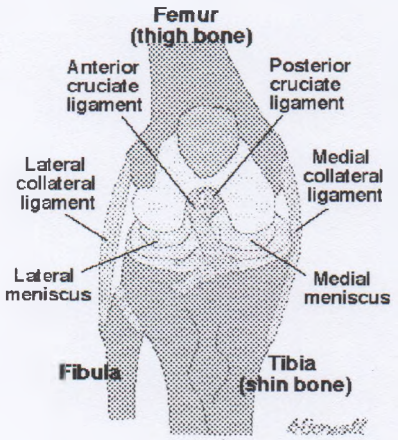
1. What is a fracture?
2. What are symptoms of a fracture?
3. How are fractures classified?
4. How are fractures treated?

KNEE PAIN

The knee is a joint which has three parts. The thigh bone (femur) meets the large shin bone (tibia) forming the main knee joint. This joint has an inner (medial) and an outer (lateral) compartment. The kneecap (patella) joins the femur to form a third joint, called the patellofemoral joint.

The knee joint is surrounded by a joint capsule with ligaments strapping the inside and outside of the joint (collateral ligaments) as well as crossing within the joint (cruciate ligaments). These ligaments provide stability and strength to the knee joint.

The meniscus is a thickened cartilage pad between the two joints formed by the femur and tibia. The meniscus acts as a smooth surface for the joint to move on. The knee joint is surrounded by fluid-filled sacs called bursae, which serve as gliding surfaces that reduce friction of the tendons. Below the kneecap, there is a large tendon (patellar tendon) which attaches to the front of the tibia bone. There are large blood vessels passing through the area behind the knee (referred to as the popliteal space). The large muscles of the thigh move the knee. In the front of the thigh the quadriceps muscles extend the knee joint. In the back of the thigh, the hamstring muscles flex the knee. The knee also rotates slightly under guidance of specific muscles of the thigh.



KNEE JOINT front view

The knee functions to allow movement of the leg and is critical to normal walking. The knee flexes normally to a maximum of 135 degrees and extends to 0 degrees. The bursae, or fluid-filled sacs, serve as gliding surfaces for the tendons to reduce the force of friction as these tendons move. The knee is a weight-bearing joint. Each meniscus serves to evenly load the surface during weight-bearing and also aids in disbursing joint fluid for joint lubrication.

Injury can affect any of the ligaments, bursae, or tendons surrounding the knee joint. Injury can also affect the ligaments, cartilage, menisci (plural for meniscus), and bones forming the joint. The complexity of the design of the knee joint and the fact that it is an active weight-bearing joint are factors in making the knee one of the most commonly injured joints.

Ligament Injury

Trauma can cause injury to the ligaments on the inner portion of the knee (medial collateral ligament), the outer portion of the knee (lateral collateral ligament), or within the knee (cruciate ligaments). Injuries to these areas are noticed as immediate pain, but are sometimes difficult to localize. Usually, a collateral ligament injury is felt on the inner or outer portions of the knee. A collateral ligament injury is often associated with local tenderness over the area of the ligament involved. A cruciate ligament injury is felt deep within the knee. It is sometimes noticed with a "popping" sensation with the initial trauma. A ligament injury to the knee is usually painful at rest and may be swollen and warm. The pain is usually worsened by bending the knee, putting weight on the knee, or walking. The severity of the injury can vary from mild (minor stretching or tearing of the ligament fibers, such as a low grade sprain) to severe (complete tear of the ligament fibers). Patients can have more than one area injured in a single traumatic event.

Ligament injuries are initially treated with ice packs and immobilization, with rest and elevation. It is generally initially recommended to avoid bearing weight on the injured joint and crutches may be required for walking. Some patients are placed in splints or braces to immobilize the joint to decrease pain and promote healing. Arthroscopic or open surgery may be necessary to repair severe injuries.

Surgical repair of ligaments can involve suturing alone, grafting, and synthetic graft repair. These procedures can be done by either open knee surgery or arthroscopic surgery (described in the section below). The decision to perform various types of surgery depends on the level of damage to the ligaments and the activity expectations of the patient. Many repairs can now be done arthroscopically. However, certain severe injuries will require an open surgical repair. Reconstruction procedures for cruciate ligaments are increasingly successful with current surgical techniques.

Meniscus Tears

The meniscus can be torn with the shearing forces of rotation that are applied to the knee during sharp, rapid motions. This is especially common in sports requiring reaction body movements. There is a higher incidence with aging and degeneration of the underlying cartilage. More than one tear can be present in an individual meniscus. The patient with a meniscal tear may have a rapid onset of a popping sensation with a certain activity or movement of the knee. Occasionally, it is associated with swelling and warmth in the knee. It is often associated with locking or and unstable sensation in the knee joint. The doctor can perform certain maneuvers while examining the knee which might provide further clues to the presence of a meniscal tear.

Routine x-rays, while they do not reveal a meniscal tear, can be used to exclude other problems of the knee joint. The meniscal tear can be diagnosed in one of three ways: arthroscopy , arthrography, or an MRI. Arthroscopy is a surgical technique by which a small diameter video camera is inserted through tiny incisions on the sides of the knee for the purposes of examining and repairing internal knee joint problems. Tiny instruments can be used during arthroscopy to repair the torn meniscus.

Arthrography is a radiology technique whereby a liquid is directly injected into the knee joint and internal structures of the knee joint thereby become visible on x-ray. An MRI scan is another radiology technique whereby magnetic fields and a computer combine to produce two- or three-dimensional images of the internal structures of the body. It does not use x-rays, and can give accurate information about the internal structures of the knee when considering a surgical intervention. Meniscal tears are often visible using an MRI scanner. MRI scans have largely replaced arthrography in diagnosing meniscal tears of the knee. Meniscal tears are generally repaired arthroscopically.

Tendinitis

Tendinitis of the knee occurs in the front of the knee below the kneecap at the patellar tendon (patellar tendinitis), or in the back of the knee at the popliteal tendon (popliteal tendinitis). Tendinitis is an inflammation of the tendon, which is often produced by a strain event, such as jumping. Patellar tendinitis, therefore, also has the name "jumper's knee." Tendinitis is diagnosed based on the presence of pain and tenderness localized to the tendon. It is treated with a combination of ice packs, immobilization with a knee brace as needed, rest, and antiinflammatory medications. Gradually, exercise programs can rehabilitate the tissues in and around the involved tendon. Cortisone injections, which can be given for tendinitis elsewhere, are generally avoided in patellar tendinitis because there are reports of risk of tendon rupture as a result of corticosteroids in this area. In severe cases, surgery can be required. A rupture of the tendon below or above the kneecap can occur. When it does, there may be bleeding within the knee joint and extreme pain with any knee movement. Surgical repair of the ruptured tendon is often necessary.

Fractures

With severe knee trauma, such as motor vehicle accidents and impact traumas, bone breakage (fracture) of any of the three bones of the knee can occur. Bone fractures within the knee joint can be serious and can require surgical repair as well as immobilization with casting or other supports.

Pain can occur in the knee from diseases or conditions that involve the knee joint, the soft tissues and bones surrounding the knee, or the nerves that supply sensation to the knee area. In fact, the knee joint is the most commonly involved joint in rheumatic diseases, immune diseases that affect various tissues of the body including the joints to cause arthritis.

Arthritis is inflammation within a joint. The causes of knee joint inflammation range from noninflammatory types of arthritis such as osteoarthritis, which is a degeneration of the cartilage of the knee, to inflammatory types of arthritis (rheumatoid arthritis or gout). Treatment of the various type of arthritis is directed towards the specific type of arthritis. For more information on arthritis, please read the following articles: Rheumatoid Arthritis, Osteoarthritis, Psoriatic Arthritis, Gout, and Reactive Arthritis.

Infections of the bone or joint can rarely be a serious cause of knee pain and have associated signs of infection including fever, extreme heat, warmth of the joint, chills of the body, and may be associated with puncture wounds in the area around the knee.

Knee Pain At A Glance

- The knee joint has three compartments.
- Causes of knee pain include injury, degeneration, arthritis, infrequently infection and rarely bone tumors.
- Ligaments within the knee (cruciate ligaments) and on the inner and outer sides of the knee (collateral ligaments) stabilize the joint.
- Surgical repair of ligament injury can involve suturing, grafting, and synthetic graft repair.
- Routine x-rays do not reveal meniscus tears, but can be used to exclude other problems of the bones and other tissues.
- The knee joint is the most commonly involved joint in rheumatic diseases, immune diseases that affect various tissues of the body including the joints to cause arthritis.

SCOLIOSIS
(In Children and Adolescents)

Scoliosis is a sideways curvature of the spine, or backbone. The bones that make up the spine are called the vertebrae. The degree of scoliosis ranges from

mild to severe. Patients with milder curves may only need to visit their doctor for periodic observation. Persons with more severe scoliosis may require treatment.

People of all ages can have scoliosis, but this article focuses on children and adolescents. Of every 1,000 children, 3 to 5 develop spinal curves that are considered large enough to need treatment. Adolescent idiopathic (of unknown cause) scoliosis is the most common type and appears after the age of 10. Girls are more likely than boys to have this type of scoliosis.

Since scoliosis can run in families, a child who has a parent, brother, or sister with idiopathic scoliosis should be checked regularly for this condition by the family doctor.

Idiopathic scoliosis can also affect children younger than 10 years of age, but this is very rare. Juvenile idiopathic scoliosis appears in children between the ages of 3 and 10. Early onset or infantile idiopathic scoliosis, which occurs in children less than 3 years old.

In 80 to 85 percent of people, the cause of scoliosis is unknown. This type is referred to as idiopathic scoliosis. Before concluding that a person has idiopathic scoliosis, the doctor looks for other possible causes, such as injury or infection. Causes of curves are classified as either nonstructural or structural.

- **Nonstructural (functional) scoliosis:** A structurally normal spine that appears curved. This is a temporary, changing curve, which is caused by an underlying condition such as a difference in leg length, muscle spasms, or inflammatory conditions, such as appendicitis. Doctors treat this type of scoliosis by correcting the underlying problem.
- **Structural scoliosis:** A fixed curve that doctors treat case by case. Structural scoliosis can occur from unknown factors without reference to other physical problems (idiopathic scoliosis) or be part of a syndrome or disease. Examples of conditions that can result in structural scoliosis are: Marfan's syndrome, an inherited connective tissue disorder; neuromuscular diseases (such as cerebral palsy, poliomyelitis, or muscular dystrophy); birth defects (such as hemivertebra, in which one side of a vertebra fails to form normally before birth); injury; certain infections; tumors (such as those caused by neurofibromatosis, a birth defect sometimes associated with benign tumors on the spinal column); metabolic diseases; connective tissue disorders; or rheumatic diseases

The doctor takes the following steps to evaluate a patient for scoliosis:

- **Medical history:** The doctor talks to the patient and parent(s) and reviews the patient's records to look for medical problems that might be causing the spine to curve; for example, birth defects, trauma, or other disorders that can be associated with scoliosis.
- **Physical examination:** The doctor examines the patient's back, chest, pelvis, legs, feet, and skin. The doctor checks if the patient's shoulders are level, whether the head is centered, and whether opposite sides of the body look level. The doctor also examines the back muscles while the patient is bending forward to see if one side of the rib cage is higher than the other. If there is a significant asymmetry (difference between opposite sides of the

body), the doctor will refer the patient to an orthopedic spine specialist (a doctor who has experience treating people with scoliosis). Certain changes in the skin, such as so-called cafe au lait spots, can suggest that the scoliosis is caused by a birth defect.

- **X-ray evaluation:** Patients with significant spinal curves, unusual back pain, or signs of involvement of the central nervous system (brain and spinal cord), such as bowel and bladder control problems, need to have an x- ray. The x-ray should be done with the patient standing with his or her back to the x-ray machine. The view is of the entire spine on one long (36-inch) film. Occasionally, doctors request additional tests to determine if there are other problems.
- **Curve measurement:** The doctor measures the curve on the x-ray image by examining the vertebrae at the beginning and end of the curve and measuring the angle of the curve. Curves that are greater than 20 degrees require treatment.
- **Location:** To identify a curve's location, doctors find the apex of the curve (the vertebra within the curve that is the most off-center). The location of the apex is the "location" of the curve. A thoracic curve has its apex in the thoracic area (the part of the spine to which the ribs attach). A lumbar curve has its apex in the lower back. A thoracolumbar curve has its apex at the point where the thoracic and lumbar vertebrae join.
- **Shape:** The curve usually is S- or C-shaped.
- **Pattern:** Curves frequently follow patterns that have been studied in previous patients. The larger the curve is, the more likely the condition will progress (depending on the amount of growth remaining).

Many children who are sent to the doctor by a school scoliosis screening program have very mild spinal curves that do not need treatment. When treatment is required, the doctor may send the child to an orthopedic spine specialist.

The doctor will suggest the best treatment for each patient based on the patient's age, how much more he or she is likely to grow, the degree and pattern of the curve, and the type of scoliosis. The doctor may recommend observation, bracing, or surgery.

- **Observation:** Doctors follow patients without treatment and re-examine them every 4 to 6 months when the patient is still growing (is skeletally immature) and has an idiopathic (of unknown cause) curve of less than 25 degrees.
- **Bracing:** Doctors advise patients to wear a brace to stop a curve from getting any worse when the patient:
    - is still growing and has an idiopathic curve that is more than 25 to 30 degrees;
    - has at least 2 years of growth remaining, has an idiopathic curve that is between 20 and 29 degrees, and, if a girl, has not had her first menstrual period; or
    - is still growing and has an idiopathic curve between 20 and 29 degrees that is getting worse.

As a child nears the end of growth, the indications for bracing will depend on how the curve affects the child's appearance, whether the curve is getting worse, and the size of the curve.

- **Surgery:** Doctors advise patients to have surgery to correct a curve or stop it from worsening when the patient is still growing, has a curve that is more than 45 degrees, and has a curve that is getting worse.

Some people have tried other ways to treat scoliosis, including manipulation by a chiropractor, electrical stimulation, dietary supplements, and corrective exercises. So far, studies of these treatments have not been shown to either prevent or aggravate curve progression. Studies have also shown that exercise alone will not stop progressive curves. However, patients may still wish to exercise for the beneficial effects on their general health and well being.

The decision about which brace to wear depends on the type of curve and whether the patient will follow the doctor's directions about how many hours a day to wear the brace.

There are two main types of braces. Braces can be custom made or can be made from a pre-fabricated mold. All must be selected for the specific curve problem and fitted to each patient. To have their intended effect (to keep a curve from getting worse), the brace must be worn every day for the full number of hours prescribed by the doctor until the child stops growing.

- **Milwaukee brace:** Patients can wear this brace to correct any curve in the spine. This brace has a neck ring.
- **Thoracolumbosacral orthosis (TLSO):** Patients can wear this brace to correct curves whose apex is at or below the eighth thoracic vertebra. The TLSO is an underarm brace, which means that it fits under the arm and around the rib cage, lower back, and hips.

Many surgical techniques can be used to correct the curves of scoliosis. The goals of the main surgical procedure are correction, stabilization, and fusion of the curve. Fusion is the joining of two or more vertebrae. Surgeons can choose different ways to straighten the spine and also different implants to keep the spine stable after surgery. (Implants are devices that remain in the patient after surgery to keep the spine aligned.) The decision about the type of implant will depend on the cost; the size of the implant, which depends on the size of the patient; the shape of the implant; its safety; and the experience of the surgeon. Each patient should discuss their options with at least two experienced surgeons.

Patients and parents who are thinking about surgery may want to ask their doctors the following questions:

Exercise does not worsen scoliosis. In fact, it is very important for all people, including those with scoliosis, to exercise and remain physically fit. Girls have a higher risk than boys of developing osteoporosis (a disorder that results in weak bones that can break easily) later in life. The risk of osteoporosis is reduced in women who exercise regularly all their lives; and weight-bearing exercise, such as walking, running, soccer, and gymnastics, increases bone density and helps prevent osteoporosis. For both boys and girls, exercising and participating in sports also improves their general sense of well being.

Researchers are looking for the cause of idiopathic scoliosis. They have studied genetics, growth, structural and biochemical alterations in the discs and muscles, and central nervous system changes. The changes in the discs and muscles seem to be a result of scoliosis and not the cause. Scientists are still hopeful that studying changes in the central nervous system in people with idiopathic scoliosis may reveal a cause of this disorder.
Researchers continue to examine how a variety of braces, surgical procedures, and surgical instruments can be used to straighten the spine or prevent further curvature. They are also studying the long-term effects of a scoliosis fusion and of untreated scoliosis.

Scoliosis At A Glance

- Scoliosis ranges in degree from mild to severe.
- Mild scoliosis may not require treatment.
- The diagnosis of scoliosis is based on the patient's medical history, physical examination, x-ray testing, and measurement of the curvature of the spine.
- Traditional treatments for scoliosis are observation, bracing, and surgery.

Answer the following questions:

1. What Is scoliosis?
2. Who develops scoliosis?
3. What causes scoliosis?
4. How is scoliosis diagnosed?
5. Does scoliosis have to be treated? What are the treatments?
6. Are there other ways to treat scoliosis?
7. Which brace is best?
8. If the doctor recommends surgery, which procedure is best?
9. Can people with scoliosis exercise?
10. What are researchers trying to find out about scoliosis?
11. Scoliosis At A Glance
12. Where can people get more information about scoliosis?

EARS, EYES, NOSE, and THROAT
TONSILS AND ADENOIDS

The tonsils and adenoids are composed of tissues that are similar to the lymph nodes or "glands" found in the neck or other parts of the body. Together, they are part of a ring of glandular tissue (Waldeyer's ring) encircling the back of the throat. The tonsils are the two masses of tissue on either side of the back of the throat. Normal tonsils are usually about the same size and have the same pink color as the surrounding area. On their surfaces are little depressions, called crypts, which may appear deep and contain pus pockets or stones. The adenoids are located high in the throat behind the nose and soft palate (or roof of the mouth)

and, unlike the tonsils, are not easily visible through the mouth. A tonsillectomy and an adenoidectomy (commonly referred to as a T & A) are surgical procedures performed to remove the tonsils and adenoids, respectively.

The tonsils and adenoids are thought to assist the body in its defense against incoming bacteria and viruses by helping the body to form antibodies. However, this function may only be important during the first year of life. In fact, there is no evidence to support a significant role of the tonsils and adenoids in immunity. Medical studies have shown that children who must have their tonsils and adenoids removed suffer no loss whatsoever in their future immunity to disease. The popular myth that they act as filters to bacteria is untrue, not to mention impossible.

The most common problems occurring with the tonsils and adenoids are recurrent or chronic infections and significant enlargement (hypertrophy).

Acute Tonsillitis

Acute tonsillitis is an infection of the tonsils caused by one of several possible types of bacteria or viruses. Acute tonsillitis is characterized by either the sudden or gradual onset of a sore throat which is usually associated with fever. The patient may stop swallowing saliva, start to drool, complain of ear pain with swallowing, and have bad breath. The surface of the tonsil may be bright red with or without a grayish-white coating (exudate). The lymph nodes in the neck may be swollen. Fever can be present.

TRACHEA

The trachea begins immediately below the larynx (voicebox) and runs down the center of the front part of the neck ends behind the upper part of the sternum. Here it divides to form two branches which enter the lung cavities. The trachea (windpipe) forms the trunk of an upside-down tree and is flexible, like a vacuum tube, so that the head and neck may twist and bend during the process of breathing. The trachea, or windpipe, is made up of fibrous and elastic tissues and smooth muscle with about twenty rings of cartilage, which help keep the trachea open during extreme movement of the neck. The lining includes cells that secrete mucus along with other cells that bear very small hairlike fringes. This mucus traps tiny particles of debris, and the beating of the fringes moves the mucus up and out of the respiratory tract, keeping the lungs and air passages free. In Russian folk medicine, there is the thought that rubbing the chest with pork fat will cure a cold. Mustard plasters and boiled snails in barley water were thought to be effective by others, and nobody knows what the ingredients were for early "cure-all tonics" and "snake oil" kits. It is now believed that the best medicine is to rest, keep warm, drink plenty of fluids, and eat good, digestible meals. Sounds good to me...and certainly better smelling.

The Anatomy of Hearing and Balance

This article will provide some basic facts about the structure (anatomy) of the ear that, as I have come to learn, patients want to know but sometimes are hesitant to ask. For instance, just what is the eardrum? Or, where is the middle ear? Or, which parts of the ear deal with hearing and which parts deal with balance? The idea is that a clearer understanding of the anatomy of the organs involved will help individuals better understand normal and abnormal hearing and balance.

Hearing

Scientists who study the structure of organs (anatomists) typically divide the ear into three compartments: the outer (external) ear, middle ear, and inner ear (labyrinth). See the Figure.

Outer ear

The outside part of the ear and the ear canal make up the outer ear. They function to collect sound (acoustic energy), and funnel it to the eardrum (tympanic membrane).

Middle ear

Usually considered part of the middle ear, the eardrum is a thin, flexible membrane that separates the outer ear from the middle ear. The middle ear is an air filled space that houses the three middle ear bones that transmit sound. The first bone is the hammer (malleus), which is connected to the anvil (incus), which is connected to the stirrup (stapes). These tiny bones are named to reflect their particular shapes. The middle ear is connected to the back of the nose (nasopharynx) by the Eustachian tube.

Like the outer ear, the middle ear is involved in hearing. Thus, the sound energy coming from the outer ear causes the eardrum to vibrate. In turn, the eardrum sets into motion the first ear bone, which transmits the motion to the second bone. Finally, the third bone (the stapes) works like a piston to transform the sound energy into mechanical energy. The mechanical energy is then transmitted from the stapes to the hearing part (cochlea) of the inner ear.

Inner ear (labyrinth)

A delicate membranous inner ear (labyrinth) is enclosed and protected by a bony chamber that is referred to as the bony labyrinth. The inner ear is made up of both hearing (auditory) and balance (vestibular) components. As already mentioned, the cochlea is that part of the inner ear involved with hearing. (The semicircular canals and the vestibule are the parts of the inner ear involved with balance. See below.)

There are two compartments of fluid in the cochlea (as well as in the rest of the inner ear):

- The perilymphatic space, which is within the bony labyrinth and surrounds the membranous labyrinth
- The endolymphatic space, which is within the membranous labyrinth

As the stapes pushes back and forth against the cochlea, it compresses the fluid to create waves in the fluid-filled compartments. Depending on the characteristics of the waves, specific nerve messages (impulses) are created. These messages then

travel through the cochlear nerve (the hearing branch of the eighth cranial nerve) to the base of the brain (brainstem) and brain where they are interpreted.

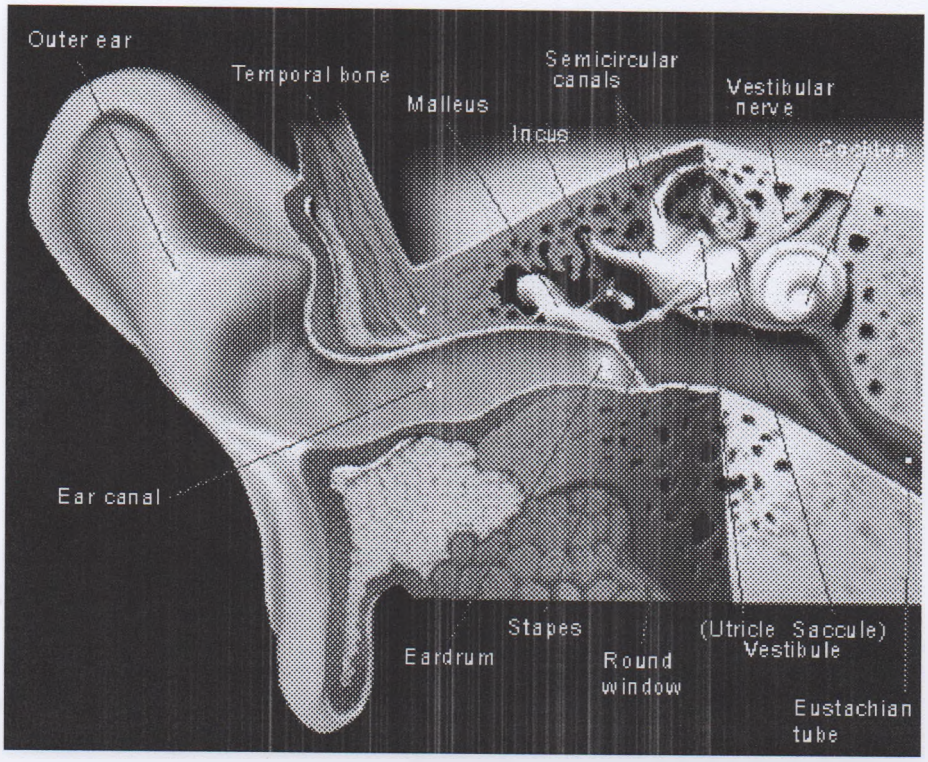


Figure 1. Diagram of outer, middle, and inner ear. The outer ear is labeled in the figure and includes the ear canal. The middle ear includes the eardrum (tympanic membrane) and three tiny bones for hearing. The bones are called the hammer (malleus), anvil (incus), and stirrup (stapes) to reflect their shapes. The middle ear connects to the back of the throat by the Eustachian tube. The inner ear (labyrinth) contains the semicircular canals and vestibule for balance, and the cochlea for hearing.

Balance

The sense of balance is maintained by complex relationships between sense organs that are located in the ears, eyes, joints, skin, and muscles. The brain (part of the central nervous system) receives and processes the input from these peripheral sense organs. When the system is working successfully, the brain is able to tell us in what direction we are pointed, what direction we are moving toward, and if we are turning or standing still. Balance problems can occur, however, when the brain receives conflicting messages from the different sense organs, or if a disease affects one or more of the sense organs.

The balance system

The vestibular (balance) system is made up of five organs that are housed in the inner ear (labyrinth). These so-called vestibular organs are the three semicircular canals, the saccule, and the utricle. (The saccule and the utricle make up the vestibule.) See the Figure. The semicircular canals are responsible for the

detection of rotation (angular acceleration). In contrast, the saccule and utricle are responsible for the detection of straight-line (linear) acceleration and gravity.

As already mentioned, these five vestibular organs, as well as the hearing part (cochlea) of the inner ear, contain fluid-filled compartments (endolymphatic fluid in the endolymphatic space). What's more, these organs are contained within the fluid-filled bony labyrinth (perilymphatic fluid in the perilymphatic space). A healthy vestibular system is dependent on the proper maintenance of these fluid spaces. Furthermore, each vestibular organ has a paired partner in the other (contra lateral) ear. And, the partners are connected to each other in the brainstem by the vestibular nerve, which is the other main branch of the eighth cranial nerve.

The semicircular canals

The three semicircular canals in each ear are geometrically arranged precisely so that the canals are situated at right angles (perpendicular) to each other. Accordingly, rotational movement in any direction is measured by the appropriate semicircular canal in each ear. You see, the canals are fluid-filled circular tubes that work to produce messages by displacing the fluid during rotational movement.

The vestibule (saccule and utricle)

In contrast to the three semicircular canals, the saccule and utricle respond to linear (straight line) acceleration and gravity. A dense structure called the macula is located in the wall of the saccule and utricle. The macula is made up of nerve endings that are capped by tiny stone-like structures. These stones (called otoconia or cupulolithiasis) are actually crystals or granules of calcium carbonate. They are imbedded in the cupula, which is a gelatinous layer that lines the macula. During head movement, the combined forces of linear acceleration and gravity displace the tiny stones, and thereby generate messages.

The brain

The messages from the right and left vestibular systems feed by way of the right and left vestibular nerves into the vestibular centers (nuclei) in the brainstem. These centers also receive input from the eyes, muscles, spinal cord, and joints. Furthermore, higher centers in the brain continue to process the information. The final result is an integrated system that allows us to maintain our balance in our ever-changing environment.

When input from each ear is equal, the system is in balance, and there is no sense of movement. When inputs are unequal, the brain interprets this as movement. And, as a result, compensatory eye movements and postural adjustments occur to maintain balance. The brain can override or in some cases make up (compensate) for a loss of vestibular function. In fact, by using other sensory inputs, the brain can re-balance itself, and thereby often compensate for a complete loss of vestibular function in one ear.

Well, I hope that this information has helped you better understand the structure (anatomy) of the organs involved in the complex processes of hearing and balance.

SORE THROAT
(Pharyngitis)

A sore throat can have many causes. Some of these are listed below:

1. Many common viruses, and even the viruses that cause mononucleosis (mono) and the flu, can cause a sore throat. Some of the viruses that cause a sore throat can produce blisters in the mouth and throat ("aphthous stomatitis").
2. Breathing through the mouth can produce throat dryness and soreness.
3. Sinus drainage may cause a sore throat.
4. A sore throat can also be caused by bacteria. The two most common bacteria to cause as sore throat are Streptococcus (which causes strep throat) and Arcanobacterium haemolyticum. Arcanobacterium causes sore throats mainly in young adults and is sometimes associated with a fine red rash.

A sore throat that lasts for more than 2 weeks can be a sign of generally, sore throats must run their course (Exception: Strep throat will be addressed below). Salt water gargles, hard candies, sprays (for example, Chloraseptic) and lozenges can provide temporary pain relief. (Caution: Lozenges and hard candy are a choking hazard for children. Avoid their use in young children.) A humidifier may be helpful in relieving symptoms, especially in sore throats caused by mouth breathing and dry air. Acetaminophen or ibuprofen may help control the pain.
For adults, if your nose is plugged, nasal sprays, such as AFRIN, may be used for 2-3 days to prevent mouth breathing. It is NOT a good idea to use these products for more than a couple of days; you may become dependent on them. Other decongestant products, such as Sudafed, may be helpful. If you have health problems such as heart disease or high blood pressure, contact your health care professional before using these products.

Strep throat is caused by the Streptococcus bacteria, which is the same bacteria that causes rheumatic fever. Only 5%-10% of adult sore throats are caused by strep while about 15%-40% of sore throats in children are related to strep. For this reason, many health care professionals will recommend a "rapid strep" test for a patient with a sore throat. The "rapid strep" test can usually be done in the office and takes 15-20 minutes. If the result is negative, it is often followed with a strep culture. If either of these is positive, the sore throat is generally treated with penicillin or another antibiotic.

A major objective of treating Strep throat is to prevent the development of rheumatic fever, a serious illness that can cause joint pain and heart valve damage. However, antibiotics do not necessarily hasten the resolution of the sore throat itself and antibiotics are of no help for a sore throat unless it is found to be caused by strep. Another strep related illness, scarlet fever, can cause a rash, but will not cause heart injury or joint pain.

1. If you have been in contact with someone with strep throat and you have a sore throat, it is reasonable to have a strep test done.

2. If your sore throat is not associated with cold symptoms or is associated with a fever, swollen "glands" (lymph nodes), or white patches on the back of your throat, you should have a strep test done.
3. Any sore throat that has a sudden onset and is associated with a fever should be seen by a health care worker.
4. Pain with swallowing is to be expected with a sore throat. However, if you are having trouble swallowing liquids, you should be examined.
5. If your sore throat persists for more than a week, medical attention should be sought.
6. If you have a sore throat and the front of your neck is sore, you should be seen by a health care professional.

There are a number of situations in which a child or adult can have multiple positive strep tests.

1. The first, and most common, is that the strep bacteria were never eradicated in the first place. The child did not get all of the doses of the medication prescribed. Unless a child gets a full 10 day course of penicillin or erythromycin, the strep throat will not clear. Even missing a dose or two can be a problem. One solution to this problem, and one I dislike, is to give the child a shot of penicillin (if not allergic). This is painful and is best avoided if it can be assured that the child will receive all of the doses by mouth.
2. The child is a "carrier" of strep. There are individuals who have strep in their throats all of the time as part of their normal bacteria. If the child did not have a sore throat with the positive strep tests (or even if he or she did) he or she could be a carrier. It may be that your child's sore throat was caused by a virus and he or she just happens to have strep in his/her throat as a carrier.
3. There are no Strep (of the throat kind) that are resistant to penicillin. However, other bacteria in the throat can secrete an enzyme (penicillinase) that breaks down penicillin. This can be overcome by using a drug that is resistant to this enzyme, such as cephalexin (Keflex).
4. The child may just be unlucky and have contracted a series of strep infections. This may occur if there is a carrier in the family or in school. In fact, dogs have been known to be carriers!
5. If none of the above is the case, the whole family should be tested for strep and see if there is an asymptomatic carrier (a carrier who does not have symptoms of a sore throat).

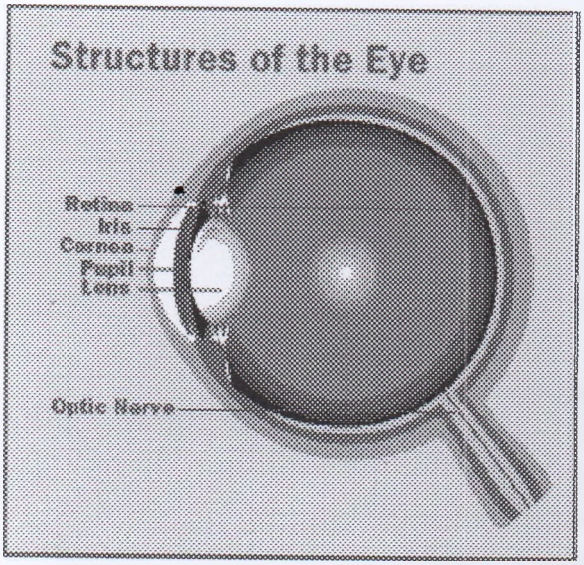
Sore Throat At A Glance

- Most sore throats are caused by viruses or mechanical causes (such as mouth breathing) and can be treated successfully at home.
- Any sore throat that has a rapid onset and is associated with a fever or tenderness of the front of the neck may be serious and should be seen by a health care professional.
- Any sore throat that causes you to have difficulty swallowing (not just pain with swallowing) or breathing should be seen by a health care professional.

- Any sore throat that lasts for more than a week should be evaluated by a health care professional.

Answer the following questions:

1. What causes a sore throat?
2. What can I do at home for a sore throat?
3. What is Strep throat and why is it different?
4. When should I seek medical care for a sore throat?
5. What if I have multiple episodes of strep throat?



Vision & The Eye

When you understand how the eye works, it is easier to comprehend why people need glasses or contact lenses to see well.

The eyes are complex sensory organs. They are designed to optimize vision under conditions of varying lighting. The basic elements are similar to those of an average photography camera.

The primary function of the eye is to focus light. For the eye to see, light rays must be bent or "refracted" to meet at a single point through the cornea, the clear window at the front of the eye that provides most of the focusing power. The transparent dome cornea is a firm covering and is susceptible to dryness and abrasion injuries.

The iris of the eye is the color portion behind the cornea. Our eye color is a function of the amount of pigment within the iris (brown eyes have the most pigment, while blue eyes have the least). The iris contains muscles that open and close its central opening called the pupil in response to decreases and increases in light exposure (exactly like the camera aperture).

Light then travels through the lens, where it is fine-tuned to focus properly on the retina, the nerve layer that lines the back of the eye and connects to the brain. The retina acts like the film in a camera, and clear vision is achieved only if light from an object is precisely focused onto it. If the light focuses either in front of or behind the retina, the image you see is blurred. A refractive error means that the shape of eye structures does not properly bend the light for focusing.

Having 20/20 vision means seeing at 20 feet what a normal person sees at 20 feet. However, if vision is measured at 20/40, it means a person has to walk up to 20 feet to see the same size letter that someone with 20/20 vision could see at 40 feet. People whose best- corrected visual acuity (what they see using glasses or contact lenses) is less than 20/200 in the better eye are considered legally blind, even though they still have enough vision to get around.

The white outer layer of the eyeball is called the sclera. The sclera is covered by a fine tissue containing tiny blood vessels called the conjunctiva. (It is the dilation and proliferation of these blood vessels that accounts for the pinkness of conjunctivitis or "pinkeye.")

The central core of the eyeball is a gel-filled area called the vitreous. Behind the vitreous, at the back of the eye is the retina. The retina is composed of 10 fine layers of specialized nervous tissues that respond to light exposure by initiating chemical reactions that are translated into electrical signals which are then transmitted to the back of the brain through a large nerve in the back of the eye (optic nerve).

Eye Care

"Oh, something is wrong with my eye!" We have all said this at some time. How uncomfortable it can be! Fortunately, many common eye (ocular) disorders disappear without treatment or can be managed by self-treating. Various products--from artificial tears and ointments to ocular decongestants--are available over-the-counter (OTC). These products can help with dryness, itching, or excessive watering of the eye. However, a word of caution: in some instances, what may seem like a minor eye problem may lead to a severe, potentially blinding condition. Many safe and effective OTC products for eye disorders are available for self-treatment. Two important factors to remember when considering self-treatment are: (1) if the problem appears to involve the eyeball itself, you should consult a physician immediately; and (2) if you use an OTC eye care product for 72 hours without improvement of the condition being treated or the condition worsens, you also should see a doctor immediately.

To self-treat common ocular disorders with OTC eye care products, viewers should understand: (1) the structure of the eye; (2) the cause of the disorder; (3) which disorders are safe to self- treat and which should be referred to a physician; (4) the types of OTC eye care products that are available and the disorders in which they are useful.

The eye consists of the eyeball, the upper and lower eyelids, and the conjunctivas. The eyeball consists of a clear, transparent dome at the front (the cornea) that is surrounded by the white of the eyeball (the sclera). The iris of the eye is the circular, colored portion within the eyeball and behind the cornea, and the pupil is the central opening within the iris. Behind the iris and pupil is the eye's lens.

The inner sides of the eyelids which touch the eyeball, are covered by a thin membrane (the palpebral conjunctiva) that produces mucus to lubricate the eye. This thin membrane folds back on itself and covers the visible sclera of the eyeball. (This continuation of the palpebral conjunctiva is called the bulbar conjunctiva.) The tissue between the skin of the eyelid and the palpebral conjunctiva is filled with glands that secrete sebum, an oily substance that provides additional lubrication for the eye. Tears are formed by the lacrimal gland in the upper, outer corner of the eye and are collected and drained by the lacrimal sac in the inner, lower corner of the eye.

Blepharitis: Blepharitis is a common condition that is caused by inflammation of the eyelid. It results in red, scaly, and thickened eyelids and typically some loss of the eyelashes. Blepharitis may be due to either Staphylococcus epidermidis or Staphylococcus aureus (types of bacteria), or seborrheic dermatitis (a type of skin inflammation of unknown cause), or a mixture of the two. The most common complaints are itching and burning. Blepharitis is initially treated by applying hot compresses to the affected eye, followed by an eyelid scrub. If the condition persists, you should see the doctor, who may prescribe antibiotics.

Lice: The eyelids can become infested with one of two different lice, the crab louse (Phthirus pubis) or the head louse (Pediculus humanus capitis). Lice in the eyelids cause symptoms and signs that are similar to those of blepharitis (red, scaly, and thickened eyelids, usually with some loss of the eyelashes). Petrolatum or a non-medicated ointment is applied to the eyelid and suffocates the lice eggs. RID, NIX, A-2000 or any other preparation that is designed for use in the hair should not be used near the eyes.

Contact dermatitis: Contact dermatitis is an inflammation of the skin that causes swelling, scaling, or redness of the eyelid with intense itching. This condition usually is triggered by the use of a new product (soap or make-up) or exposure to a foreign substance. If both the upper and lower eyelids are affected, the cause of the inflammation is likely to be an allergic reaction. Antihistamines that are taken by mouth can be used to treat contact dermatitis of the eyelid.

Foreign substance: Lint, dust, an eyelash or other foreign matter can become stuck in the eye. When the substance cannot easily be removed either with your finger, water, or an ophthalmic irrigant, a doctor should be seen.

Thermal damage: Thermal damage is a burn injury to eye itself. Exposure to the sun's UV radiation during outdoor activities is an example of minor ocular thermal damage. An eye lubricant can be applied to soothe the eye. If there is no relief to the eye after 24 hours, a physician should be seen. An injury to the eye, for example, from a welder's arc, warrants the immediate attention of a doctor.

Conjunctivitis: Bacteria, virus, allergy, or inflammation- promoting agents can cause inflammation of the palpebral and bulbar conjunctiva, also known as conjunctivitis. The inflammation causes enlargement of the blood vessels in the conjunctiva ("congestion") and causes the conjunctiva to become red ("blood-shot"). Itchy eyes may or may not accompany the inflammation. The congestion and itchiness can be treated with ocular decongestants, but the underlying cause may need treatment as well.

Dry eye: Dry eye is characterized by a white or mildly reddened eye combined with a sandy, gritty feeling. Unlike the name implies, dry eye is accompanied by excessive tearing. Abnormalities of the tears or the lubricants of the eye themselves are thought to reduce the effectiveness of the lubrication. The resulting inadequate lubrication stimulates an increase in the production of tears. Other factors thought to contribute to dry eye are aging and some drugs such as antihistamines, antidepressants, or diuretics (water pills). A different type of dry eye can occur when the flow of tears is reduced because of inflammation and

destruction of the lacrimal glands (keratoconjunctivitis sicca). Although lubricants are effective for treating dry eye, a physician also should be consulted.

- **Hordeolum:** Commonly referred to as a sty, a hordeolum is an inflammation of the glands within the eyelid. The primary sign of a hordeolum is a tender, raised nodule on the eyelid. Sometimes, the eyelid is so swollen that the eye appears to be completely shut. A hordeolum is usually caused by the same bacteria that are linked to blepharitis. Treatment usually is with hot compresses several times per day, but if the problem worsens or does not clear within a week, a physician should be seen. Antibiotics may be necessary.

Chalazion: A chalazion looks similar to a hordeolum. A chalazion is a raised nodule without the tenderness of a hordeolum. Like a hordeolum, it is treated with hot compresses. If the chalazion persists, a physician should be consulted.

Trauma: Blunt trauma to the eye requires immediate evaluation by an ophthalmologist or optometrist. Trauma to the eye can activate bleeding into the eye from ruptured blood vessels or cause detachment of the retina. Both situations can seriously impair vision.

- **Abrasion:** An abrasion usually occurs when a fingernail or metallic foreign object rubs across the cornea or conjunctiva. There is a risk of bacterial or fungal contamination and infection following an eye abrasion.

Chemical exposure: Exposure of the eye to household cleaning solutions, fumes, or an actual chemical splash requires immediate evaluation by a physician, though initially it may be self- treated with water or an irrigant.

Keratitis: Keratitis is an inflammation of the cornea that may occur alone or simultaneously with conjunctivitis. The symptoms of keratitis include blurred vision, pain, and intolerance to light (photophobia).

Corneal swelling: Corneal swelling, or edema, is a condition in which fluid accumulates in the cornea. The edema causes visual disturbances such as halos or starbursts around lights. Reduced vision may or may not occur. Corneal swelling can arise as a complication of contact lenses, surgical damage to the cornea, or an inherited defect. Hyperosmotics are used to treat corneal swelling, but additional treatment by a physician may be necessary.

Uveitis: Uveitis is an inflammation of the eye structures in the uveal tract (the iris and other structures within the eye to which the iris attaches). Uveitis may occur without an obvious cause or may be due to trauma or an inflammatory disease in other parts of the body. Symptoms and signs of uveitis are similar to those of conjunctivitis and keratitis.

Angle-Closure Glaucoma: This disorder usually is triggered after an eye exam in which the pupils have been dilated. Angle- closure glaucoma is due to an obstruction of the canal system that drains fluid from the inside of the eye. As a result, fluid accumulates and the pressure within the eye increases. Patients may have a tendency to develop angle-closure glaucoma because of an anatomical defect in their eye. Common symptoms include an aching eyebrow or a headache that leads to nausea and vomiting. Angle-closure glaucoma should be suspected if symptoms develop after an agent is used to dilate the pupils for an eye exam.

There are seven types of OTC eye-care products available. Each product contains one or more active and inactive ingredients.

1. **Artificial tears**: Lubricants--also called artificial tears--are synthetic (man-made), water-based solutions that are used to lubricate the eye and thicken tears. Artificial tears are formulated as solutions or drops. The components in artificial tears that provide the lubrication include cellulose ethers (hydroxymethylcellulose or HPMC), polyvinyl alcohol or PVA, povidone or PVP and retinol solutions (containing vitamin A). Examples of artificial tears include Akwa Tears (drops), Tears Naturale, and Refresh Tears. Artificial tears usually are administered three times daily.
2. **Ointments or Emollients:** Ointments also are useful lubricants. These products are not water-based and contain lubricating ingredients similar to petroleum jelly. Examples of ointments include DuraTears Naturale, Lacri-Lube, and Refresh PM. Their advantage over a water-based solution containing HPMC, PVA or PVP is that they remain in the eye longer. Emollients usually are used twice a day.
3. **Eye washes:** Eye washes--also known as ocular irrigants--are used to cleanse and/or rinse debris from the eye. These products are balanced to the proper acidity and electrolyte concentration so as to be non-irritating to the eye. Washes are available as liquids, solutions or drops. These products may contain boric acid with sodium borate, sodium phosphate, or sodium hydroxide to maintain the proper acidity. Examples of washes include AK Rinse, Dacriose, and Eye-Stream.
4. **Hyperosmotics:** Hyperosmotics are used to treat corneal swelling. Hyperosmotics draw water out of the cornea and thus reduce corneal swelling. Most OTC hyperosmotics contain sodium chloride in various concentrations as either a solution or an ointment. The 2% solution tends to cause less stinging and burning than the 5% solution. An example of a hyperosmotic for corneal swelling is Adsorbon a C.
5. **Scrubs:** Eyelid scrubs are useful for removing oils, debris, or loose skin that can be associated with eyelid inflammation. Soap agents PEG-200 glycerol tallowate or PEG-80 glycerol cocoate provide the foaming action. An example of this type of product is Eye-Scrub.

OTC products may contain lubricants alone or lubricants combined with medications usually as medicated eye drops. The medicated eye drops may contain decongestants or antihistamines.

6. **Decongestants:** Decongestants are used to shrink swollen blood vessels in the congested (red) eye, for example, in conjunctivitis. Phenylephrine is the most common decongestant for this purpose. Patients with angle-closure glaucoma should cautiously use phenylephrine because it can cause an increase in pressure within the eye. Rebound congestion, in which blood vessels become dilated even with continued use of decongestants, is a common side effect of phenylephrine. Therefore, if no improvement in redness or symptoms occurs within 72 hours of use, phenylephrine should be discontinued. A frequent side effect of phenylephrine is dilation of the

pupils. If phenylephrine is absorbed from the eye into the body, an increase in blood pressure may occur, although this is rare. Nevertheless, patients with high blood pressure should be cautious in using phenylephrine. Additionally, if phenylephrine is absorbed, side effects may occur due to interactions with atropine, tricyclic antidepressants (Imipramine) and monoamine oxidase inhibitors such as phenelzine sulfate (Nardil) or tranylcypromine sulfate (Parnate), reserpine (Hydropres), guanethidine (Ismelin), or methyldopa (Aldomet).

A second group of chemical decongestants are the imidazoles (naphazoline, tetrahydrozoline, and oxymetazoline). Imidazoles are longer acting than phenylephrine and have fewer side effects, including rebound congestion. Caution still is recommended with imidazoles because of the potential for an increase in blood pressure. Of the three imidazoles, oxymetazoline generally appears to exhibit the least side effects. Naphazoline may dilate pupils more in persons with lightly pigmented (blue or green) eye.

Examples of medicated eye drops containing decongestants are Naphcon, Prefrin, and Opcon A.

7. **Antihistamines:** Ocular antihistamines are available OTC. These antihistamines are combined with ocular decongestants for the treatment of congestion (conjunctivitis), particularly when caused by allergy. Pheniramine maleate and antazoline both block histamine receptors in the eye, and thus provide relief from the symptoms of itchy, watery eyes. Antazoline may increase pressure slightly in the eye (of concern to patients with glaucoma) whereas pheniramine maleate has little effect on pressure. Common side effects of antihistamines include burning, stinging, and discomfort in the eye. Important side effects that may be associated with oral antihistamines have not been reported with ocular antihistamines. Antihistamines should not be used in patients at risk for developing angle-closure glaucoma. Examples of products that combine an antihistamine and decongestant are Naphcon A and Ocuhist.

Most eye care products contain ingredients that have no therapeutic value. If an individual has a known sensitivity to one or more of these ingredients, then products containing them should be avoided:

Vehicles: An ophthalmic vehicle is added to a product to enhance drug action by increasing the viscosity (thickness) of the product. Examples of ophthalmic vehicles are Dextran 70, gelatin, glycerin, poloxamer 407, and propylene glycol.

Preservatives: Preservatives are included to destroy or limit growth of bacteria that may be introduced into the product during repeated use. Examples of ophthalmic preservatives are benzalkonium chloride (BAK), cetylpyridinium chloride, chlorobutanol, methylparaben, sodium benzoate, and sorbic acid. To avoid allergies, many ophthalmic products are preservative free.

Excipients: An excipient is a substance that is added to provide physical form to the product, make it less irritating to the eye, or to preserve the ingredients

within the product. Useful ophthalmic excipients are antioxidants, wetting agents, buffers, and tonicity adjusters.

EYEGLASSES, SUNGLASSES, MAGNIFYING GLASSES

- Nonprescription eyeglasses
- Sunglasses
- Magnifying Glasses

It is common for pharmacies today to carry nonprescription eyeglasses, sunglasses, and magnifiers. We hope this review will assist consumers with valuable information about these eye products.

Nonprescription eyeglasses

Nonprescription eyeglasses are primarily for persons who can no longer read fine print. Although over-the-counter (OTC) glasses do not appear to harm vision, if they are not appropriate for a person's eyes, they can cause eyestrain after prolonged use.

Most pharmacies offer standard and bifocal lenses, and some vendors also offer transitional lenses that lighten up indoors and darken when outdoors.

The quality and durability of OTC eyeglasses varies widely. Cheap models -- costing as little as a few dollars -- may have lenses that scratch easily and distort vision. Expensive models--costing $50 or more--may incorporate some or all of the desirable characteristics of high-quality prescription lenses.

Manufacturers rate the power of nonprescription glasses from weakest (1.0) to strongest (3.5). When making a selection, the customer tries on eyeglasses and reads fine print while standing 12 to 14 inches from the print. The customer keeps trying on glasses with different power ratings until the print comes into sharp focus. Suppose, for example, the print comes into focus when the customer is wearing eyeglasses with a power rating of 2.0. The customer then knows that a 2.0 rating is correct and can select from styles with that rating.

In some cases, customers may also be asked for the "pupillary" distance. This is actually the interpupillary distance, the distance between the pupils (the openings) of the eyes. This distance is usually measured in centimeters.

We do not recommend nonprescription glasses as a permanent solution to significant eye problems because they usually are not as accurate as prescription lenses. In addition, the use of OTC glasses could lead to the postponement of an eye examination that could reveal a serious underlying problem. However, OTC glasses are okay to keep as "backups" for times when prescription glasses have been misplaced or are being repaired.

Sunglasses

Sunglasses that can be purchased without a prescription come in hundreds of models with varying shapes, materials, and colors.

A must-have feature for all sunglasses is complete (100 percent) protection against the potentially damaging effects of the sun's ultraviolet-A and ultraviolet-B rays. Avoid buying dark sunglasses that do not offer 100 percent UV protection. Dark glasses prompt the pupil of the eye to dilate (enlarge), allowing UV rays to enter. So, if dark glasses lack complete UV protection, they can promote damage to the eye.

Some favorable features that consumers should be aware of include the following:

- **Polarization:** Polarized sunglasses reduce glare from snow, water, highways, and other reflective surfaces. Consequently, wearers see better and squint less. These advantages can be crucial to automobile drivers, airline pilots, heavy-equipment operators, and athletes.
- **Impact resistance:** Impact-resistant sunglasses resist breakage when dropped or mishandled. Glasses made of a trade-name plastic called CR-39 are lighter than glass and more impact- resistant. Glasses made of high-index plastic are even lighter than CR-39 glasses. In addition, these lenses have a coating that protects them against scratching.
- **Photocromicity:** Photocromic sunglasses have lenses that brighten or darken in response to the intensity of sunlight.
- **Water-sheeting:** Lenses with this feature help preserve visual acuity when water (from the rain, the sea, waterfalls, etc.) strikes the lens. With water-sheeting, the water forms in a see- through sheet on the lens rather than in individual droplets that block or distort vision.

Magnifying Glasses

Many pharmacies (and other vendors) today sell magnifying glasses for viewing tiny objects or fine print. These products are available as hand-held magnifying glasses, headset magnifiers, magnifiers that rest on a stand, and magnifiers that can be attached to eyeglasses, sunglasses, or even diving masks.
The power of these products usually ranges from 2x to 3x (2 times actual size to 3 times actual size). Hand-held magnifiers generally resemble a big lollipop. Head-set magnifiers feature a wrap-around cinch that attaches to the head and a flip-up visor with the magnifiers. The magnifiers can be raised above the eyes or lowered to the eyes as necessary. Magnifiers on a stand allow viewing a small object while the hands remain free. Magnifiers attached to eyeglasses, sunglasses, or diving masks also enable the viewer to keep his or her hands free. Some magnifying glasses contain a light to illuminate viewed objects. These products require batteries.

Inexpensive plastic magnifiers are also available. They may or may not be flexible. These devices may be attractive because of their light weight, handiness,

and of course their low cost. However, they tend to scratch easily and have a short lifespan. It is generally best for anyone who really has need of a good magnifying glass not to skimp but invest in one of quality.

Six Common Eye Complaints

The following common eye complaints often happen with age. In most cases, they can be treated easily. Sometimes, they signal a more serious problem.

1. **Presbyopia** (prez-bee-OH-pee-uh) is a slow loss of ability to see close objects or small print. It is a normal process that happens as you get older. Signs of presbyopia include holding your reading materials at arm's length or getting headaches or tired eyes when you read or do other close work. Reading glasses can often fix the problem.
2. **Floaters** are tiny spots or specks that seem to float across your eyes. You might notice them in well-lit rooms or outdoors on a bright day. Floaters can be normal. But sometimes they are a sign of a more serious eye problem, such as retinal detachment. This often is the case if you see light flashes along with floaters. If you notice a sudden change in the type or number of spots or flashes, see your eye care professional right away.
3. **Tearing** (or having too many tears) can come from being sensitive to light, wind, or temperature changes. Tearing also can come from having dry eye. Protecting your eyes (by wearing sunglasses, for example) may solve the problem. Sometimes, tearing may mean a more serious eye problem, such as an infection or a blocked tear duct. Your eye care professional can treat both of these conditions.
4. **Corneal diseases and conditions** can cause redness, watery eyes, pain, reduced vision, or a halo effect. The cornea is the clear, dome-shaped "window" at the front of the eye. It helps to focus light that goes into the eye. Disease, infection, injury, toxic agents, and other things can harm the cornea. Treatments include changing your eyeglass prescription, using eye drops, or in severe cases, having surgery, including corneal transplantation. Corneal transplantation is a common treatment that works well and is safe.
5. **Eyelid problems** can come from different diseases or conditions. Common eyelid complaints include pain, itching, tearing, or being sensitive to light. Eyelid problems often can be treated with medicine or surgery.
6. **Conjunctivitis** (also called pink eye) happens when the tissue that lines the eyelids and covers the cornea becomes inflamed. It can cause itching, burning, tearing, or a feeling that something is in your eye. Conjunctivitis can be due to allergies or an infection. Infectious pinkeye can easily spread from one person to another. It is a common eye problem that your eye care professional can treat.

Glaucoma

Glaucoma *is usually, but not always, associated with elevated pressure in the eye (intraocular pressure).* This pressure leads to damage to the eye (optic)

nerve. Actually, glaucoma is now considered a disease of the optic nerve (optic neuropathy) that causes a loss of vision, usually in both eyes (bilateral). This loss often begins with a subtle decrease in side (peripheral field) vision. If the glaucoma is not diagnosed and treated, it may progress to loss of central vision and blindness.

Worldwide, glaucoma affects about 6 billion people and is the leading cause of irreversible blindness. In fact, as many as 6 million individuals are blind in both eyes from this disease. In the United States alone, according to one estimate, over 3 million people have glaucoma. As many as half of the individuals with glaucoma, however, may not know that they have the disease. The reason they are unaware is that glaucoma initially causes no symptoms, and the loss of vision on the side (periphery) is hardly noticeable.

Elevated pressure in the eye is the main factor leading to glaucomatous damage to the eye (optic) nerve. Glaucoma with normal intraocular pressure is discussed below in the section on the different types of glaucoma. The optic nerve, which is located in back of the eye, is the main seeing nerve for the eye. This nerve transmits the images we see back to the brain for interpretation. The eye is firm and round, like a basketball. Its tone and shape are maintained by a pressure within the eye (the intraocular pressure), which normally ranges between 8 and 22 mm (millimeters) of mercury. When the pressure is too low, the eye becomes softer, while a too high pressure causes the eye to become harder. It turns out that the optic nerve is the most susceptible part of the eye to high pressure because the delicate fibers in this nerve are easily damaged.

An eye doctor (ophthalmologist) can usually detect those individuals who are at risk for glaucoma (because of, for example, a narrow filtering angle or increased intraocular pressure) before nerve damage occurs. The doctor also can diagnose patients who already have glaucoma by observing their nerve damage or visual field loss. The following tests, all of which are painless, may be part of this evaluation.

- **Tonometry** determines the pressure in the eye by measuring the tone or firmness of its surface. Several types of tonometers are available for this test, the most common being the applanation tonometer. After the eye has been numbed with anesthetic eye drops, the tonometer's sensor is placed against the front surface of the eye. The firmer the tone of the surface of the eye, the higher the pressure reading.
- **Gonioscopy** is done by numbing the eye with anesthetic drops and placing a special type of thick contact lens with mirrors inside on the eye. The mirrors enable the doctor to view the interior of the eye from different directions. The purpose of this test is to examine the filtering angle and drainage area of the eye. In this procedure, the doctor can determine whether the angle is open or narrow. As indicated earlier, individuals with narrow angles have an increased risk for a sudden closure of the angle, which can cause an acute glaucomatous attack. Gonioscopy can also determine if anything, such as abnormal blood vessels, might be blocking the drainage of the aqueous fluid out of the eye.

- **Ophthalmoscopy** is an examination in which the doctor uses a hand-held device to look directly through the pupil (the opening in the colored iris) into the eye. This procedure is done to examine the optic nerve (seen as the optic disc) at the back of the eye. Damage to the optic nerve, called cupping of the disc, can be detected in this way. Cupping, which is an indentation of the optic disc, can be caused by increased intraocular pressure. Additionally, a pale color of the nerve can suggest damage to the nerve from poor blood flow or increased intraocular pressure. Special cameras can be used to take photographs of the optic nerve to compare changes over time.
- **Visual Field testing** actually maps the visual fields to detect any early (or late) signs of glaucomatous damage to the optic nerve. This test can be done by having the patient look straight ahead and count the fingers shown by the examiner from the side. More typically, however, visual fields are measured by a computerized assessment. For this procedure, one eye is covered and the patient places his or her chin in a type of bowl. Then, when the patient sees lights of various intensities and at different locations, he or she pushes a button. This process produces a computerized map of the visual field.

Other, more sophisticated tests may also be employed. All of these tests need to be repeated at intervals to assess the progress of the disease and the effect of the treatment.

Glaucoma At A Glance

- Glaucoma is a disease that is often associated with elevated intraocular pressure, in which damage to the eye (optic) nerve can lead to loss of vision and even blindness.
- Glaucoma is the leading cause of blindness in the world.
- Glaucoma usually causes no symptoms early in its course, at which time it can only be diagnosed by regular eye examinations (screenings with the frequency of examination based on age and the presence of other risk factors.
- Intraocular pressure increases when either too much fluid is produced in the eye or the drainage or outflow channels (trabecular meshwork) of the eye become blocked.
- While anyone can get glaucoma, some people are at greater risk.
- The two main types of glaucoma are open angle glaucoma, which has several variants and is a long duration (chronic) condition, and closed angle glaucoma, which is a sudden (acute) condition.
- Damage to the optic nerve and impairment of vision from glaucoma are irreversible.
- Several painless tests that determine the intraocular pressure, the status of the optic nerve and drainage angle, and visual fields are used to diagnose glaucoma.

- Glaucoma is usually treated with eye drops, although lasers and surgery can also be used. Most cases can be controlled well with these treatments, thereby preventing further loss of vision.
- Much research into the causes and treatment of glaucoma is being carried out throughout the world.
- Early diagnosis and treatment is the key to preserving sight in people with glaucoma.

IMMUNE SYSTEM
Flu Vaccination
(Influenza Immunization)

Flu vaccination is a method of preventing a specific type of infection (common flu) caused by the influenza virus. The vaccine is injected into the body to stimulate the normal immune system to produce antibodies that are directed against the influenza virus.

This method of stimulating the normal immune system to be directed against a specific microbe is called immunization. Flu vaccination is also referred to as influenza immunization.

Flu vaccination does not protect against infection caused by microbes other than the influenza virus.

The flu vaccine is generally recommended for persons in the following groups:

- Adults 65 years of age and older.
- Residents of nursing homes or other facilities for patients with chronic medical conditions.
- Persons >6 months of age with chronic heart or circulation problems or lung disorders, including asthma.
- Persons >6 months of age with chronic metabolic diseases (including diabetes), kidney disease, hemoglobinopathies (such as sickle cell disease), immunosuppressive or immunodeficiency disorders (such as AIDS).
- Women who will be in their 2nd or 3rd trimester of pregnancy during the flu season.
- Persons 6 months to 18 years of age receiving long-term aspirin therapy.
- Groups, including household members and care givers, who can infect high risk persons.
- Depending on season and destination, persons traveling to foreign countries should consider vaccination (at least 2 weeks in advance).
- Any person > 6 months of age who wishes to reduce the likelihood of becoming ill with influenza should be vaccinated.

The flu vaccine is administered as a single dose of 0.5 mL of liquid injected through the skin into muscle (intramuscular or IM). Typically the injection is into the deltoid muscle at the side of the arm, using alcohol rubbed over the skin for sterilization. The vaccine is given annually, each fall.

The vaccine is generally effective against the influenza virus within two weeks of the injection. The vaccine is only effective against the strains of the virus

that match the vaccine. These strains vary from flu season to flu season each year. This is the reason that revaccination is required annually with the vaccine that matches the strains of influenza that are currently prevalent.

Side effects of flu vaccination are not common. Side effects include soreness at the site of the injection, muscle aching, fever, and feeling unwell. Very rarely serious allergic reactions have been reported.

Those that should avoid the flu vaccine include:

- Persons with a history of allergy reactions to eggs.
- Those with a history of hypersensitivity to the vaccine.
- Those with recent fever illness.
- Subsequent vaccination should be avoided for persons known to have developed the rare nerve disease Guillain-Barre syndrome within 6 weeks of a previous vaccination. However, for most persons with a Guillain-Barre syndrome history who are at high risk for severe complications, many experts believe the established benefits of vaccination justify yearly vaccination.

Answer the following questions:

1. What is flu vaccination?
2. Who should receive the flu vaccine?
3. How is the flu vaccine administered?
4. How soon does the vaccine begin working?
5. What side effects can occur with flu vaccination?
6. Who should not receive the flu vaccine?

Common Cold

The **common cold**, also known as a viral upper respiratory tract infection, is a contagious illness that can be caused by a number of different types of viruses. Because of the great number of viruses that can cause a cold, the body never builds up resistance against all of them. For this reason, colds are a frequent and recurring problem. In fact, on average, preschool children have 9 colds a year; those in kindergarten, 12 colds a year; and adolescents and adults, 7 colds per year.

Symptoms of a common cold include nasal stuffiness and drainage, sore throat, hoarseness, cough, and perhaps a fever and headache. Many people with a cold feel tired and achy. These symptoms typically last from 3-10 days.

The common cold is spread mostly by hand-to-hand contact. For example, a person with a cold blows or touches his or her nose and then touches someone else who then becomes infected with the virus. Additionally, the cold virus can live on objects such as pens, books, and coffee cups for several hours and can be acquired from such objects. While common sense would suggest that coughing and sneezing spread the common cold, these are actually very poor mechanisms for spreading a cold.

Going out into the cold weather has no effect on the spread of a cold. The reason that there appears to be a relationship is that people spend more time indoors during the cold winter weather. In fact, however, it is the proximity to other people rather than the temperature outside that seems to be the culprit. For this same reason, children in daycare or kindergarten are particularly prone to having colds.

No. Antibiotics play no role in treating the common cold. Antibiotics only work against illnesses caused by bacteria and colds are caused by viruses. Not only do antibiotics not help, but they can also cause allergic reactions that may be fatal (1:40,000). Further, using antibiotics when they are not necessary has led to the growth of several strains of common bacteria that are resistant to antibiotics (including one that commonly causes ear infections in children). For these and other reasons, it is important to limit the use of antibiotics to situations in which they are necessary.

Sometimes, an infection with bacteria can follow the cold virus. Bacterial infections are treated with antibiotics.

Yes, several therapies have been shown to be effective. The most exciting news about the common cold is zinc. In a recent trial, zinc gluconate lozenges reduced the duration of symptoms from a common cold by about 3 days if started within the first 24 hours of symptoms. The dose used was 13.3mg of zinc every 2 hours while awake. This study was done in adults and, while it has shown favorable results, it will require further studies in order to determine optimal recommendations. Zinc is not recommended for children under age 13 unless suggested by your healthcare practitioner. Zinc lozenges are available from most grocery stores and pharmacies.

Vitamin C, if taken on a regular basis, can help reduce the duration of symptoms from a common cold. It does not prevent you from getting a cold, however, and starting it after you have a cold doesn't help.

Several treatments that can ease the symptoms associated with a common cold also exist. Decongestants, such as pseudoephedrine (Sudafed and others), and nasal sprays (Afrin and others) can help reduce symptoms. Persons with heart disease, poorly controlled high blood pressure, or other illness should contact their physician or other healthcare practitioner prior to using these medications. Additionally, over the counter nasal sprays should not be used for more than 3 days because the nose can become dependent on them and a worse stuffy nose will result when they are discontinued.

Antihistamines (Benadryl and others) may help reduce nasal drainage. Only those antihistamines that can also cause drowsiness seem to work. Again, the elderly or those individuals with other health problems (such as prostate trouble or constipation) should contact their healthcare practitioner before using these medications.

Acetaminophen (Tylenol and others) or ibuprofen (Advil and others) can help with the muscle aches. Cough can be controlled with cough syrups containing dextromethorphan. Finally, drink lots of fluids, use throat lozenges for sore throat,

and stay in a moist environment (for example, running a humidifier at night may help with the symptoms).

If you have tried the over-the-counter remedies without any success, several prescription medications are available for nasal stuffiness and cough (for example, ipratropium or cromolyn nasal spray for stuffiness and drainage and benzonatate for cough).

If you have a sore throat with fever and no cold symptoms, you should be seen by your doctor. This type of sore throat is more likely to be a Strep throat or other potentially serious illness.

Finally, if you notice facial pain, tooth pain, or yellow drainage from your nose accompanied by a fever, it is possible that you have an infection of the nasal passages (sinusitis) or a dental infection that would benefit from a medical evaluation and a course of antibiotics.

Common Cold At A Glance

- Common colds are caused by viruses.
- Going out into the cold weather has no effect on the spread of a cold.
- Antibiotics do not help the common cold.
- There are effective home remedies for the common
-

Answer the following questions:

1. What is the common cold?
2. What are the symptoms of the common cold?
3. How is the common cold spread?
4. Does it have anything to do with exposure to cold weather?
5. Do antibiotics help the common cold?
6. Is there anything that can be done at home for the common cold?
7. When should a doctor or other health care practitioner be consulted?

ALLERGY

Introduction

In this review you will learn how allergy relates to the immune system. You will begin understanding how and why certain people become allergic. The most common allergic diseases are discussed briefly in this article.
An allergy refers to a misguided reaction by our immune system in response to bodily contact with certain foreign substances. It is misguided because these foreign substances are usually harmless and remain so to non- allergic people. Allergy-producing substances are called "allergens." Examples of allergens include pollens, dust mite, molds, danders, and foods. To understand the language of allergy it is important to remember that allergens are substances that are foreign to the body and can cause an allergic reaction in certain people.
When an allergen comes in contact with the body, it causes the immune system to develop an allergic reaction in persons who are allergic to it. When you

inappropriately react to allergens that are normally harmless to other people, you are having an allergic reaction and can be referred to as allergic or atopic. Therefore, people who are prone to allergies are said to be allergic or "atopic."
Austrian pediatrician Clemens Pirquet (1874-1929) first used the term allergy. He referred to both immunity that was beneficial and to the harmful hypersensitivity as "allergy." The word allergy is derived from the Greek words "allos," meaning different or changed and "ergos," meaning work or action. Allergy roughly refers to an "altered reaction." The word allergy was first used in 1905 to describe the adverse reactions of children who were given repeated shots of horse serum to fight infection. The following year, the term allergy was proposed to explain this unexpected "changed reactivity."

Allergy Fact

- It is estimated that 50 million North Americans are affected by allergic conditions.
- The cost of allergies in the United States is more than $10 billion dollars yearly.
- Hay fever affects about 35 million Americans, 6 million of whom are children.
- Asthma affects 15 million Americans, 5 million of whom are children.
- The number of cases of asthma has doubled over the last 20 years.

To help answer this question, let's look at a common household example. A few months after the new cat arrives in the house, dad begins to have itchy eyes and episodes of sneezing. One of the three children develops coughing and wheezing, especially when the cat comes into her bedroom. The mom and the other two children experience no reaction whatsoever to the presence of the cat. How can we explain this?
The immune system is the body's organized defense mechanism against foreign invaders, particularly infections. Its job is to recognize and react to these foreign substances, which are called antigens. Antigens are substances that are capable of causing the production of antibodies. Antigens may or may not lead to an allergic reaction. Allergens are certain antigens that cause an allergic reaction and the production of IgE.

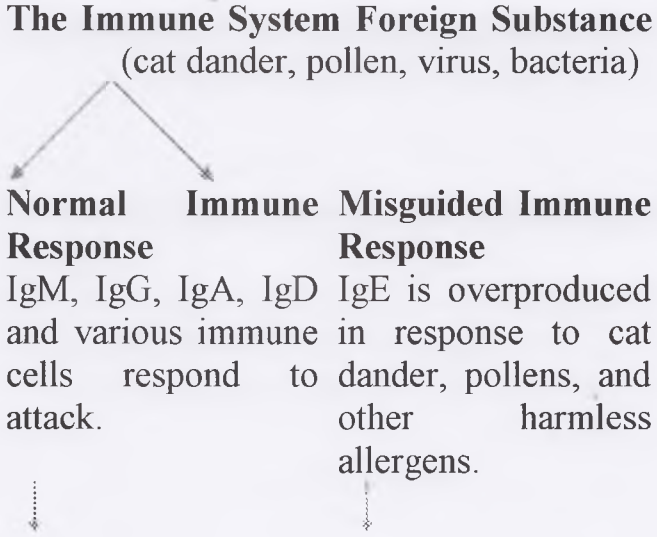
The aim of the immune system is to mobilize its forces at the site of invasion and destroy the enemy. One of the ways it does this is to create protective proteins called antibodies that are specifically targeted against particular foreign substances. These antibodies, or immunoglobulins (IgG, IgM, IgA, IgD), are protective and help destroy a foreign particle by attaching to its surface, thereby making it easier for other immune cells to destroy it. The allergic person however, develops a specific type of antibody called immunoglobulin E, or IgE, in response to certain normally harmless foreign substances, such as cat dander. To summarize, immunoglobulins are a group of protein molecules that act as antibodies. There are 5 different types; IgA, IgM, IgG, IgD, and IgE. IgE is the allergy antibody.
(In 1967, the husband and wife team of Kimishige and Teriko Ishizaka detected a previously unrecognized type of immunoglobulin in allergic people. They called it gamma E globulin or IgE.)

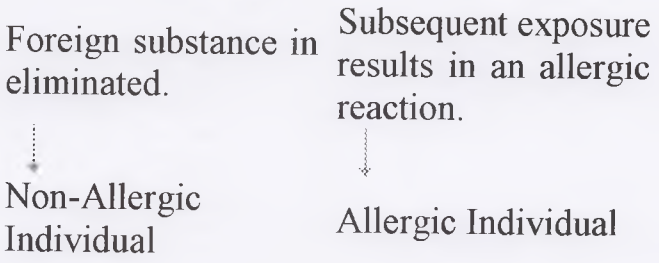
In the pet cat example, the dad and the youngest daughter developed IgE antibodies in large amounts that were targeted against the cat allergen, the cat dander. The dad and daughter are now sensitized or prone to develop allergic reactions on subsequent and repeated exposures to cat allergen. Typically, there is a period of "sensitization" ranging from months to years prior to an allergic reaction. Although it might occasionally appear that an allergic reaction has occurred on the first exposure to the allergen, there must have been a prior contact in order for the immune system to be poised to react in this way.

IgE is an antibody that all of us have in small amounts. Allergic persons, however, produce IgE in large quantities. Normally, this antibody is important in protecting us from parasites, but not from cat dander or other allergens. During the sensitization period, cat dander IgE is being overproduced and coats certain potentially explosive cells that contain chemicals. These cells are capable of causing an allergic reaction on subsequent exposures to the dander. This is because the reaction of the cat dander with the dander IgE irritates the cells and leads to the release of various chemicals, including histamine. These chemicals, in turn, cause inflammation and the typical allergic symptoms. This is how the immune system becomes misguided and primed to cause an allergic reaction when stimulated by an allergen.

On exposure to cat dander, the mom and the other two children produce other classes of antibodies, none of which cause allergic reactions. In these non-allergic members of the family, the dander particles are eliminated uneventfully by the immune system and the cat has no effect on them.

Figure 1.





Allergies can develop at any age, possibly even in the womb. They commonly occur in children but may give rise to symptoms for the first time in adulthood. Asthma may persist in adults while nasal allergies tend to decline in old age.

Why, you may ask, are some people "sensitive" to certain allergens while most are not? Why do allergic persons produce more IgE than those who are non-allergic? The major distinguishing factor appears to be heredity. For some time, it has been known that allergic conditions tend to cluster in families. Your own risk of developing allergies is related to your parents' allergy history. If neither parent is allergic, the chance that you will have allergies is about 15%. If one parent is allergic, your risk increases to 30% and if both are allergic, your risk is greater than 60%.

Although you may inherit the tendency to develop allergies, you may never actually have symptoms. You also do not necessarily inherit the same allergies or the same diseases as your parents. It is unclear what determines which substances will trigger a reaction in an allergic person. Additionally, which diseases might develop or how severe the symptoms might be is unknown.

Another major piece of the allergy puzzle is the environment. It is clear that you must have a genetic tendency and be exposed to an allergen in order to develop an allergy. Additionally, the more intense and repetitive the exposure to an allergen and the earlier in life it occurs, the more likely it is that an allergy will develop.

There are other important influences that may conspire to cause allergic conditions. Some of these include smoking, pollution, infection, and hormones.

The parts of the body that are prone to react to allergies include the eyes, nose, lungs, skin, and stomach. Although the various allergic diseases may appear different, they all result from a misguided immune response to foreign substances in sensitive people. The following brief descriptions will serve as an overview of common allergic disorders.

Hay Fever

Hay fever (Allergic Rhinitis) is the most common of the allergic diseases and refers to seasonal nasal symptoms that are due to pollens. Year round or perennial allergic rhinitis is usually due to indoor allergens, such as dust mites or molds. Symptoms result from the inflammation of the tissues that line the inside of the nose (mucus lining or membranes) after allergens are inhaled. Adjacent areas, such as the ears, sinuses, and throat can also be involved. The most common symptoms include:

- Runny nose
- Stuffy nose
- Sneezing
- Nasal itching (rubbing)
- Itchy ears and throat
- Post nasal drip (throat clearing)

In 1819, an English physician, John Bostock, first described hay fever by detailing his own seasonal nasal symptoms, which he called "summer catarrh." The condition was called hay fever because it was thought to be caused by "new hay."

Asthma

Asthma is a breathing problem that results from the inflammation and spasm of the lung's air passages (bronchial tubes). The inflammation causes a narrowing of the air passages, which limits the flow of air into and out of the lungs. Asthma is most often, but not always, related to allergies. Common symptoms include:

- Shortness of breath
- Wheezing
- Coughing
- Chest tightness

Allergic Eyes

Allergic Eyes (Allergic Conjunctivitis) is inflammation of the tissue layers (membranes) that cover the surface of the eyeball and the undersurface of the eyelid. The inflammation occurs a result of an allergic reaction and may produce the following symptoms:

- Redness under the lids and of the eye overall
- Watery, itchy eyes
- Swelling of the membranes

Allergic Eczema

Allergic Eczema (Atopic Dermatitis) is an allergic rash that is usually not caused by skin contact with an allergen. This condition is commonly associated with allergic rhinitis or asthma and features the following symptoms:

- Itching, redness, and or dryness of the skin
- Rash on the face, especially children
- Rash around the eyes, in the elbow creases, and behind the knees, especially in adults

Hives

Hives (Urticaria) are skin reactions that appear as itchy swellings and can occur on any part of the body. Hives can be caused by an allergic reaction, such as

to a food or medication, but they also may occur in non-allergic people. Typical hive symptoms are:

- Raised red welts
- Intense itching

Allergic Shock

Allergic Shock (Anaphylaxis or Anaphylactic Shock) is a life-threatening allergic reaction that can affect a number of organs at the same time. This response typically occurs when the allergen is eaten (for example, foods) or injected (for example, a bee sting). Some or all of the following symptoms may occur:

- Hives or reddish discoloration of the skin
- Nasal congestion
- Swelling of the throat
- Stomach pain, nausea, vomiting
- Shortness of breath, wheezing
- Low blood pressure or shock

Shock refers to the insufficient circulation of blood to the body's tissues. Shock is most commonly caused by blood loss or an infection. Allergic shock is caused by dilated and "leaky" blood vessels, which result in a drop in blood pressure.

We have seen that allergens are special types of antigens that cause allergic reactions. The symptoms and diseases that result depend largely on the route of entry and level of exposure to the allergens. The chemical structure of allergens affects the route of exposure. Airborne pollens, for example, will have little effect on the skin. They are easily inhaled and will thus cause more nasal and lung symptoms and limited skin symptoms. When allergens are swallowed or injected they may travel to other parts of the body and provoke symptoms that are remote from their point of entry. For example, allergens in foods may prompt the release of mediators in the skin and cause hives.

We will assume that allergens are defined as: the source of the allergy producing substance (e.g. Cat), the substance itself (cat dander), or the specific proteins that provoke the immune response (e.g. Feld1). Feld1, from the Felis domesticus (the domesticated cat), is the most important chemical allergen in cat dander.

Allergens may be inhaled, ingested (eaten or swallowed), applied to the skin, or injected into the body either as a medication or inadvertently by an insect sting.

In The Air We Breathe

Breathing can be hazardous if you are allergic. Aside from oxygen, the air contains a wide variety of particles; some toxic, some infectious, and some "innocuous," including allergens. The usual diseases that result from airborne allergens are hay fever, asthma, and conjunctivitis. The following allergens are

usually harmless, but can trigger allergic reactions when inhaled by sensitized individuals.

- Pollens: trees, grasses, and/or weeds
- Dust mites
- Animal proteins: dander, skin, and/or urine
- Mold spores
- Insect parts: cockroaches

In What We Ingest

When foods or medications are ingested, allergens may gain access to the blood stream and become attached to specific IgE on cells in remote sites such as the skin or nasal membranes. The ability of allergens to travel explains how symptoms can occur in areas other than the gastrointestinal tract. Food allergy reactions may begin with tongue or throat swelling and may be followed by tingling, nausea, diarrhea, or stomach cramps. Nasal breathing difficulties or skin reactions may also be seen. The two main allergen groups that are ingested are:

- Foods
- Drugs (when taken by mouth): e.g. antibiotics and aspirin

Allergy Assist

The most common foods that cause allergic reactions are cow's milk, fish, shellfish, eggs, peanuts, tree nuts, soy, and wheat.

Touching Our Skin

Allergic contact dermatitis is an inflammation of the skin that is caused by a local allergic reaction. The majority of these localized skin reactions do not involve IgE, but are caused by cells of inflammation. The rash produced is similar to that of a poison ivy rash. It should be noted that when some allergens (e.g., latex) come into contact with the skin, they are absorbed by the skin and can also potentially cause reactions throughout the body, not just the skin. For most people, however, the skin is a formidable barrier that can be only locally affected. Examples of allergic contact dermatitis include:

- Latex (causes IgE and non-IgE reactions
- Plants (poison ivy and oak)
- Dyes
- Chemicals
- Metals (nickel)
- Cosmetics

Allergic contact dermatitis does not involve IgE antibody, but involves cells of the immune system which are programmed to react when triggered by a sensitizing allergen. Touching or rubbing a substance to which you were previously sensitized can trigger a skin rash.

Injected Into Our Body

The most severe reactions can occur when allergens are injected into the body and gain direct access to the blood stream. This access carries the risk of a generalized reaction, such as anaphylaxis, which can be life-threatening. The following are commonly injected allergens that can cause severe allergic reactions:

- Insect venom
- Medications
- Vaccines (including allergy shots)
- Hormones (e.g., insulin)

Allergy At A Glance

- Allergy involves a misguided response of the immune system.
- The immune system is the body's organized defense mechanism against foreign invaders, particularly infections.
- Allergens are substances that are foreign to the body and can cause an allergic reaction.
- IgE is the allergy antibody.
- Allergies can develop at any age.
- Your risk of developing allergies is related to your parents' allergy history.

Food allergy or food intolerance affects nearly everyone at some point. When people have an unpleasant reaction to something they ate, they often think that they have an allergy to the food. In fact, one out of three people say that some member of their family has an allergy to food that has necessitated a change in their diet. Actually, however, only about 1% of adults and 3% of children have clinically proven allergic reactions to food.

This difference between the prevalence of clinically proven food allergy and the public's perception of the problem is due primarily to misinterpreting food intolerance as food allergy. Food allergy is an abnormal response to food that is triggered by a specific reaction in the immune system and expressed by certain, often characteristic, symptoms. Food intolerance also is an abnormal response to food, and its symptoms can resemble those of food allergy. Food intolerance, however, is far more prevalent, occurs in a variety of diseases, and is triggered by several different mechanisms that are distinct from the immunological reaction responsible for food allergy.

People who have food allergies must identify and prevent them because, although usually mild and not severe, these reactions can cause devastating illness and, in rare instances, be fatal.

The allergens in food are those components that are responsible for an allergic reaction. They are proteins that usually resist the heat of cooking, the acid in the stomach, and the intestinal digestive enzymes. As a result, the allergens survive to cross the gastrointestinal lining, enter the bloodstream, and go to target

organs, causing allergic reactions throughout the body. The mechanism of food allergy involves the immune system and heredity.

Immune system: An allergic reaction to food involves two components of the immune system. One component is a type of protein, an antibody called immunoglobulin E (IgE), which circulates through the blood. The other is the mast cell, a specialized cell that is in all tissues of the body. The mast cell is especially common, however, in areas of the body that are typical sites of allergic reactions, including the nose and throat, lungs, skin, and gastrointestinal tract

Heredity: The tendency of an individual to produce IgE against something seemingly as innocuous as food appears to be inherited. Generally, allergic people come from families in which allergies are common—not necessarily to food, but perhaps allergies to pollen, fur, feathers, or drugs. Thus, a person with two allergic parents is more likely to develop food allergies than someone with one allergic parent.

Mechanism: Food allergy is a hypersensitivity reaction, meaning that before an allergic reaction to an allergen in food can occur, a person needs to have been exposed previously, that is, sensitized, to the food. At the initial exposure, the allergen stimulates lymphocytes (specialized white blood cells) to produce the IgE antibody that is specific for the allergen. This IgE then is released and attaches to the surface of the mast cells in different tissues of the body. The next time the person eats that food, its allergen hones in on the specific IgE antibody on the surface of the mast cells and prompts the cells to release chemicals such as histamine. Depending upon the tissue in which they are released, these chemicals cause the various symptoms of food allergy.

The complex process of digestion affects the timing, location, and particular symptoms of an allergic reaction to food. All of the symptoms of food allergy occur within a few minutes to an hour of eating. A food allergy can initially be experienced as an itching in the mouth and difficulty swallowing and breathing. Then, during digestion of the food in the stomach and intestines, symptoms such as nausea, vomiting, diarrhea, and abdominal pain can start. Incidentally, gastrointestinal symptoms are those that are most often confused with the symptoms of different types of food intolerance.

As mentioned previously, the allergens are absorbed and enter the blood stream. When they reach the skin, allergens can induce hives or eczema, and when they reach the lungs, they can cause asthma. As the allergens travel through the blood vessels, they can cause lightheadedness, weakness, and anaphylaxis, which is a sudden drop in blood pressure. Anaphylactic reactions are severe even when they start off with mild symptoms, such as a tingling in the mouth and throat or discomfort in the abdomen. They can be fatal if not treated quickly.

The Answer is Yes: Allergies to milk or soy formula (a milk- substitute made from soybeans) can occur in infants and young children. These early allergies sometimes do not involve the usual hives or asthma, but rather can cause infantile colic, and perhaps blood in the stool or poor growth.

Infantile Colic: The clinical picture of infantile colic, which usually starts within one month of birth, is that of a crying child who sleeps poorly at night. The

cause of colic is uncertain. A variety of psychosocial and dietary factors have been implicated, however, and allergy to milk or soy probably is responsible for up to 20% of colic in infants. The infants are particularly susceptible to this allergy because of the immaturity of both their immune system and digestive tract. In addition, sometimes the family has a history of allergies or other problems with feeding.

Summary

Food allergy is caused by immunological reactions to foods, sometimes in individuals or families predisposed to allergies. A number of foods, especially shellfish, milk, eggs, peanuts, and fruit can cause allergic reactions (notably hives, asthma, abdominal symptoms, lightheadedness, and anaphylaxis) in adults or children. When a food allergy is suspected, a medical evaluation is the key to proper management. The differential diagnosis comprises other abnormal responses to food, that is, food intolerances, which actually are far more common than food allergy. Once the diagnosis of food allergy is made (primarily by the medical history) and the allergen is identified (usually by skin tests), the treatment basically is to avoid the offending food. People with food allergies should work with their physicians and become knowledgeable about allergies and how they are diagnosed and treated.

This article incorporates information provided, with kind permission, by the National Institutes of Health, the principal biomedical research agency of the U.S. Government.

Food Allergy At A Glance

- Food allergy is not common, but can be serious.
- Food allergy differs from food intolerance, which is far more common.
- The more frequent types of food allergies in adults differ from those in children.
- Children can outgrow their food allergies, but adults usually do not.
- The diagnosis of food allergy is made with the help of the patient's detailed history, the patient's diet diary, or an elimination diet.
- Food allergy is treated primarily by dietary avoidance.

ALLERGIES

An allergy refers to a misguided reaction by our immune system in response to bodily contact with certain foreign substances. It is misguided because these foreign substances are usually harmless and remain so to non- allergic people. Allergy-producing substances are called "allergens." Examples of allergens include pollens, dust mite, molds, danders, and foods. To understand the language of allergy it is important to remember that allergens are substances that are foreign to the body and can cause an allergic reaction in certain people.

When an allergen comes in contact with the body, it causes the immune system to develop an allergic reaction in persons who are allergic to it. When you

inappropriately react to allergens that are normally harmless to other people, you are having an allergic reaction and can be referred to as allergic or atopic. Therefore, people who are prone to allergies are said to be allergic or "atopic."
Austrian pediatrician Clemens Pirquet (1874-1929) first used the term allergy. He referred to both immunity that was beneficial and to the harmful hypersensitivity as "allergy." The word allergy is derived from the Greek words "allos," meaning different or changed and "ergos," meaning work or action. Allergy roughly refers to an "altered reaction." The word allergy was first used in 1905 to describe the adverse reactions of children who were given repeated shots of horse serum to fight infection. The following year, the term allergy was proposed to explain this unexpected "changed reactivity."

Allergy Fact

It is estimated that 50 million North Americans are affected by allergic conditions.

- The cost of allergies in the United States is more than $10 billion dollars yearly.
- Hay fever affects about 35 million Americans, 6 million of whom are children.
- Asthma affects 15 million Americans, 5 million of whom are children.
- The number of cases of asthma has doubled over the last 20 years.

REPRODUCTIVE SYSTEM

The reproduction system uses the process of producing a new generation to continue the existence of the species by the fusion of two cells from different individuals; this is achieved in humans by the fusion of one sperm and one ovum (egg). This fusion is called "fertilization" and is achieved by sexual intercourse between a male and female or by artificial insemination. The male body is designed to allow the manufacture, storage and transfer of male sex cells (or sperm). The female body is designed to manufacture, store and release eggs (ova). The creation of human life is a miracle to behold as two tiny cells - the sperm and the ovum - fuse to form a new cell which, after fertilization, resides in the female womb. Nine months later, a fully- formed, breathing, living human being in tiny replica is born.

URINARY TRACT

Tasks:
Ex.1. Make a vocabulary.
Ex.2. Read and translate the following text.

*The **urinary tract** or system consists of the kidneys, ureters, bladder, and urethra.* The key players in the system are the kidneys, a pair of purplish-brown

organs located below the ribs toward the middle of the back. The kidneys remove liquid waste from the blood in the form of urine, keep a stable balance of salts and other substances in the blood, and produce a hormone that aids the formation of red blood cells. Narrow tubes called ureters carry urine from the kidneys to the bladder, a triangle-shaped chamber in the lower abdomen. Urine is stored in the bladder and emptied through the urethra.

The average adult passes about a quart and a half of urine each day. The amount of urine varies, depending on the fluids and foods a person consumes. The volume formed at night is about half that formed in the daytime.

Urinary tract infections are a serious health problem affecting millions of people each year. Infections of the urinary tract are common- only respiratory infections occur more often. Each year, urinary tract infections (UTIs) account for about 8 million doctor visits.

Normal urine is sterile. It contains fluids, salts, and waste products, but it is free of bacteria, viruses, and fungi. An infection occurs when microorganisms, usually bacteria from the digestive tract, cling to the opening of the urethra and begin to multiply. Most infections arise from one type of bacteria, Escherichia coli (E. coli), which normally live in the colon.

In most cases, bacteria first begin growing in the urethra. An infection limited to the urethra is called urethritis. From there bacteria often move on to the bladder, causing a bladder infection (cystitis). If the infection is not treated promptly, bacteria may then go up the ureters to infect the kidneys (pyelonephritis).

Microorganisms called Chlamydia and Mycoplasma may also cause UTIs in both men and women, but these infections tend to remain limited to the urethra and reproductive system. Unlike E. coli, Chlamydia and Mycoplasma may be sexually transmitted, and infections require treatment of both partners.

The urinary system is structured in a way that helps ward off infection. The ureters and bladder normally prevent urine from backing up toward the kidneys, and the flow of urine from the bladder helps wash bacteria out of the body. In men, the prostate gland produces secretions that slow bacterial growth. In both sexes, immune defenses also prevent infection. Despite these safeguards, though, infections still occur.

Some people are more prone to getting a UTI than others. Any abnormality of the urinary tract that obstructs the flow of urine (a kidney stone, for example) sets the stage for an infection. An enlarged prostate gland also can slow the flow of urine, thus raising the risk of infection.

A common source of infection is catheters, or tubes, placed in the bladder. A person who cannot void, is unconscious or critically ill, often needs a catheter that stays in place for a long time. Some people, especially the elderly or those with nervous system disorders who lose bladder control, may need a catheter for life. Bacteria on the catheter can infect the bladder, so hospital staff takes special care to keep the catheter sterile and remove it as soon as possible.

People with diabetes have a higher risk of a UTI because of changes of the immune system. Any disorder that suppresses the immune system raises the risk of a urinary infection.

Many women suffer from frequent UTI's. Nearly 20 percent of women who have a UTI will have another, and 30 percent of those will have yet another. Of the last group, 80 percent will have recurrences.

Usually, the latest infection stems from a strain or type of bacteria that is different from the infection before it, indicating a separate infection. (Even when several UTI's in a row are due to E. coli, slight differences in the bacteria indicate distinct infections.)

Research funded by the National Institutes of Health (NIH) suggests that one factor behind recurrent UTI's may be the ability of bacteria to attach to cells lining the urinary tract. A recent NIH funded study has also shown that women with recurrent UTI's tend to have certain blood types. Some scientists speculate that women with these blood types are more prone to UTI's because the cells lining the vagina and urethra may allow bacteria to attach more easily. Further research will show whether this association is sound and proves useful in identifying women at high risk for UTI'S.

Pregnant women seem no more prone to UTI's than other women. However, when a UTI does occur, it is more likely to travel to the kidneys. According to some reports, about 2 to 4 percent of pregnant women develop a urinary infection. Scientists think that hormonal changes and shifts in the position of the urinary tract during pregnancy make it easier for bacteria to travel up the ureters to the kidneys. For this reason, many doctors recommend periodic testing of urine. Not everyone with a UTI has symptoms, but most people get at least some. These may include a frequent urge to urinate and a painful, burning feeling in the area of the bladder or urethra during urination. It is not unusual to feel bad all over-tired, shaky, washed out-and to feel pain even when not urinating. Often, women feel an uncomfortable pressure above the pubic bone, and some men experience a fullness in the rectum. It is common for a person with a urinary infection to complain that, despite the urge to urinate, only a small amount of urine is passed. The urine itself may look milky or cloudy, even reddish if blood is present. A fever may mean that the infection has reached the kidneys. Other symptoms of a kidney infection include pain in the back or side below the ribs, nausea, or vomiting.

In children, symptoms of a urinary infection may be overlooked or attributed to another disorder. A UTI should be considered when a child or infant seems irritable, is not eating normally, has an unexplained fever that does not go away, has incontinence or loose bowels, or is not thriving. The child should be seen by a doctor if there are any questions about these symptoms, especially if there is a change in the child's urinary pattern.

To find out whether you have a UTI, your doctor will test a sample of urine for pus and bacteria. You will be asked to give a "clean catch" urine sample by washing the genital area and collecting a "midstream" sample of urine in a sterile container. (This method of collecting urine helps prevent bacteria around the genital area from getting into the sample and confusing the test results.) Usually,

the sample is sent to a laboratory, although some doctors' offices are equipped to do the testing.

- In the urinalysis test, the urine is examined for white and red blood cells and bacteria. Then the bacteria are grown in a culture and tested against different antibiotics to see which drug best destroys the bacteria. This last step is called a sensitivity test.

Some microbes, like Chlamydia and Mycoplasma, can only be detected with special bacterial cultures. A doctor suspects one of these infections when a person has symptoms of a UTI and pus in the urine, but a standard culture fails to grow any bacteria.

When an infection does not clear up with treatment and is traced to the same strain of bacteria, the doctor will order a test that makes images of the urinary tract. One of these tests is an intravenous pyelogram (IVP), which gives x-ray images of the bladder, kidneys, and ureters. An opaque dye visible on x-ray is injected into a vein, and a series of x- rays are taken. The film shows an outline of the urinary tract, revealing even small changes in the structure of the tract.

Ex.3. Make a plan based on the text.
Ex.4. Give a short summary of the text.

FEMALE REPRODUCTIVE SYSTEM

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

As in the male, female reproduction is under the control of hormonal and nervous regulation. Development of the female reproductive organs and normal function depend on the relative levels of a number of hormones in the body. The female reproductive system consists of ovaries, uterine tubes, uterus, vagina, external genital organs, and mammary glands. The female reproductive system produces ova and provides a place for the embryo growth.There are two fallopian tubes (also called uterine tubes) one on each side of the uterus. Each of these tubes contains a passageway no wider than a needle. The fallopian tubes transport the oocyte or zygote (the fertilized oocyte) from the ovary to the uterus.Two ovaries are small organs approximately 2 to 3.5 cm long and 1 to 1.5 cm wide. They are located in pelvic cavity. Between puberty and menopause, the ovaries generally release one egg each month. They also produce the female sex hormones (estrogen and progesterone). The union of the male and female sex cells in humans takes place within the female body. Fertilization is the process of penetrating the secondary oocyte by the spermatozoon. It is completed with the fusion of the male and female pronuclei. If fertilization takes place, the new cell formed begins a nine-month period of development within the uterus. The size and shape of the uterus is as a medium-sized pear and is approximately 7.5 cm long and 5 cm wide. The walls of uterus are thick and consist of three layers: serous, muscular, and mucous. The powerful muscles contract during childbirth to push the baby out. The

narrow neck of the uterus is called the cervix, and it also has thick walls. The mucus fills the cervical canal and acts as a barrier to substances that could pass from the vagina into the uterus. Ordinarily, the opening of the cervix is exceedingly small. During childbirth, the cervical opening expands to allow passage of the baby. The cervix extends into vagina, which is a muscular tube about 10 cm long. The wall of the vagina consists of an outer muscular layer and an inner mucous membrane. Most of the time the walls of vagina touch, but they can expand to accommodate a baby. The internal reproductive organs are held in place within the pelvis by a group of ligaments.The opening to vagina is protected by external genitals. Mammary glands are the organs of milk production and are located within breasts. The mammary glands are modified sweat glands. Externally, the breasts of both males and females have a raised nipple surrounded by a circular, pigmented areola (pl. areolae). The female breasts begin enlarging during puberty under the influence of estrogen and progesterone.

Ex.3. Write a short summary on female reproductive system.

MALE REPRODUCTIVE SYSTEM

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

The main function of the male reproductive system is producing sperm cells and transporting them to the female reproductive system.

The male reproductive system consists of the testes (or testicles), epididymides, ductus deferentia, urethra, seminal vesicles, prostate gland, bulbourethral glands, scrotum, and penis. Sperm cells are very temperature sensitive and do not develop normally at usual body temperatures. The testes and epididymides are located outside the body cavity where the temperature is low.

The testes are contained in a pouch of skin, called the scrotum. In each testis there is a tightly packed mass of coiled tubes surrounded by a protective capsule. At puberty the testes begin to produce the sperm cells (spermatozoa) that are used in reproduction. This process continues throughout life. In addition to producing sperm cells the testes secrete the male hormone testerone, which plays an important role in the development and maintenance of the typical masculine physical characteristics, such as facial hair, greater muscle mass and strength, and a deeper voice. The sperm cells are constantly being produced within each testis. They are transported through the epididymides and the ductus deferentia and then stored in the seminal vesicles. The mixture of the sperm cells with the fluids formed by the seminal vesicles and the prostate gland forms the semen that is ejaculated during sexual activity. Although sperm cells make up only a small portion of the semen, a single ejaculation contains as many as 500 million sperm. After sexual intercourse, one of these cells may reach and fertilize an egg in the female. The prostate gland contributes fluids to the semen. As a man ages, the prostate gland frequently enlarges. The urethra, which runs the length of the penis

through its center, carries urine during voiding and semen during ejaculation. The urethra exits from the pelvis and passes through the penis to the outside of the body.

INFERTILITY

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Infertility is a common problem in partners. Fortunately, major advances have been made in recent decades, and the problem of infertility can be solved in many cases. Problems of infertility can include problems with the sperm, problems with egg, or difficulties encountered in their union. Abnormal function of the fallopian tube or uterus, infections, and immunologic and other factors may also cause infertility. Infertility problems also can result from sexual dysfunction.To physicians, the term infertility usually means the inability to become pregnant after 1 year of frequent sexual intercourse without using any contraception.Ten to 15 percent of couples are infertile. Of these couples, the man is the infertile partner in about 30 percent of cases and contributes to the infertility problem in an additional 20 percent of cases; the woman is infertile 50-70 percent of the time. In both men and women, various factors can account for infertility. Forty percent of infertile couples have more than one cause of their infertility. Thus, the physician will begin a comprehensive infertility examination of both partners. The most cause of infertility in men is a slow sperm cell count. Normal sperm counts range from 75,000,000 to 400,000,000 sperm cells. If the sperm cell count drops to 20,000,000 sperm cells per milliliter, the male is usually sterile. Decreased sperm cell count can occur because of damage to the testes (e.g., because of mumps, radiation, or trauma), obstruction of the duct system, or inadequate hormone production.In women, the failure to release an egg, is responsible for infertility problems in up to 15 percent of cases. It can be caused by various factors. We know of uterine's and immunologic factors' being a cause of infertility.In some cases the physicians don't know exactly the reasons of infertility's occurring.

The numerous treatments for infertility depend on the cause. Recent developments in therapy have increased the number of once-infertile couples who can achieve pregnancy. Various means of insemination or embryo transfer may be possible so that the woman can still become pregnant.

BREAST CANCER

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Breast canceris the disease women fear most. Experts predict 178,000 women will develop breast cancer in the United States in 2007. Breast cancer can also occur in men, but it's far less common. For 2007, the predicted number of new breast cancers in men is 2,000.

Yet there's more reason for optimism than ever before. In the last 30 years, doctors have made great strides in early diagnosis and treatment of the disease and in reducing breast cancer deaths. In 1975, a diagnosis of breast cancer usually meant radical mastectomy – removal of the entire breast along with underarm lymph nodes and muscles underneath the breast. Today, radical mastectomy is rarely performed. Instead, there are more and better treatment options, and many women are candidates for breast-sparing operations.

Knowing the signs and symptoms of breast cancer may help save your life. When the disease is discovered early, you have more treatment options and a better chance for a cure.

Most breast lumps aren't cancerous. Yet the most common sign of breast cancer for both men and women is a lump or thickening in the breast. Often, the lump is painless. Other potential signs of breast cancer include: a spontaneous clear or bloody discharge from your nipple, often associated with a breast lump, retraction or indentation of your nipple, a change in the size or contours of your breast, any flattening or indentation of the skin over your breast, redness or pitting of the skin over your breast, like the skin of an orange, a number of conditions other than breast cancer can cause your breasts to change in size or feel. Breast tissue changes naturally during pregnancy and your menstrual cycle. Other possible causes of noncancerous (benign) breast changes include fibrocystic changes, cysts, fibroadenomas, infection or injury.

If you find a lump or other change in your breast – even if a recent mammogram was normal – see your doctor for evaluation. If you haven't yet gone through menopause, you may want to wait through one menstrual cycle before seeing your doctor. If the change hasn't gone away after a month, have it evaluated promptly.

A diagnosis of breast cancer is one of the most difficult experiences you can face. In addition to coping with a potentially life-threatening illness, you must make complex decisions about treatment.

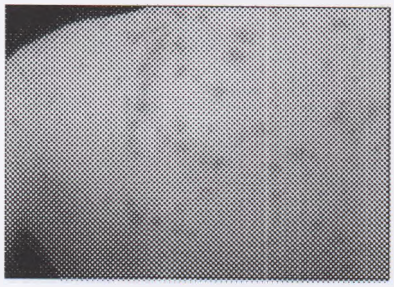
Treatments exist for every type and stage of breast cancer. Most women will have surgery and an additional (adjuvant) therapy such as radiation, chemotherapy or hormone therapy. Experimental treatments are also available at cancer treatment centers.

CHILDHOOD DISEASES

Chickenpox
(Varicella)

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Chickenpox ***is a common childhood disease caused by a virus.*** **The virus is called the varicella-zoster virus.**



Most people contract chickenpox by age 15, the majority between age 5 and 9, but all ages can contract it. Chickenpox is usually more severe in adults than children. Winter and spring are the most common times of the year for chickenpox to occur.

Chickenpox is very highly contagious. It is easily passed between members of families and school classmates through airborne particles, droplets in exhaled air and fluid from the blisters or sores. Indirect transmission also occurs through contact with articles of clothing and other items exposed to fresh drainage from open sores. Patients are contagious up to 5 days (more commonly, 1 to 2 days) before and 5 days after the date that their rash appears. When the sores have crusted over, the person is usually no longer contagious.

Symptoms tend to appear 14 to 16 days after initial exposure but can occur any time from 10 days up to 21 days after contact with the virus. Chickenpox is characterized by 1 to 2 days of mild fever up to 102 degrees F, general weakness, and a rash, often the first sign of the disease. Rarely, a person may have the disease without the rash. The rash of chickenpox develops in crops with raised red spots arriving first, progressing to blisters that burst, creating open sores, before crusting over. This process usually starts on the scalp, then the trunk (its area of greatest concentration), and finally the arms and legs. Any area of skin that is irritated (by diaper rash, poison ivy, eczema, sunburn, etc.) is likely to be hard hit by the rash. The rash is typically very itchy (pruritic).

Complications can and do occur from chickenpox. The most prominent is bacterial infection of the open pox sore, sometimes causing scarring, especially if the patient scratches the inflamed area. In fact, among children, bacterial skin infection is the most common complication of chickenpox. The next most common complications in children affect the central nervous system and include a disorder of the cerebellar portion of the brain (cerebellar ataxia with wobbliness, dizziness, tremor, and altered speech), encephalitis (inflammation of the brain with headaches, seizures, and decreased consciousness), damaged nerves (nerve palsies) and Reye's syndrome (a potentially fatal combination of liver and brain disease). Especially serious complications can occur in patients with AIDS, lupus, leukemia, and cancer. Complications also occur in people taking immune-suppressing drugs, such as cortisone-related medications. Newborn infants whose mothers have chickenpox in the last trimester of pregnancy are at increased risk from the disease.

If the mother develops the disease from 5 days before to 2 days after delivery, the fatality rate for the baby is up to 30%.

Conclusion

Most people develop lifetime immunity to chickenpox after the first occurrence and never experience it again. But the virus can sometimes resurface later in life as shingles (zoster). The current aim in the U.S. and many other countries is to achieve universal (or nearly universal) immunization of children with the chickenpox vaccine. The vaccination requires only one shot given at about one year of age. If an older person has not had chickenpox, the shot may be given at any time. There have been few significant adverse reactions to the chickenpox vaccine.

Answer the questions:

1. What is chickenpox?
2. What are the symptoms?
3. What are the possible complications?

MALARIA

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Malaria is a disease caused by a parasite that infects the red blood cells. Of the 4 types of malaria, the most serious type is falciparum malaria. It can be life-threatening. The other 3 types of malaria (vivax, malariae, and ovale) are generally less serious and are not

As is well known, malaria is transmitted to people by mosquitos. The scientific name of the particular type of mosquito is Anopheles. An infected Anopheles mosquito bites a person and injects the malaria parasites into the blood. The malaria parasites then travel through the bloodstream to the liver and eventually infect the red blood cells.

Malaria is a particular problem and a major one in areas of Asia, Africa, and Central and South America. Unless precautions are taken, anyone living in or traveling to a country where malaria is present

The symptoms characteristic of malaria include fever, chills, muscle aches, and headache. Cycles of chills, fever, and sweating that recur every 1, 2, or 3 days are typical. There can sometimes be vomiting, diarrhea, coughing and yellowing (jaundice) of the skin and whites of the eyes.

Persons with severe falciparum malaria may develop bleeding problems, shock, kidney or liver failure, central nervous system problems, coma, and die.

The period between the mosquito bite and the onset of the malarial illness is usually 1-3 weeks (7 to 21 days). However, the incubation period may be longer when a person has taken an inadequate course of malaria prevention medications.

Certain types of malaria parasites can also take much longer, as long as 8 to 10 months, to cause symptoms.

The treatment for malaria depends upon the geographic area where a person has been infected with the disease. Different areas of the world have malaria types that are resistant to certain medications. The correct drugs for each type of malaria must be prescribed by a doctor.

Since people infected with falciparum malaria can die (often because of delayed treatment), immediate treatment for falciparum malaria is critical.

Yes. Malaria may pose a serious threat to a pregnant woman and her pregnancy. Malaria infection in pregnant women may be more severe than in women who are not pregnant. Malaria may also increase the risk of problems with the pregnancy, including prematurity, abortion, and stillbirth. Therefore, all pregnant women who are living in or traveling to a malaria-risk area should consult a doctor and take prescription drugs to avoid contracting malaria.

All children, including young infants, living in or traveling to malaria-risk areas should take antimalarial drugs. Although the recommendations for most antimalarial drugs are the same as for adults, it is crucial to use the correct dosage for the child which depends on the age and weight of the child.

Since an overdose of an antimalarial drug can be fatal, all antimalarial (and all other) drugs should be stored in childproof containers well out of the child's reach.

If you are traveling to an area known to have malaria, find out which medications you need to take, and take them as prescribed. Your doctor, travel clinic or the health department can advise you as to what medicines to take to keep from getting malaria.

- Avoid exposure to mosquitos during the early morning and early evening hours (the hours of greatest mosquito activity).
- Wear appropriate clothing (long-sleeved shirts and long pants, for examples) especially when you are outdoors.
- Apply insect repellent to the exposed skin. The recommended insect repellent contains 20% - 35% DEET (N,N-diethyl-m-toluamide).
- Spray mosquito repellents on clothing to prevent mosquitos from biting through thin clothing.
- Use a mosquito net over your bed.
- Have screens over windows and doors.
- Spray permethrin or a similar insecticide in the bedroom before going to bed.

Ex.3. Answer the following questions:

1. What is malaria?
2. How is malaria transmitted?
3. Where is malaria a particular problem?
4. What are the symptoms of malaria?
5. What is the incubation period for malaria?
6. How is malaria treated?

7. Is malaria a particular problem during pregnancy?
8. Is malaria a particular problem for children?
9. How do I keep from getting malaria?
10. What other precautions should I take to avoid malaria?
11. Where can I get more information about malaria?

MEASLES

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

***Measles** (rubeola) is an acute highly contagious disease, caused by a virus, featuring fever, runny nose, cough, red eyes, and a spreading skin rash. Rubeola is measles. They are synonymous (exactly the same).*

The name "measles" comes from the Middle English "maselen" meaning "many little spots" referring to the rash that is characteristic of measles. Rubeola refers specifically to the reddish color of the rash.

For this article, we chose the title "MEASLES (RUBEOLA)" in order to distinguish this disease from another that has similar names but is quite different, namely, German measles (rubella).

Other names for the measles (rubeola) include the hard measles and (depending on how long you think it lasts) the seven-day measles, the eight-day measles, the nine-day measles, or the ten-day measles, and morbilli.

Measles is caused by the measles virus (which is classified scientifically as a paramyxovirus).

The glib answer is that it is spread with ease. The measles virus is, in fact, spread principally by small droplets from the nose, throat, and mouth of someone who is in the early stages of the disease. These infected droplets are sprayed out during sneezing and coughing.

Measles can also be passed by direct contact with nasal or throat secretions of infected persons or objects contaminated with the measles virus.

Measles is among the most readily transmitted of all infectious diseases. It is like chickenpox in this respect.

Measles epidemics occur every 2-3 years in areas of the world without effective immunization programs and there are small localized outbreaks in the intervening years.

Outbreaks of measles still occur In countries such as the U.S. in spite of widespread immunization programs. These outbreaks are often in unimmunized preschoolers or other unimmunized people in the population.

A child born to a mother who had measles receives immunity from its mother lasting most of the first year of life. One attack of measles provides lifelong immunity, and proper vaccination confers lifelong protection against measles.

The time from contact with the virus until signs and symptoms begin (the incubation period) is 1-2 weeks (7-14 days).

A person with measles can transmit it beginning 2 to 4 days before the rash appears until the time that the rash fades and clears.

Those persons at high risk for measles include:

- Infants too young to have been immunized (less than 1 year of age).
- Those who refuse vaccination.
- Those who received immune globulin near the time of measles vaccination.
- Persons vaccinated with an inactivated vaccine (available from 1963-1967) who have not been revaccinated for measles.

Everyone born before 1957 is generally considered immune because they probably already have had the disease (since it is so highly contagious).

There is no evidence whatsoever that measles (rubeola) can cause malformations of the developing embryo and fetus. Measles can, however, trigger miscarriages (spontaneous abortions) and premature delivery in pregnant women.

Typical measles begins with fever, runny nose (coryza), hacking cough, and red eyes (conjunctivitis). The very characteristic (pathognomonic) spots within the mouth (called Koplik's spots) appear 2 to 4 days later, are often on the inside of the cheeks (the buccal mucosa) opposite the 1st and 2nd upper molars, and look like little grains of white sand surrounded by a red ring.

Sore throat (pharyngitis) occurs along with inflammation of the airways (the laryngeal and tracheobronchial mucosa) develop.

The rash appears 3 to 5 days after the onset of symptoms. The rash progresses from the head downward. It begins below the ears and on the side of the neck as small irregular bumps that soon increase in size and spread rapidly (within 1-2 days) to the trunk and limbs as they begin to fade on the face. Bleeding spots (petechiae) and bruises (ecchymoses) can occur with very severe rashes.

The fever can top 104° F (40° C). The eyes are reddened and watery (conjuctivitis), very sensitive to light (photophobiac) and there is swelling around the orbits (periorbital edema). There is a hacking cough. The patient looks (and feels) sick.

The course of the disease usually follows the course of the rash. In 3 to 5 days, the rash begins to fade, the fever falls abruptly, and the patient feels more comfortable. (The patient now can no longer pass on the disease). The rash may leave discoloration in its wake and the discolored skin may peel.

The atypical measles syndrome (AMS) is an altered expression of measles. (Call it modified measles.) AMS begins suddenly with high fever, headache, cough, and abdominal pain. The rash may appear 1 to 2 days later, often beginning on the limbs. Swelling (edema) of the hands and feet may occur. Pneumonia is common and may persist for 3 months or more.

AMS occurs in persons who were incompletely immunized against measles. This may happen if:

- The person was given the old killed-virus measles vaccine (which does not provide complete immunity and is no longer available); or
- The person was given attenuated (weakened) live measles vaccine that was, by accident, inactivated during improper storage.

Immunization with inactivated measles virus does not prevent measles virus infection. It can, however, sensitize a person so that the expression of the disease is altered, resulting in AMS.

The diagnosis of measles may be suspected in someone with a head cold, light sensitivity of the eyes (photophobia) and bronchitis. But before the rash appears, a definitive diagnosis of measles can be made only by seeing Koplik's spots, the tiny white spots most often seen on the inside of the cheeks (the buccal mucosa) opposite the lst and 2nd upper molars. These spots, followed by high fever and the rash with its characteristic progression firmly establish the clinical diagnosis of measles.

The measles virus can be detected in the early stage of the disease. This is done by rapid staining (by immunofluorescence) of cells from the throat (pharynx) or urine.

The virus can be isolated in tissue culture in the lab. Blood (serologic) tests are also available.

Isolation of the measles virus by growing it in tissue culture and/or blood (serologic) tests may be necessary to establish the diagnosis of the atypical measles syndrome (AMS) because AMS, by definition, involves the altered expression of the disease (modified measles).

It might be a lot of other diseases including rubella (German measles), scarlet fever, drug rashes, roseola, infectious mononucleosis, and adenovirus, echovirus and coxsackievirus infections.

Atypical measles syndrome (AMS) can be confused with other diseases including Rocky Mountain spotted fever, meningococcal infection, various types of pneumonia, appendicitis, juvenile rheumatoid arthritis, and others.

A number of different types of complications, some of them very serious, even fatal, can and do occur with measles:

Bacterial infections: Pneumonia and ear infections (otitis media), and other bacterial infections are common complications. People with measles are vulnerable to strep infections. Measles can reactivate and worsen tuberculosis (TB).

Immune deficiency: Immunodeficient patients may develop a grave progressive pneumonia without a rash.

Acute thrombocytopenic purpura: Low blood platelet levels (important blood clotting elements) with severe bleeding constitute a potentially serious complication during the acute phase of measles.

Encephalitis: Brain inflammation (encephalitis) occurs in 1 in 1,000 cases. It starts (up to 3 weeks) after onset of the rash and presents with high fever, convulsions, and coma. It may run a blessedly short course with full recovery within a week. Or it may eventuate in central nervous system impairment or death.

Subacute sclerosing panencephalitis (SSPE): The measles virus causes subacute sclerosing panencephalitis (SSPE), a chronic brain disease of children and adolescents that occurs months to often years after an attack of measles, causing convulsions, motor abnormalities, mental retardation and, usually, death.

People exposed to a person who has measles should contact their health care provider immediately. If they have not been vaccinated, measles vaccine can help prevent infection if it is given within three days of exposure.

The medical treatment of measles is mainly symptomatic, that is, to treat the symptoms. There is no known way to cure the measles. (Note again that anyone at

risk who is exposed to measles should contact their health care provider immediately since measles vaccine helps prevent infection if given within 3 days of exposure).

Persons with measles should not be exposed to strep infections (infections with streptococcal bacteria).

Conversely, people who have measles should limit their contact with others and have as little contact with others as possible.

Bacterial complications of measles such as pneumonia and ear infections are treated with antibiotics.

Eye care: The eyes may be very sensitive to light and have an irritating discharge. Wash the eyes by wiping them with a clean, wet washcloth but avoid rubbing them. Keep lights dim or the room darkened. Sunglasses may also help.

Humidity: For the cough, humidify the air with a cool mist vaporizer or with pans of water set in the room. The mist from a shower also helps.

Fluids: Increase fluids to 12-16 glasses of liquid (8 ounces or 250 ml per glass) a day during the fever. You should drink enough fluids to cause urination every 2 hours.

Bed rest: Stay in bed during the fever.

Balanced diet: Eat a balanced diet (as always, we hope).

Avoid aspirin: Avoid aspirin and all aspirin products. (Aspirin today is not recommended for children or for patients with infectious diseases caused by viruses, because of the association with Reyes syndrome).

Barring complications, measles has a low mortality rate when it occurs in normal well-nourished healthy children.

Unfortunately, complications are not rare with measles and they increase the degree of morbidity (illness). And some of the complications of measles (such as measles encephalitis and subacute sclerosing panencephalitis) carry an appreciable mortality rate.

The way to prevent measles is by measles immunization: The standard MMR (measles, mumps and rubella) vaccine is given in two dosages. The first dose should be at 12-15 months of age. The second vaccination should be at 4-6 years of age.

Measles, mumps, and rubella vaccines may be administered as individual shots, if necessary, or as a measles-rubella combination.

Most children should receive MMR vaccinations. Exceptions may include children with congenital immunodeficiency (born with an inability to fight off infection), some children on treatment with radiation or drugs for cancer, and children on long term steroids (cortisone). People with severe allergic reactions to eggs or the drug neomycin should probably avoid the MMR vaccine. Pregnant women should wait until after delivery before being immunized with MMR.

Worldwide (universal) immunization against measles is the goal. Exceptions should be made only for special reasons. People with HIV or AIDS should normally receive MMR vaccine.

Measles At A Glance

- Measles is a potentially serious disease.
- Measles is due to a virus that is easily spread.
- Measles can be complicated by ear infections, pneumonia, or encephalitis.
- Measles infection of the brain (encephalitis) can cause convulsions, mental retardation, and even death.
- Measles in pregnant women can cause miscarriages or premature delivery.
- Measles can be prevented through vaccination.
- Each person not immunized against measles is at risk for measles and puts others at risk.

MUMPS

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Mumps *is an acute (sudden) viral illness.*

The virus that causes mumps is a paramyxovirus. It is spread by direct contact as well as by airborne droplets and saliva.

Mumps was once considered one of the inevitable infectious diseases of childhood. Since a mumps vaccine became available in 1967, the incidence of mumps has declined in the U.S., but there are still many underimmunized populations (for example, more blacks than whites have not yet been immunized). Mumps usually presents with inflammation of the salivary glands, particularly the parotid glands (salivary glands near the ears). A child with mumps often looks like a chipmunk with a full mouth due to the swelling of the parotids. (Mumps is also called epidemic parotitis).

Mumps can cause inflammation of tissues other than the salivary glands. Most frequently, the covering and substance of the central nervous system are inflamed causing meningoencephalitis. The pancreas is another target organ resulting in pancreatitis.

Especially after adolescence, mumps tends to affect the ovary (oophoritis) and the testis (orchitis). The mature testis is particularly susceptible to damage from mumps which can lead to infertility.

The standard MMR (measles, mumps and rubella) vaccine is now given in two dosages. The first should be given at 12-15 months of age. The second vaccination should be given at 4-6 years. Most children should receive MMR vaccinations. Exceptions may include children born with an inability to fight off infection, some children with cancer, on treatment with radiation or drugs for cancer, on long term steroids (cortisone). People with severe allergic reactions to eggs or the drug neomycin should probably avoid the MMR vaccine. Pregnant women should wait until after delivery before being immunized with MMR. People with HIV or AIDS should normally receive MMR vaccine.

The origin of the word mumps is not clear. It may have to do with the English usage, now obsolete, of "mump" to mean a grimace. More probably,

mumps comes from a colder climate, Iceland, where "mumpa" meant to fill the mouth too full.

ALCOHOL ABUSE AND ALCOHOLISM

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Alcoholism *is also known as "alcohol dependence."* It is a disease that includes alcohol craving and continued drinking despite repeated alcohol-related problems, such as losing a job or getting into trouble with the law. Alcoholism includes four symptoms:

- **Craving** - A strong need, or compulsion, to drink.
- **Impaired control** - The inability to limit one's drinking on any given occasion.
- **Physical dependence** - Withdrawal symptoms, such as nausea, sweating, shakiness, and anxiety, when alcohol use is stopped after a period of heavy drinking.
- **Tolerance** - The need for increasing amounts of alcohol in order to feel its effects.

Alcoholism is now accepted as a disease. It is a chronic and often progressive disease. Like many diseases, it has symptoms that include a strong need to drink despite negative consequences, such as serious job or health problems. Like many diseases, it has a generally predictable course and is influenced by both genetic (inherited) and environmental factors.

Alcoholism is a treatable disease, and medication has also become available to help prevent relapse, but a cure has not yet been found. This means that even if an alcoholic has been sober for a long time and has regained health, he or she may relapse and must continue to avoid all alcoholic beverages.

Two different types of medications are commonly used to treat alcoholism. The first are tranquilizers called benzodiazepines (e.g., Valium and Librium), which are used only during the first few days of treatment to help patients safely withdraw from alcohol.

A second type of medication is used to help people remain sober. A recently approved medicine for this purpose is naltrexone (ReVia TM). When used together with counseling, this medication lessens the craving for alcohol in many people and helps prevent a return to heavy drinking. Another, older medication is disulfiram (Antabuse), which discourages drinking by causing nausea, vomiting, and other unpleasant physical reactions when alcohol is used.

Treatment is effective in many, but by no means all, cases of alcoholism. Studies show that a minority of alcoholics remains sober 1 year after treatment, while others have periods of sobriety alternating with relapses. Still others are unable to stop drinking for any length of time. Treatment outcomes for alcoholism compare favorably with outcomes for many other chronic medical conditions. The longer a person abstains from alcohol, the more likely that person is to remain sober.

It is important to remember that many people relapse once or several times before achieving long-term sobriety. Relapses are common and do not mean that a person has failed or cannot eventually recover from alcoholism. If a relapse occurs, it is important to try to stop drinking again and to get whatever help is needed to abstain from alcohol. Ongoing support from family members and others can be important in recovery.

WRINKLES

Introduction

Although wrinkles can be signs of experience and wisdom, most people would rather not have them.

People's desire to retain and regain youth is strong and universal. The eternal wish for a "fountain of youth" can be seen in the innumerable products and procedures advertised in books, magazines, and other media that promise "younger-looking skin." Many claims for such youth-enhancing methods are unfortunately overblown or entirely nonexistent. Let the buyer beware! Still, effective techniques for softening and even removing wrinkles do exist.

Skin ages all over the body, but much more so where there has been sun exposure. Changes brought on by sun damage (photoaging) include "dryness" (really roughness), sagginess, skin growths like keratoses ("liver spots"), and wrinkles.

Wrinkles in turn can be divided into two categories; fine, surface lines and deep furrows. Wrinkle treatments are in general much more effective for fine lines. Deeper creases may require more aggressive techniques, such as plastic surgery.

Wrinkles are found primarily on the parts of the body where sun exposure is greatest. These areas especially include the face, neck, the backs of the hands, and the tops of the forearms.

Factors that promote wrinkling include:

- Smoking
- Skin type (people with light-colored skin and blue eyes are more susceptible to sun damage)
- Heredity (some families wrinkle more)
- Hairstyle (depending on how much skin is covered by hair and protected from the sun)
- Dress (again, by determining which skin is exposed)
- Occupational and recreational sun exposure over the course of many years

Some of these factors are beyond our control. The main preventative measures we can take are to minimize sun exposure and not smoke.

SPF numbers on sunscreen labels refer to protection against UVB radiation (short-wave ultraviolet light, or the"sunburn rays"). Most sunscreens allow UVA (long-wave ultraviolet light) to penetrate the skin. These are the same rays used in suntan parlors. Although UVB is more energetic in producing wrinkles, there are about 10 times as many UVA rays in the atmosphere as there are UVB rays. It is therefore likely that using tanning parlors and spending lots of time outdoors--even

with "maximum protection"--will contribute to the development of wrinkles. Some sunscreens contain ingredients (like Parsol 1789) that provide UVA protection, but these are only partially effective. For more, please read the articles, Sunburn and Sun Sensitizing Drugs and Sun Protection and Sunscreens.

So, what can be done to treat wrinkles? There are several medical (topical medicines and creams) and cosmetic techniques available for improving (minimizing) the appearance of wrinkles and even removing them. Below is a description of these methods and their potential outcomes and side effects.

Medical treatments

- **Vitamin A Acid (tretinoin, Retin-A, Renova).** Among medical treatments, this is by far the most proven and effective way of bettering many of the signs of aging, such as mottled pigmentation, roughness, and wrinkling. Creams containing this medication must be used on an ongoing basis. At first, they produce redness and peeling. Although this can be unpleasant for a while, it is essential to achieving improvement once the peeling stops.
- **Alpha-hydroxy acids.** These are the so-called "fruit acids" and include glycolic and lactic acid. Preparations containing these fruit acids are quite safe and cause no more than mild and temporary irritation. The improvement they produce is, however, relatively subtle.
- **Antioxidants.** These include preparations that contain the vitamins A, C, and E, as well as beta-carotene. These creams may provide a certain amount of sun protection as well as mild improvement of wrinkles.
- **Ordinary moisturizers.** Regular creams, which don't contain any of the above substances, may make wrinkles look temporarily less prominent. This is what advertisers have in mind by products that "reduce the appearance of fine lines."

Cosmetic procedures

- **Glycolic acid peels.** These superficial peels can make a very slight difference in the intensity of fine wrinkles.
- **Deeper peels.** These peels use ingredients like salicylic acid and trichloroacetic acid and penetrate somewhat deeper into the skin. These deeper peels do a better job of smoothing fine lines. In general, however, the deeper the peel, the greater the risk of side effects, such as long-lasting pigment changes (changes in skin color) and scarring. Such peels do not require anesthesia. Mild sedation helps ease short-term but fairly intense discomfort.
- **Dermabrasion.** Often performed under general anesthesia, this procedure involves the use of a rotating instrument to sand the skin down. Depending a great deal on the skill and experience of the operator, dermabrasion can result in excellent improvement, but can also produce significant side effects, including scarring and permanent changes in skin color.

- **Laser resurfacing.** Using instruments such as the carbon dioxide and erbium lasers, physicians can achieve results similar to those of dermabrasion with greater reliability and precision. The laser is passed several times over the area to be treated until the peel reaches the middle of the dermis, the skin's second layer. This helps stimulate the body's natural collagen synthesis (production), which plumps up sagging skin and wrinkles. Some doctors perform laser resurfacing under "conscious sedation," in which the patient remains awake and receives intravenous medications to calm and ease pain. This sedation is combined with the application of topical anesthetic creams such as EMLA or Ela-Max, as well as injections of local anesthetics like lidocaine. Procedures may need to be repeated once or twice at 6 to12 month intervals to maximize improvement. They are, however, associated with pain, lengthy healing times, and potential for permanent pigment changes and scarring.
- **Non-ablative laser resurfacing.** Newer lasers attempt to stimulate collagen synthesis under the skin without peeling or damaging the epidermis. Data on their effectiveness are still preliminary at this point, but suggest that results for fine lines and wrinkles may approach those of invasive laser resurfacing. Treatment is almost painless and there is little or no redness, peeling, or "down-time" afterward. Noticeable improvement may involve several repeated procedures over a period of months.
- **Plastic surgical procedures.** Surgical facelifts, brow lifts, and similar operations can be very helpful for selected patients.
- **Botox.** Injection of botulinum toxin, the muscle poison, can paralyze muscles that produce the "frown lines" on the forehead, fine lines around the eyes, and other wrinkles. Improvement lasts several months and must be repeated to sustain improvement. Safety depends again on the experience of the physician.

Anyone considering any of the cosmetic procedures should be sure to consult doctors who have experience in one or several of these techniques. Patients should fully inform themselves about the risks and potential benefits of the procedure they are considering before going forward.

Wrinkles At A Glance

- Skin ages all over the body, but much more so where there has been sun exposure. Changes brought on by sun damage (photoaging) include "dryness" (really roughness), sagginess, skin growths like keratoses ("liver spots"), and wrinkles.
- Wrinkles in turn can be divided into two categories; fine, surface lines and deep furrows. Wrinkle treatments are in general much more effective for fine lines. Deeper creases may require more aggressive techniques, such as plastic surgery.
- Factors that promote wrinkling include smoking; skin type (people with light-colored skin and blue eyes are more susceptible to sun damage);

heredity (some families wrinkle more); hairstyle (depending on how much skin is covered by hair and protected from the sun); dress (again, by determining which skin is exposed); occupational and recreational sun exposure over the course of many years.

- Treatments available for wrinkles include medical treatments (such as vitamin A acid, alpha hydroxy acids, antioxidants, and moisturizer) and cosmetic procedures (such as glycolic acids peels, deep peels, dermabrasion, laser resurfacing, surgical procedures, and botox).

SUN PROTECTION AND SUNSCREENS

Sun protection is simply guarding yourself and others from the adverse effects of sunlight. Aside from the hazards of heat, the sun poses the danger of sunburn, which can permanently damage the skin and cause skin cancer.

The best ways to avoid sunburn are to:

- Limit time in the sun, especially between 10 a.m. and 3 p.m.;
- Wear protective clothing, including;
  - A broad-brimmed hat,
  - A shirt with sleeves that cover the arms, and
  - A long skirt or pants with long legs
- Use a protective sunscreen to minimize the penetration of the sun's ultraviolet (UV) rays.

Sunscreen is any substance or material that protects the skin from UV radiation. Sunscreens are available in the forms of topical lotion, cream, ointment, gel, or spray that can be applied to the skin; a salve or stick that can be applied to the lips, nose, and eyelids; a moistener in towelettes that can be rubbed against the skin; sunglasses that protect the eyes; and film screen that can be affixed to the windows of a car, room, or office.

SPF, an abbreviation for sun-protection factor, is a number such as 15, 30 or 50 that indicates how long a topical sunscreen remains effective on the skin. A user can determine the duration of effectiveness simply by multiplying the SPF by the length of time it takes for him or her to suffer a burn without sunscreen.

For example, Mary A. normally suffers a burn in 10 minutes without wearing a sunscreen. If she applies a sunscreen with an SPF of 15, she will be protected for 150 minutes (10 minutes multiplied by the SPF of 15). As another example, Jack B. normally burns in a half-hour without wearing a sunscreen. If he also applies a sunscreen with an SPF of 15, he will be protected for 450 minutes (30 minutes multiplied by the SPF of 15).

Persons with sensitive skin who burn quickly and must spend a lot of time outdoors should consider applying a sunscreen with an SPF of 30 or more.

Some sunscreens protect against only one type of ultraviolet radiation; ultraviolet-B (UV-B). Others protect against both types of ultraviolet radiation that reach earth's atmosphere from the sun; Ultraviolet-B and ultraviolet-A (UV-A).

Sunscreens that protect against both UV-A and UV-B, and are thus classified as "broad spectrum," are the best choice.

Sunscreens containing zinc oxide or titanium dioxide protect against UV-B and UV-A. However, zinc oxide blocks more UV radiation than titanium dioxide and, therefore, is the preferred ingredient.

It's a good general rule to apply a sunscreen very liberally. Anyone who skimps won't receive full protection. The sunscreen should be applied about a half hour before going outside to allow time for the sunscreen to soak in and take effect.

Therefore, sunscreen should be reapplied at least every two hours and after swimming, bathing, perspiring heavily, or drying off with a towel or handkerchief. Water and perspiration resistant sunscreens are available. However, even their protection will not last indefinitely.

Yes. In some people, sunscreens containing PABA (para-aminobenzoic acid) can actually heighten the risk of suffering a sunburn. Other ingredients in sunscreens may also increase the risk of a reaction in certain people. Anyone can determine the suitability of a particular sunscreen without risk of serious harm by:

1. Clothing his or her body fully except for a small patch of skin; and then
2. Applying the sunscreen to the skin patch and exposing it to sunlight.
3. If a reaction occurs, the user should not use that product. He or she should try another product.

As a general rule, babies six months of age or younger should not have sunscreen applied to their skin because their bodies may not be capable of tolerating the chemicals in sunscreens. Instead, they should be clothed and shaded. Everyone over six months of age should use a sunscreen regularly unless they and their doctors decide it would be better to protect the skin in other ways. In an effort to make sunscreen labels more reliable and useful, the Food and Drug Administration (FDA) in 1999 issued new labeling regulations for over-the-counter sunscreens. According to the new FDA guidelines, sunscreen labels will be prohibited from making claims that are considered unproven or absolute such as "waterproof" and "all-day protection."

The FDA will also no longer permit a product to be called "sunblock." (Sunscreens don't block out all of the sun's rays.) Manufacturers must also list the active sunscreen ingredients in their products on the label.

No. Some don't. Tanning products that don't contain sunscreen will be required by the FDA to carry a warning label alerting consumers to the dangers of unprotected sunbathing.

Those that provide 100 percent protection against UV radiation, as stated on the label at the time of purchase.

Yes. UV radiation, though not as intense in the winter, still poses a threat, especially when rays reflect off snow. There is no safe time of year when it comes to UV radiation.

No. They are only one part of a complete sun protection program. An effective program also includes limiting sun exposure and wearing protective clothing.

SLEEP

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Sleep *is a natural body function during which we are relatively unconscious and the muscles that we normally control are relaxed.* The result of sleep is a refreshment of the nervous system (including the brain) and of the muscles.

Sleep plays a central role in everyone's life.
Statistics say that 95 percent of Americans have difficulty sleeping at some time in their lives.

As we age, our bodies normally require less sleep. Infants require from 12 to 14 hours while seniors may require from 6 to 8 hours. There is an interesting sex difference in duration of sleep. The average male adult sleeps 8 hours while the average female sleeps 9 hours.

Sleep is initiated by specialized areas in the brain. Certain brain areas are also responsible for wakefulness.
There are various stages of sleep which are defined by body motions as well as by the character of the electrical activity in the brain. The typical patterns of electrical activity for the phases of sleep vary with age.

Sleep walking (medically termed somnambulism) as well as bedwetting occur usually during a particular phase of sleep during which the electrical activity slows down (slow wave sleep). These behaviors occur most commonly during arousal from slow wave sleep.

Sleep walking episodes can last for several minutes during which the walker may move around with eyes open, avoiding obstacles, while not recalling any of the walk upon awakening!

When we have persistent difficulty in falling asleep, clock watching should be avoided. Sometimes very slow, deep breathing can encourage drowsiness. It can be helpful to get out of bed and do a quiet activity that is relaxing. (This might be reading or writing, for examples.) Remaining in bed while you cannot sleep is usually not helpful.

We can also promote a better sleep on our own by altering our diets, by changing our lifestyles, and with medications.

DIET

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Persons with difficulty sleeping (insomnia) should avoid caffeine. Caffeine is in coffee and it is also a component of teas and cola drinks. Alcohol should also be avoided because it can disturb the last phases of sleep. Many people have a drink before bedtime (a nightcap or the equivalent). To sleep better, they should not.

A light snack before bedtime sometimes can promote sleep. The reverse is also true, i.e., that hunger has the effect of making sleep difficult.

LIFESTYLE CHANGES

When we are having trouble sleeping at night we should not take naps during the day. On the contrary, it can be very beneficial to exercise regularly.
At bedtime, it can be helpful to slow down our activities. It is just before bedtime when we should "unwind" our thoughts. Relaxation techniques and a quiet environment can be helpful. Stressful issues of the day should be replaced by soothing thoughts.

The appropriate time to go to bed varies from individual to individual. We should normally go to bed only when we are tired and try to get up at a regular time each morning. Regulating these events helps to establish our biological rhythms.

MEDICATIONS

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Most individuals with sleeping difficulty can achieve restful sleep using the techniques described above. Some persons require occasional medications for relief of insomnia. Those with inability to fall asleep, daytime sleepiness, or inadequate sleep should contact their doctors. For additional information, please read the article Sleep Aids and Stimulants.

Answer the following questions:

1. What is sleep?
2. What causes sleep and how is it defined?
3. What can we do when we are having difficulty sleeping?

INSOMNIA, SLEEP AIDS, STIMULANT PRODACTS

Insomnia *means difficulty in falling or staying asleep, the absence of restful sleep, or poor quality of sleep.* Insomnia is a symptom and not a disease. The most common causes of insomnia are medications, psychological conditions (e.g., depression, anxiety), environmental changes (e.g., travel, jet lag, or altitude changes), and stressful events. Insomnia can also be caused by faulty sleeping habits such as excessive daytime naps or caffeine consumption.

Insomnia may be classified by how long the symptoms are present. Transient insomnia usually is due to situational changes such as travel and stressful events. It lasts for less than a week or until the stressful event is resolved. Short-term insomnia lasts for 1-3 weeks, and long-term insomnia (chronic insomnia) continues

for more than 3 weeks. Chronic insomnia often results from depression or substance abuse. Transient insomnia may progress to short- term insomnia and without adequate treatment, short-term insomnia may become chronic insomnia.
Among the medications and substances that can contribute to insomnia are caffeine and coffee, tobacco, alcohol, decongestants (e.g., pseudoephedrine), diuretics (Lasix/furosemide, Dyazide/hydrochlorothiazide) given at bedtime, antidepressants (e.g., Bupropion, Prozac), appetite suppressants (e.g., Meridia, Fastin), and amphetamines. Insomnia also may be the result of withdrawal from benzodiazepines (e.g., Valium, Librium, Ativan), alcohol, antihistamines, amphetamines, cocaine, and marijuana.

Appropriate sleep habits are important in the management of insomnia. In some instances, changing sleep habits may correct the problem without the need for medications. Good sleep habits should include:

- Regular sleep times;
- A comfortable bed and quiet room at a comfortable temperature;
- Appropriate lighting;
- Regular exercise but not close to bedtime or late in the evening;
- A bedroom that is not used for work or other activities that are not related to sleep;
- Avoidance of stimulants (e.g. caffeine, tobacco), alcohol, and large meals close to bedtime;
- Relaxation techniques such as breathing exercises; and
- Avoidance of naps during the day.

Self-treatment of insomnia with over-the-counter (OTC) drugs is advisable only for transient or short-term insomnia. OTC sleep aids should only be used for a short period of time in conjunction with changes in sleeping habits. Chronic use of these drugs may result in dependence on the them. This creates a situation in which sleep is not possible unless the drug is used. Chronic insomnia should be evaluated by a physician.

Antihistamines

Diphenhydramine (e.g., Sominex, Nytol) and doxylamine (e.g., Unisom) are the two antihistamines that are currently marketed as OTC sleep aids. Diphenhydramine is the only agent that is considered to be safe and effective by the Food and Drug Administration. The safety and effectiveness of doxylamine has not been evaluated adequately for FDA approval. Other uses for diphenhydramine include allergy, motion sickness, and cough suppression. Scientists believe that diphenhydramine and doxylamine cause sedation by blocking the action of histamine in the brain, but the exact mechanism of action is not known.
If insomnia is associated with pain, there are numerous products containing a combination of an antihistamine and pain reliever. These combination products should not be used if pain is not present because the added pain reliever is not necessary.

Pregnancy and Lactation: The effects of diphenhydramine and doxylamine on the fetus have not been evaluated adequately. Although the likelihood of an adverse effect on the fetus is low, these drugs probably should be avoided during

pregnancy. Both agents may decrease lactation (production of milk). Additionally, these drugs are secreted into the breast milk, which could affect the newborn. Therefore, nursing mothers should also avoid both drugs. Children less than 12 years of age should not use doxylamine because its use in this in age group has not been assessed.

Drug Interactions: Diphenhydramine and doxylamine add to the sedative effects of alcohol and other medications that cause drowsiness.

Side Effects: Drowsiness is the most frequent side effect of both diphenhydramine and doxylamine. Therefore, these agents should not be used in situations (e.g., driving) where mental alertness is required. Diphenhydramine and doxylamine also cause constipation, dry mouth, and difficulty urinating. Both drugs may worsen the symptoms of glaucoma, asthma, heart problems, and prostate gland enlargement. People with these conditions should not use OTC sleep aids without consulting a physician.

Both drugs may paradoxically cause excitation, resulting in nervousness and insomnia. This occurs most often in children and the elderly.

Melatonin

Melatonin (e.g., Melatonex) is the only hormone available OTC for insomnia. Melatonin is a hormone that is produced by the pineal gland. Melatonin helps regulate the body's clock or sleep-wake cycle. The secretion of melatonin is increased by darkness and decreased by light. The exact mechanism of how melatonin induces sleep has not been determined. Melatonin also decreases mental alertness and body temperature.

Melatonin is sold as a dietary supplement and is, therefore, not regulated by the Food and Drug Administration (FDA). It is commonly used for jet lag, insomnia, and sleep disturbances related to working the late night shift. Some limited evidence suggests that melatonin may be useful for treating sleep disturbances.

Dosing: There is no established dose or time of administration. Doses of 5 to 10 mg have been evaluated. Individuals should follow the product labeling for dosing and administration.

Pregnancy and Lactation: The use of melatonin during pregnancy or lactation has not been studied adequately. At high doses (more than 300 mg), melatonin may affect contraception (birth control) and increase levels of prolactin in the body. Based on past experience with other agents and the possibility of unknown risks to the fetus, melatonin should be avoided during pregnancy or lactation until more information is available.

Children: The use of melatonin in children should be avoided until more information about safety is available.

Drug Interactions: Although melatonin is sold as a dietary supplement, it should be thought of as a drug. It has side effects and may have drug interactions that have not been identified. The level of melatonin that the body produces is increased by certain drugs, such as selective serotonin reuptake inhibitor antidepressants (e.g. Prozac, Zoloft, Paxil) and monoamine oxidase inhibitors (e.g.

Parnate, Nardil). The interaction between these antidepressants and melatonin that is used as a sleeping aid has not been assessed.

- **Side Effects:** The most common adverse effect of melatonin is drowsiness. Therefore, tasks that require alertness (e.g,. driving) should be avoided for 4 to 5 hours after taking melatonin. Melatonin also may also cause itching, abnormal heartbeats, and headaches. Long-term side effects of melatonin have not been studied.

Melatonin is either derived from animal sources or synthesized in a laboratory. Melatonin obtained from animal sources has a higher likelihood of contamination, which can cause allergic reactions and viral transmission, than synthetic melatonin.

Melatonin may stimulate the immune system. Therefore, people with severe allergies or other disorders that may be caused by an overactive immune system (e.g. systemic lupus erythematosus, rheumatoid arthritis) should avoid using melatonin.

Persons with insomnia often suffer from fatigue as a result of sleep deprivation. Stimulant products are frequently used in an attempt to offset fatigue and other unpleasant side effects that can accompany a lack of sleep. (These products are also used by persons who need to stay awake for longer periods of time than is normal for them, such as school examinations or long distance driving.) However, the use of stimulant products can also cause insomnia, leading to a counterproductive effort to deal with sleep deprivation.

Caffeine

Caffeine (e.g., Nodoz, Caffedrine) is the sole active ingredient in most non-prescription stimulants. It is the only drug approved by the FDA for this purpose. Caffeine is used for improving alertness and for staying awake. Caffeine is a powerful stimulant, but tolerance (the need to use increasing amounts) can be developed. Caffeine also is present in medications for menstrual cramps, headaches, and colds. Additionally, caffeine is found in coffee, tea, and chocolate. Caffeine increases alertness by stimulating the nerves in the brain and spinal cord. It decreases muscle fatigue by stimulating muscle contraction. Caffeine also increases the heart rate and the force of contraction of the heart. The effect of caffeine varies among individuals and some people are only affected minimally.

Pregnancy and Lactation: Studies have shown that moderate caffeine intake does not cause low birth weights, miscarriages, or premature births. However, there are reports of birth problems in women who consume more than 300 milligrams per day of caffeine. Therefore, daily caffeine intake should probably be limited to less than 300 milligrams during pregnancy.

Caffeine is secreted into breast milk. The concentration of caffeine in breast milk is approximately 1% of the amount in the mother's blood. A lack of sleep and irritation may occur in breastfed infants whose mothers consume more than 600 milligrams of caffeine per day. No adverse effects have been noted in breastfed infants whose mothers consume between 200-336 milligrams per day of caffeine. A mother can limit the amount of caffeine her infant receives by limiting the amount of her caffeine intake and ingesting the caffeine after nursing.

Children: Caffeine is not recommended for children less than 12 years of age.

Drug Interactions: Cimetidine (Tagamet), norfloxacin (Noroxin), ciprofloxacin (Cipro), and the estrogens in oral contraceptives block the break-down and elimination of caffeine from the body. Use of caffeine with these drugs could lead to increased levels of caffeine in the body and, therefore, a higher likelihood of side effects.

Caffeine decreases the absorption of iron tablets. Iron should be administered 1 hour before or 2 hours after the consumption of caffeine.

Caffeine decreases the effects of sedatives, and sedatives decrease the restlessness, alertness, and arousal that is caused by caffeine.

Adverse Effects: The most common adverse effects of caffeine are insomnia, nervousness, excitement, headaches, vomiting, diarrhea, and stomach pain. Caffeine also causes abnormal heartbeats and increases heart rate.

Dependence can occur from the regular use of caffeine. If caffeine intake is stopped suddenly, a withdrawal reaction that consists of fatigue, headaches, anxiety, vomiting, and restlessness may occur. Symptoms of withdrawal start 12-24 hours after the last consumption of caffeine and may last for a week.

EXERCISE AND ACTIVITY

It has been determined that chronic inactivity, or what is referred to as a sedentary lifestyle, increases the risk for a number of diseases.

In contrast, physical exercise and activity can be a very helpful as a health measure. Regular exercise is associated with reduced risks for heart attack, blood vessel disease, stroke, diabetes, depression, obesity, broken bones from osteoporosis, and cognitive (thought) decline and it leads to an overall sense of well-being. It also can help to improve congestive heart failure and reduce blood pressure as well as lower the levels of harmful fats in the blood.

Furthermore, inactive persons who subsequently improve their physical fitness have reduced risk of death from many diseases, including heart disease and stroke.

In order to reduce health risks and improve one's health status it is not necessary to enter a strictly formal, aggressive, uninterrupted workout program.

The National Institutes of Health (NIH) define physical activity as "bodily movement produced by skeletal muscles that requires energy expenditure" and produces healthy benefits. Exercise, a type of physical activity, is defined as "a planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness."

Exercise programs must be customized for each individual. They simply cannot be dogmatically defined. It is now recommended that everyone engage in regular physical activity at a level appropriate to their capacity, needs, and interest. Children and adults alike should set a goal of accumulating at least 30 minutes of moderate-intensity physical activity on most, and preferably, all days of the week.

Moderate-intensity exercise is the equivalent of walking at the speed of 3 miles, or about 4-5 kilometers per hour.

One of the key points here is that sedentary persons are encouraged to accumulate 30 minutes of physical activity. Even the most inactive individuals should gradually begin doing some form of activity which can become physically more challenging with time. Of note, beginning exercise at lower levels of intensity and gradually increasing the level improves the likelihood for persons to adhere to the program over time.

It is important to recognize that moderate levels of physical activity confer significant health benefits. Even those who currently meet these daily standards may derive additional health and fitness benefits by becoming more physically active or including more vigorous activity.

For those with known heart or blood vessel disease, heart rehabilitation programs that combine physical activity with reduction in other risk factors are recommended. Prior to beginning an exercise program, viewers are recommended to consult with their healthcare providers to review options, given their particular history of health conditions.

Exercise and Activity At A Glance

- Lack of physical activity is a health risk.
- Physical activity reduces the risks for heart disease and stroke.
- Physical activity with a proper diet reduces the risks for obesity.
- Physical activity reduces the risk for diabetes.
- Physical activity reduces stress and the risk of depression.
- Physical activity reduces the risks for fractures from osteoporosis.
- Physical activity provides other health benefits.
- Exercise programs must be customized for each person.
- Even minor improvement in activity levels is beneficial for sedentary persons.

BIOLOGICAL THERAPY

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Biological therapy *is treatment designed to stimulate or restore the ability of the body's immune (natural internal defense) system to fight infection and disease.* Biological therapy is also called biotherapy or immunotherapy. Biological therapy is a form of treatment that uses portions of the body's natural immune system to treat a disease. Biological therapy is also used to protect the body from some of the side effects of certain treatments.

Biological therapy often involves the use of substances called biological response modifiers (BRMs). The body normally produces these substances in small amounts in response to infection and disease. Using modern laboratory techniques,

scientists can produce BRMs in large amounts for use in the treatment of cancer and other diseases, such as rheumatoid arthritis and Crohn's disease.

Monoclonal antibodies, interferon, interleukin-2 (IL-2), and several types of colony-stimulating factors (CSF, GM- CSF, G-CSF) are forms of biological therapy. For example, interleukin-2 and interferon are two examples of BRMs being tested for the treatment of advanced malignant melanoma.

Modes of biologic therapy that involve blocking the action of specific proteins of inflammation, called tumor necrosis factor (TNF), are being used for the treatment of a number of diseases, including rheumatoid arthritis and Crohn's disease. Etanercept (Enbrel) and infliximab (Remicade) are examples of commercially available injectable TNF-blocking treatments for patients with severe rheumatoid arthritis.

The side effects of biological therapy depend on the type of treatment. Side effects include flu-like symptoms such as chills, fever, muscle aches, weakness, loss of appetite, nausea, vomiting, and diarrhea. Some patients develop a rash, and some bleed or bruise easily. In addition, interleukin therapy can cause swelling. Depending on how severe these problems are, for some patients hospitalization during treatment may be required. Side effects are usually short-term and gradually subside after treatment ends.

The long-term side effects of the various currently available biological therapies will be better defined with future research from which will also surely emerge new and valuable forms of these treatments.

HAIR LOSS

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

What over-the-counter treatments are there for hair loss?
Minoxidil

Because hope springs eternal, there are many products, which claim to slow hair loss. However, there's only one available over- the- counter which really helps, even if only a little: minoxidil. Originally introduced as a drug to combat high blood pressure, minoxidil may work by increasing blood flow to the scalp. Used consistently for 4-6 months, studies show that this drug can slow the rate of loss somewhat, and even grow a little hair in some people. Minoxidil is safe, nonirritating, and quite inexpensive (as little as $5/month in the generic form.) But there are drawbacks:

- Minoxidil mainly works on the crown (top of the head), not on the scalp on the front of the head, which is where baldness really bugs most men.
- You have to keep it up indefinitely (in other words, forever.) If you stop, whatever hair the drug has helped you hold onto will fall out and leave you where you would have been without it. Putting something on twice a day forever is tedious, especially when you rarely see spectacular improvement. Instead, your hair continues to thin, and you have to keep on believing that it

would be worse without treatment. The only way to prove that, of course, is to stop and watch more fall out.

.Original minoxidil comes in a 2% formulation. Other forms available include 2% minoxidil with added tretinoin (Retin-A), or 5% minoxidil ("extra-strength"), with or without additives. Some studies suggest that these preparations are a little more effective than the original formula, but it's hard to say if they're worth the additional cost, which can be substantial (up to $50/month, and not covered by insurance, of course.)

Hairpieces, etc.

You can always choose one of the time-honored ways to add hair temporarily; hairpieces or hair weaving, in which a mesh is attached to your remaining hair and artificial or human hair is woven to blend with your own. Either method can produce quite satisfactory results, but quality varies considerably and depends a great deal on how much you want to spend. Also, hairpieces and weaves stretch, oxidize, and loosen, which requires you to refresh or replace them (or in the case of hairpieces buy 2 or more at a time, to have on reserve.) Also, some stay on more securely than others during swimming and other activity. (How's that for a delicate euphemism?)

What can your doctor do for hair loss?

- Medications: Propecia is a low-dose version of a drug that has been used for several years to treat enlarged prostates in middle- aged men. It has a good safety record, although it hasn't been on the market very long (about a year) as a treatment for hair loss. Studies show that Propecia slows down the rate of hair loss and may grow some additional hair growth as well. Taking one pill a day is easy, but some men prefer not to take something oral for an indefinite period (forever).
- Surgery: Surgical approaches include various versions of hair transplantation (taking hair from the back and putting it near the front) or scalp reduction (cutting away bald areas and stitching the rest together.). Check credentials carefully when consulting about these approaches since the skill of surgeons varies widely. If the doctor has limited experience, a poor esthetic sense, or if he or she transplants hairs that are destined to fall out anyway, results can be unnatural and unfortunate.

HAIR LOSS IN MEN

- Where'd my hair go?
- What over-the-counter treatments are there for hair loss?
- What can your doctor do for hair loss?

You know, thinning hair really doesn't look so bad in a guy.

You ought to come to terms with this idea, at least to a point, because frankly, there isn't a whole lot you can do about hair loss. That's not to say you can't do anything at all, but modest expectations are a key to minimizing disappointment.

Where'd my hair go?

The first time a man notices that his hair is thinning, he assumes it all happened the week before and he'll be bald in a year. In fact, balding is gradual and unpredictable. Hair loss is not inherited just through the mother's side. Looking at your family gives only a general idea of what you'll look like, and you will not necessarily get bald at the same rate as your dad or older brother. Balding continues throughout life, and even people (men and women) with "full heads of hair" have less at 70 than at 20.

Because the rate of balding varies so much, it's all but impossible to tell whether treatment is working or not. You can very easily fool yourself into thinking hair is coming out more or less than it used to. Here are some points to keep in mind:

1. You lose up to 100 hairs per day normally - some days a lot more; others, a lot less. These hairs have finished their 3-year life span and are ready to be shed, then replaced. Finding hair on your comb or in the sink, therefore, does not necessarily mean you're going bald.
2. Hats and headgear do not throttle the follicles and make you lose hair.
3. Shampooing does not accelerate balding; the hairs you find are just the ones ready to come out, and these will be replaced.
4. Sometimes, acute stress to the system (such as high fever, sudden weight loss, etc.) produces a sudden, rapid shedding of hair, where you find clumps of hair coming out all over the place. Although this syndrome (called telogen effluvium) is alarming, it actually is good news, because the body readjusts itself and most if not all the hair grows back. People whose loss of hair is inherited notice their hair is thinning but don't see very much hair actually coming out.

BIORHYTHMS...

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

What are biologic rhythms? In essence, they're the rhythms of life. All forms of life on earth, including our bodies, respond rhythmically to the regular cycles of the sun, moon, and seasons.

For example, as night turns into day, vital body functions, including heart rate and blood pressure, speed up in anticipation of increased physical activity. These and other predictable fluctuations in body function, taking place during specific time cycles, are our biologic rhythms. They are regulated by "biologic clock" mechanisms located in the brain.

Although biologic rhythms can be "reprogrammed" by environmental influences (such as when a person regularly works the night shift and sleeps during the day), they are genetically "hard-wired" into our cells, tissues, and organs.
Medical chronobiologists have found that biologic rhythms can affect the severity of disease symptoms, diagnostic test results - even the body's response to drug

therapy. Now these investigators are working to discover how the rhythms of life can be used to improve the practice of medicine - and your health.
These time-related medical observations, and others still in the exciting process of discovery, are rooted in chronobiology *(chronos - time; bios - life; logos - science)*, the study of biologic rhythms.

For more, please click on the topic below of interest to you:

- Angina
- Heart Attack
- Hypertension
- Allergies
- Asthma
- Biologic Rhythms
- Biologic Rhythms & Symptoms of Illness
- Biologic Rhythms & Drugs
- Biologic Rhythms & Diagnostic Testing

HAIR LOSS IN WOMEN

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Hair loss in women also has an inherited (genetic) basis too, only not as much as men, and the loss is not as fast. Also, women tend not to have big bald spots; in general women's frontal hairline sticks around even to the bitter end. Thinning in women tends to be distributed throughout the scalp. Like men, when women first notice that their hair is thinner than it used to be (which can be in their early 20's in some families), they assume the process will gallop along and leave them bald in no time. In fact, it usually takes many years for thinning to become obvious to others.

Treatments for women are more or less the same as for men, with the following exceptions:

- Minoxidil can't be used during pregnancy.
- It's harder for women to apply minoxidil, because their pattern is more diffuse; in other words, there isn't an easy "bald spot" to put the medicine on.
- Propecia cannot be used by women of childbearing age who might become pregnant, because of the risk of birth defects.

EMERGENCY
TETANUS IMMUNIZATION

A cut, laceration, bite, or other wound, even if minor, can lead to a tetanus infection. The result, days or even weeks later, can be "lockjaw"— literally, a stiffness of he muscles of the jaw and other muscles. This may be followed by a

range of other symptoms, possibly culminating in convulsions and an inability to breathe.

Source of Infection

The tetanus bacteria usually are found in the soil but can occur virtually anywhere. If their spores enter a wound beyond the reach of oxygen, they germinate and produce a toxin that interferes with the nerves con-Tolling your muscles.

A tetanus infection is serious and can result in death f you have not been immunized previously.

Treating the Wound

The good news is that tetanus infection is avoidable, given proper preventive steps. Consult your physician immediately if you sustain any cut or puncture wound and have not had a tetanus shot in the past 10 years. If your wound is severe, or if you had a series of tetanus shots many years ago, your physician probably will give you a booster shot of the vaccine. Your body will quickly manufacture the needed antibodies to protect you against tetanus.

If you have not had tetanus shots previously, your physician may administer tetanus immune globulin, which gives immediate protection but only for a few weeks. Your physician may decide to cleanse the wound carefully, cutting away dead tissue and leaving it open without stitches and only a light gauze dressing so that air can reach all parts of the wound. Several antibiotics can help eliminate the tetanus bacterium, but there is no substitute for proper care of the wound and use of a booster shot or the immune globulin .

Prevention

Active immunization is vital for everyone in advance of any injury. The tetanus vaccine usually is given to children as a DPT shot, in which diphtheria and pertussis (whooping cough) vaccines are given with the tetanus vaccine. Tetanus booster shots should be given every 10 years or at the time of a major injury.

BLEEDING EMERGENCIES

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

When an injury results in bleeding (hemorrhage), steps must be taken to stop the loss of blood. If substantial amounts of blood are lost, shock, unconsciousness, and death can result.

Most bleeding injuries are not life-threatening, although appropriate care must be taken not only to stop the bleeding but also to avoid infection and other complications. The pages that follow discuss appropriate emergency procedures to accomplish these ends.

It is often useful to distinguish the kind of bleeding that was sustained. The three main classifications are capillary, venous, and arterial:

Capillary Bleeding. The capillaries are the most numerous and the smallest blood vessels in the body. When a minor cut or skin scrape opens some capillaries,

the bleeding is usually slow. The body's dotting action is generally sufficient to stop the bleeding in a matter of minutes.

Venous Bleeding. Deep cuts often open veins, releasing blood that is on its way back to the heart. Having delivered its load of oxygen to the cells, the blood is dark red. It flows steadily but slowly. Placing pressure on the wound will usually stop the blood flow.

Arterial Bleeding. The least common but most serious type of bleeding involves the opening of an artery. The blood that is released is bright red and often spews forth in rhythmic spurts that coincide with the contractions of the heart. If a major artery is severed and not treated promptly, it is possible to bleed to death in as little as a minute. In most cases, however, direct, firm pressure on the wound will stop arterial bleeding.

The location and nature of the wound itself also have an impact on the choice of treatment. The following pages discuss wounds to the skin, bleeding from the mouth or other body openings, and bleeding or severe bruising beneath the skin.

BURNS

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

The treatment of burns depends on the depth, area and location of the burn. Burn depth is generally categorized as first, second or third degree. A first degree burn is superficial and has similar characteristics to a typical sun burn. The skin is red in color and sensation is intact. In fact, it is usually somewhat painful. Second degree burns look similar to the first degree burns; however, the damage is now severe enough to cause blistering of the skin and the pain is usually somewhat more intense. In third degree burns the damage has progressed to the point of skin death. The skin is white and without sensation.

Regardless of the type of burn, the result is fluid accumulation and inflammation in and around the wound. Moreover, it should be noted that the skin is the body's first defense against infection by microorganisms. Damage to the skin can predispose the burn victim to both infection at the site of the wound as well as internally.

In addition to the intensity, the total area of the burn is significant. This is usually measured in terms of percent of total body burnt. The skin acts as a barrier from the environment, and without it, patients are subject to infection and fluid loss. Burns that cover more than 15% of the total body surface can lead to shock and require hospitalization for intravenous fluid resuscitation and skin care.

Burn location is even more important than the above factors. Burns of the neck or signs of burns to the nose or mouth require emergent guarding of the patient's airway, as swelling may results in life threatening obstruction. Burned tissue shrinks and can cause damage to underlying structures. Burns that extend circumferentially around body structures require surgical release of the tissue,

often referred to as escharotomy. Finally, all eye burns require special attention as soon as possible. Burns to the eye may lead to clouded or lost vision.

BURN FIRST AID TREATMENT

1. First remove any constricting jewelry, such as rings.
2. Do **NOT** use butter or oils on a burn.
3. The effected area should be dowsed with cool water as soon as possible. It can be cleansed gently with chlorhexidine solution. Do NOT apply ice or cool to near-freezing temperatures (this can cause additional tissue injury).
4. A tetanus booster should be obtained if not administered within the previous 5 years.

Stinging Insect Allergies

The majority of stinging insects in the United States are from Bees, Yellow Jackets, Hornets, Wasps and Fire Ants. Except for fire ants all of these insects are found throughout the United States. Fire ants are

Over 2 million Americans are allergic to stinging insects. The degree of allergy varies widely. Most people are not allergic to insect stings and most insect stings result in only local itching and swelling. Many, however, will have severe allergic reactions. 50 to 150 deaths occur each year from these stings, and up to a million hospital visits result form insect stings. If you are known to be allergic to insect stings, then the next sting is 60% likely to be similar or worse than the previous sting. Since most stings occurring in the summer and fall, you are at greatest risk during these months.

Most insect sting reactions are not allergic and result in local pain, itching, swelling and redness at the site of the sting. Some extension of the swelling is expected. Local treatment is usually all that is needed for this type of reaction. Disinfect the area, keep clean and apply ice. If the swelling increases antihistamines and possibly steroids may be needed. Occasionally, the site will become infected and antibiotics are needed. Large local non allergic reactions (occurring 10% of the time) are often alarming and can persist for days. This is usually not a cause for concern and are best treated as above.

The most serious reaction is the allergic reaction. The allergic reaction to insect sting varies from person to person. The most serious is called anaphylaxis and as indicated above can be fatal. Severe reactions are suspected if a person experiences hives and intense itching at sites other than the sting site. Difficulty breathing, swallowing, hoarseness, swelling of the tongue, dizziness and fainting are signs of a severe allergic reaction. These types of reactions usually occur within minutes of the sting, but have been known to be delayed for up to 24 hours. Prompt treatment is essential and emergency help is often needed.

It is interesting that bees find black color very irritating and blue is comforting to them. Remember this when selecting your summer bathing attire. If you think that insect repellent of any kind is effective in repelling these stinging insect you are mistaken and in fact may attract them. Please do no use except for reasons other than to avoid stinging insects.

All persons who have had a significant reaction to a stinging insect should be evaluated by an allergy specialist for possible venom immunotherapy (allergy shots that develop an immunity to insect allergy). If indicated by a well recognized protocol, selected patients with significant sensitivity and specific symptoms should undergo allergy injection therapy for stinging insect allergy. Not all patients who have stinging insect reactions should get allergy shots, but many should. Allergy immunotherapy against stinging insects in these selected patients is almost 100% effective. This type of treatment usually involves gradual twice weekly increase in the venom dose over 10-20 weeks. At this dosage level (achieved by 90% of patients) a "maintenance" dosage every 4-8 weeks is given. After approximately 5 years reevaluation discontinuation of the venom shot is considered. The risk of severe adverse reactions from this venom therapy is minimal (less than 0.2%) and to date no deaths have been reported.

Knowledge in the field of stinging insect allergy has expanded greatly in the last 10 years and will likely continue to do so.

The U.S. Department of Agriculture recommends the following:

- Avoid disturbing likely beehive sites, such as large trees, tree stumps, logs and large rocks.
- If a colony is disturbed, run and find cover as soon as possible. Running in zigzag pattern may be helpful.
- Never stand still or crawl into a hole or other space with no way out.
- Do not slap at the bees.
- Cover as much of the head and face as possible, without obscuring vision, while running.
- Once clear of the bees, remove stingers and seek medical care if necessary, especially if there is a history of allergy to bee venom.

Stinging Insect Allergies At A Glance

- Severity of reactions to stings varies greatly.
- Avoidance and prompt treatment are essential.
- In selected cases, allergy injection therapy is highly effective.
- The three "A's" of insect allergy are Adrenaline, Avoidance and Allergist.

FIRST AID
Cuts, Scrapes & Puncture Wounds

Ex.1. Read and translate the following text.
Ex.2. Find unknown words in the text and translate them using a vocabulary.

Cuts, Scrapes & Puncture Wounds At A Glance

- Washing a cut or scrape with soap and water and keeping it clean and dry is all that is required to care for most wounds.
- Putting alcohol, hydrogen peroxide, and iodine into a wound can delay healing and should be avoided.

- Seek medical care early if you think that you might need stitches. Any delay can increase the rate of wound infection.
- Any puncture wound through tennis shoes has a high risk of infection and should be seen by your healthcare professional.
- Any redness, swelling, increased pain, or pus draining from the wound may indicate an infection that requires professional care.

Table of Contents

The most important first step is to thoroughly clean the wound with soap and water being careful to remove any foreign material, such as dirt or bits of grass, that might be in the wound and which can lead to infection. The area should then be kept clean and dry.

Covering the area with a bandage (such as gauze or a band-aid) helps prevent infection and dirt from getting in the wound. A first aid ointment, such as Bacitracin, can be applied to help prevent infection. Generally, however, these products are best avoided on the hands and feet beyond the first day because they can delay healing in these areas.

Continued care to the wound is also important. Washing the area gently with soap and water daily without scrubbing is best as the wound heals.

Avoid putting products such as hydrogen peroxide, alcohol, or iodine solutions in the wound. These only delay wound healing and do not do anything to prevent infection.

People who have diabetes, other long-term illnesses such as cancer, or are taking drugs that suppress the immune system such as steroids (cortisone medications like prednisone and prednisolone) or chemotherapy, are more likely to develop a wound infection and should be seen by a health care professional.

Any cut that goes beyond the top layer of skin that might need stitches (sutures) should be seen by a health care professional. Generally, the sooner sutures are put in, the lower the risk of infection. Therefore, any cut that might need suturing should be seen as soon as possible.

REFERENCES

1. An Encyclopedia Britannica Company [Електронний ресурс]. – Режим доступу: http://www.merriam-webster.com/dictionary/disease
2. Mayo Clinic Family Healtn Book / David E. Larson, editor- in –chief. – New York: William Morrow and Company, Inc. – 1996. – 1438 p.
3. MayoClinic [Електронний ресурс]. – Режим доступу: http://www.mayoclinic.org
4. Medicine [Електроннийресурс].–Режим доступу: http://www.dmoz.org/Health/Medicine
5. MedicineNet [Електронний ресурс]. – Режим доступу:
6. http://www.medicinenet.com
7. MedilinePlus [Електронний ресурс]. – Режим доступу:
8. http://www.nlm.nih.gov/medlineplus
9. NatureMedicine [Електронний ресурс]. – Режим доступу:
10. http://www.nature.com/nm
11. New York State. Department of Health [Електронний ресурс]. – Режим доступу: http://www.health.nv.gov/diseases
12. Seeley Rod R., Stephens Trent D., Tate Philip. Anatomy and Phisiology / Rod R. Seeley, Trent D. Stephens, Philip Tate.: Mosby Year Book, second Edition, 1992. – 980 p.
13. Wikipedia [Електронний ресурс]. – Режим доступу:
14. http://en.wikipedia.org/wiki/Medicine