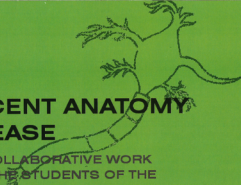


ADOLESCENT ANATOMY AND DISEASE

A COLLABORATIVE WORK
BY THE STUDENTS OF THE
DAYTON REGIONAL STEM SCHOOL



Thank You

to the medical students from the Boonshoft School of Medicine
at Wright State University and to Standard Register for your help
with the development of this book.



Dayton Regional STEM School Class of 2013

Front cover design by Jacob
Front cover illustrations by Indy and Cody

The Dayton Regional
S T E M
School

Over the course of three months,
10th grade students in the Biology and Wellness and Fitness classes at the Dayton Regional STEM School learned
about the structures and functions of the different human body systems.

Students investigated childhood diseases associated with their assigned system.

As a culminating project, students created text and artwork to illustrate how the body works.

Here is what they learned...

Kate Cook, Biology Teacher
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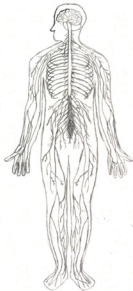
The Nervous System

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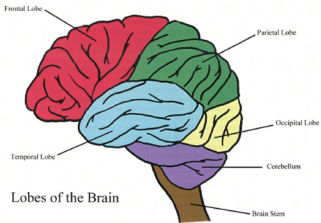
Madeline



The nervous system helps all of the body functions work together. Nerves detect temperatures, touch, pressure, pain, and other senses in the body. For example, if a person cuts their finger, nerves send messages to the brain that say "that hurts!" The brain then sends a message to the hands to tell the hands to pull away. These messages are then stored in the memory. The message from the hands to the brain and from the brain back down to the hands sounds very complicated, but it happens in a matter of milliseconds.

There are many specialized pathways in the nervous system. The peripheral nervous system contains sensory organs, such as the tongue for taste, the eyes for sight, and the ears for hearing. The peripheral nervous system connects the brain and spinal cord to the rest of the body. The somatic nervous system contains nerves only used for controlling the muscular system and external sensory receptors such as the sensory receptors in the skin. Also included is the autonomic nervous system, which controls the internal organs (Neuroscience for Kids). The central nervous system starts with the brain. The spinal cord connects to the brain, and nerves branch out from the spinal cord, which connect to the other nervous systems. Therefore, every nerve in the human body leads back to the spinal cord or the brain (Farabee).

The brain is the major organ in the nervous system. The brain has many parts, but three of the most important parts are the cerebrum, the cerebellum, and the brain stem. These parts each have a different function. The cerebrum is the largest part, which includes intelligence, memory, and decision-making. The cerebellum is the second largest part, and it mostly controls balancing by combining peripheral nerves telling you the position of the body, what is seen from the eyes, and the ears sensing movement. The brain stem is closest to the spinal cord. It controls essential functions, such as breathing and heart rate. It also controls reflexes, such as coughing, sneezing and hiccupping (Farabee).



In the nervous system, there are two types of cells: neurons and glial cells. Neurons are very important in the system, and there are about 100 million neurons in the brain alone. There are several different sections of a neuron: the dendrites, the axon, and the cell body. Dendrites receive messages and send them to the cell body. The axon sends messages away from the cell body. The cell body holds all of the organelles of the cell (Iazzetti 53). There are also three types of neurons: sensory neurons, motor neurons, and interneurons. Sensory neurons have long dendrites and short axons. Sensory neurons take messages from sensory receptors to the central nervous system. There are also motor neurons, which have short dendrites and long axons. Motor neurons take messages from the central nervous system to muscles or glands. Last, interneurons are very small neurons that connect larger neurons together. A very important cell in the nervous system that is not a neuron is a glial cell. Glial cells are much more plentiful than neurons. There are about ten to fifty times more glial cells than neurons. These cells support the neurons (Iazzetti 53).

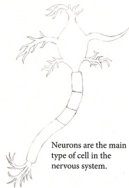
There are nerves that branch out from the spinal cord into the shoulder, leading down the arms all the way to the fingertips. However, there are no nerves in the elbow. If you pinched the extra skin on your elbow as hard as you could, you wouldn't be able to feel a thing. Nerves in the spinal cord also branch down the middle of the body and lead to the legs and down to the toes. Most mammals have similar nervous systems to the human nervous system. All multi-cellular animals have a nervous system of some kind (Iazzetti 53).

Meningitis

Between the brain and the skull are three layers of membranes called the meninges. The meninge closest to the brain is the pia mater, the next membrane is the arachnoid, and next to the skull is the dura mater. Meningitis is an infection that causes inflammation in these membranes. The two most common kinds of meningitis are bacterial and viral meningitis (Nolan 80).

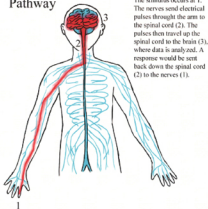
Bacterial meningitis is most common in infants in the first few months after they are born. Infants who are underweight are especially at risk (Nolan 80). It is especially rare since the bacteria that cause this form of meningitis are not able to live outside of a human host for very long. Meningitis begins with headaches and neck stiffness. As the disease progresses, the patient will become less aware of their surroundings. Soon after, a patient with bacterial meningitis could eventually end up in a coma (Nolan 80). The viral form of meningitis can be caused by many different kinds of viruses. Some may have fever and headaches, while others may have symptoms similar to bacterial meningitis (Nolan 81).

Bacterial meningitis is treated with antibiotics chosen to target the kind of bacteria causing the meninges to become inflamed. Treatment for viral meningitis is mostly in therapy since antibiotics don't affect the virus. It is essential that a patient with meningitis is diagnosed within an hour of developing symptoms, because bacterial meningitis can be fatal within hours. Often, patients suspected to have meningitis are given antibiotic treatment immediately to slow progression of the disease. Quick treatment can prevent the disease leading to coma or death (Nolan 80-81).



Neurons are the main type of cell in the nervous system.

Pathway



The stimulus occurs at 1. The nerves send electrical pulses through the arm to the spinal cord (2). The pulses then travel up the spinal cord to the brain (3), where data is analyzed. A response would be sent back down the spinal cord (2) to the nerves (1).

The nervous system has three main parts: the nerves, the spinal cord, and the brain. To better understand the nervous system, let's examine the pathway by imagining you stubbed your toe. When you stub your toe, the damage is sensed by the nerves in your toe. The nerves send out signals that there was damage done to your toe. These signals travel up to your spinal cord. The spinal cord acts as a highway by taking signals from peripheral nerves and sending them up to the brain. The brain then interprets the signals and responds to them. In this case, it would send a message back down to the spinal cord. Then the spinal cord takes that message, and sends the signal back down to the toe. In addition to processing sensory information and initiating movements, the brain also consolidates different types of information into memories so that in the future, you remember to watch where you walk (Bronson 394-396).

Cerebral Palsy

Cerebral palsy is a movement and posture disorder which is caused by a brain defect. Cerebral palsy can cause movement and posture issues before, during, or after birth. Cerebral palsy can affect a person's movement, ability to maintain balance, posture, and eating. This disorder does not get worse over time (Marino 236). The cause of cerebral palsy is from the brain not developing normally. Head trauma and early infections can cause abnormal brain development. It is also caused by a defect to the muscle tone in the body. Muscle tone refers to how much a muscle resists to movement. Some symptoms of cerebral palsy include problems with language and social skills, feeding and eating, and movement. (Stead 349).

Cerebral palsy mostly affects infants and children under the age of ten. Some treatment options for cerebral palsy include help from different specialists, such as occupational therapists, neurologists, social and educational support specialists, pediatricians, speech-language pathologists, and nutritionists (Marino 237 and Stead 349).



Neuron

Epilepsy

Epilepsy is a recurring disorder, which damages cerebral functioning. This means that the brain's largest part, the cerebrum, shuts down causing sudden, brief attacks called seizures. These attacks or seizures may lead to inappropriate behavior, altered consciousness, sensory hallucinations, and various other behaviors. About 75% of epilepsy cases in children and young adults are idiopathic. Idiopathic means that the epilepsy cases are difficult to see and therefore go untreated. Many times epilepsy is not recognized until after death (Nolan 82). For example, if a young adult dies, doctors may not know the cause of death until they perform an autopsy and discover that the death was caused by epilepsy.

Some causes of epilepsy can include birth trauma, brain infections, tumors, alcoholism, drug abuse, or a traumatic brain injury (Nolan 82). Signs and symptoms of epilepsy include various types of seizures. Seizures can start before the age of two, but these are usually due to birth trauma. The two main types of seizures are absence attacks and tonic-clonic seizures (Nolan 82). Absence attacks or petit mal seizures are brief. These seizures last about 10 to 30 seconds. Absence attacks lead to loss of consciousness, fluttering of the eyes, or loss of muscle tone. A tonic-clonic seizure or grand mal usually begins with a distorted perception and consciousness and progresses to unconsciousness (Nolan 82).

Epilepsy mostly affects young adults and children under the age of 15. Treatment for these types of seizures can include medication and surgery. The type of medication given to patients depends on the condition of the patient. For some people, surgery is recommended to prevent seizures. For others, medication impulses can be used to prevent seizures (Epilepsy).

Works Cited

- Bronson, Mary H. *Glencoe Health*. Woodland Hills, CA: Glencoe/McGraw-Hill, 2011. Print.
- "Epilepsy." *UCSF Medical Center*. 29 October 2010. Web. 05 January 2011. <<http://www.ucsfhealth.org/conditions/epilepsy/index.html>>
- Farabee, M.J. (1992-2001). "The Nervous System." *Estrella Mountain Community College*. 2001. Web. 15 Dec. 2010. <<http://www.emc.maricopa.edu/faculty/farabee/biobk/biobooknerv.html>>.
- Jazzetti, Giovanni. *Human Anatomy*. TAJ Books International LLP 2002. 15 Dec. 2010.
- Marino, Bradley, and Katie Fine. *Blueprints Pediatrics*. 5th ed. Philadelphia, 2009. Print.
- "Neuroscience For Kids - Explore the Nervous System." *UW Faculty Web Server*. 2010. Web. 30 Dec. 2010. <<http://faculty.washington.edu/chudler/nsdivide.html#cns>>.
- "Neuroscience for Kids - Spinal Cord." *UW Faculty Web Server*. Web. 30 Dec. 2010. <<http://faculty.washington.edu/chudler/spinal.html>>.
- Nolan, C. and Saladin, K. *Clinical Applications Manual to Accompany Anatomy and Physiology: The Unity of Form and Function*. 169. 2001; New York, NY. Print.
- Stead, Latha, and Matthew Stead. *First Aid for the Pediatrics Clerkship*. 2nd ed. New York, 2008. Print.

The Endocrine System

By: Anna Marie
and Sara

Shāna

Mykal

Ben

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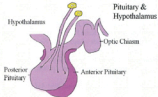
The endocrine system is made up of glands, organs, and tissues that work together to control and regulate body functions. The endocrine system works to maintain homeostasis, the constant, controlled internal condition of the body. For example, the body maintains an internal body temperature of 98.6 degrees (Homeostasis). The endocrine glands release hormones in the body. These hormones carry information from one cell to another (Bronson 443). These hormones travel through the bloodstream to their specific target cells. Target cells are cells within the body that have specific receptors for certain hormones. There are five major endocrine glands. The major glands are the pituitary, pineal, thyroid, parathyroid, and adrenal glands. The endocrine system also includes the hypothalamus, male and female gonads, and the pancreas. These are not glands, but they do contain endocrine tissue (Bastian 2).

The gland that controls all of the other endocrine glands is the pituitary gland, also called the "master gland." The gland is split into two major parts; the posterior pituitary and the anterior pituitary. The posterior lobe of the pituitary gland secretes two hormones. The first pituitary hormone, antidiuretic hormone, raises blood pressure and increases water absorption by the kidneys. The second hormone, oxytocin, helps with uterine contractions during labor. The anterior lobe releases seven major hormones that each perform a different function (Bastian 26, 28). These hormones regulate the body's metabolism, stimulate growth in children, help maintain muscle and bone mass, aid in the production of milk, regulate testosterone and estrogen, and influence the body's response to stress (The Endocrine System: Endocrine Glands and Types of Hormones).

Connected to the pituitary is another major neural tissue called the hypothalamus. The hypothalamus is a brain tissue that secretes nine different hormones, each with their own distinct function. Six of the hormones stimulate the release of hormones from the target cells. The other three hormones limit the release of certain hormones in the body (Bastian 24).

The gland shaped like a pine cone is the pineal gland. This gland is in the brain and it releases two hormones (Bastian 44). It releases a hormone that regulates the menstrual cycle and another hormone that is involved in brain physiology. The pineal gland also plays a role in puberty in teens (Floride & the Pineal Gland).

The thyroid is a major endocrine gland located in the neck. It secretes three hormones, two types of thyroid hormones and calcitonin. Thyroid hormones affect body cells by stimulating growth and protein synthesis, increasing heart rate, and stimulating development in a fetus or infant. Parathyroid glands are glands that are in the thyroid and produce one type of hormone called a parathyroid hormone. Parathyroid hormones affect the kidneys, bones, and small intestines by increasing blood calcium levels and decreasing blood phosphate levels (Bastian 32).



The pancreas is behind the stomach and releases four different hormones. Glucagon and insulin are the most important. Glucagon increases blood glucose levels while insulin decreases blood glucose levels. Growth hormone-inhibiting hormone (GHIH) and pancreatic polypeptide are the other two hormones produced by the pancreas. GHIH limits the release of insulin and glucagon. Pancreatic polypeptide slows down the absorption of food and regulates the release of digestive enzymes (Bastian 36).

Adrenal glands are found above each kidney and they secrete four main hormones. The first hormone is aldosterone, which increases water and sodium levels and decreases plasma potassium levels. Epinephrine and norepinephrine both increase the blood concentration of glucose and play a major role in the fight-or-flight response. The fourth hormone, cortisol, increases amino acid levels and plasma glucose levels (Bastian 30).

Reproductive glands are also referred to as gonads. The female gonads are called the ovaries and they produce two hormones called estrogen and progesterone. Estrogen helps with the development of female sexual characteristics. Progesterone "prepares the uterine lining and mammary glands for pregnancy" (Bastian 42). Testes are the male gonads and they produce a major hormone called testosterone (Bastian 40, 42). Testosterone helps with the development of muscle size, sperm production and a male's sexual characteristics.

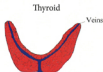
Type I Diabetes

Type I diabetes, also called insulin deficient diabetes, occurs when there is a destruction or malfunction of beta cells in the pancreas. Cells need glucose for energy, but glucose cannot enter the cells without insulin. In a healthy person, insulin binds to insulin receptors allowing glucose to flow into the cell. A person with diabetes does not have insulin to bind with these receptors and glucose cannot flow into the cell (Bowen). In type I diabetes, beta cells cannot produce insulin because glucose cannot enter the cells. Instead, glucose stays in the blood stream raising blood sugar levels.

Type I diabetes is an inherited disease meaning that it is passed down between generations. Other causes are less clear but may include an environmental trigger, such as a virus, which causes the immune system to attack beta cells. It is not possible to get type I diabetes without the inherited trait, but at the same time not everyone with the inherited trait will have type I diabetes (Basics About Diabetes, Tortora 488).

Type I diabetes affects mostly children, teens, and young adults. Some signs and symptoms of type I diabetes are frequent urination, dehydration, extreme thirst, unexplained weight loss, constantly feeling tired, and feeling exceptionally hungry. In some rapidly onset cases nausea, vomiting, and stomach pain may also be present. This is called diabetic ketoacidosis (Basics About Diabetes, Tortora 488).

Unfortunately, there is no cure for type I diabetes. However, type I diabetes can be controlled. Common treatments include healthy eating, exercising, and insulin therapy. With the right combination of treatments type I diabetics can lead a normal healthy life (Children with Diabetes: More Information).



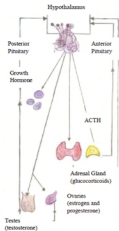
Pathway

The endocrine glands use the nervous system and bloodstream to send and receive hormones to the other glands (Gura 264- 265). The endocrine system is made up of "ductless glands that secrete hormones directly into the bloodstream or lymph system for a specific physiological purpose or response" (Gura 267).

The endocrine system uses both positive and negative feedback loops to maintain homeostasis in the body. To understand what a feedback loop is, think of a thermostat. When it's too cold it turns up the heat, when it's too hot it turns the heat off. Feedback loops detect the quantity of hormones in the blood and produce or limit hormones accordingly. An example of a negative feedback loop is when there is too much glucose found in the blood. When the feedback loop occurs it causes insulin, a hormone that rids glucose, to rise. The rising of this hormone decreases the amount of glucose in the blood. When glucose levels fall, the liver releases glucose into the blood which causes it to rise. (Porth 90-91, 599-600)

Of all the feedback loops in the body, only a few are positive feedback loops. When a positive feedback loops occurs the results cause instability rather than stability. An example of when a positive feedback loop occurs is during childbirth (Porth 90-91 and 599-600). In childbirth, the posterior pituitary releases the hormone oxytocin. The release of oxytocin results in the stretching of the uterus called contractions. The stretching of the uterus triggers the release of more oxytocin. These contractions and release of oxytocin continue to stimulate each other back and forth until a child is born (Homeostasis: Biology Encyclopedia).

The anterior pituitary also releases adrenocorticotropic hormone. The releasing of the adrenocorticotropic hormone is an example of a negative feedback loop. When the pituitary gland releases its adrenocorticotropic hormone, it is released into the nervous system and is carried down to the adrenal gland. The adrenocorticotropic hormone acts as a signal to notify the adrenal gland to produce the hormone adrenalin. The adrenalin hormone is then released into the bloodstream to control energy and power in the body (Tortora 473).



Cushing's Syndrome

Cushing's syndrome is excess secretion of cortisol. Cortisol is produced and secreted in the body at all times, but is secreted in larger amounts in stress related situations, such as being chased by a bear. Patients with Cushing's syndrome secrete cortisol at all times, even in a non-stressful state. Some of the causes can include long-term use of steroids or over stimulation of the adrenal glands causing them to secrete too much cortisol. This causes ACTH-secreting tumors (Bastian 132).

Some symptoms of Cushing's include a buffalo hump on the back, easy bruising, and high blood sugar. These symptoms are due to ACTH in the pituitary being overproduced and causing adrenal tumors. There are two types of Cushing's. These two types are bilateral adrenal hyperplasia, which is the most common type found in children older than seven, and adrenal tumors, which is the most common in infants and children under the age of seven. Two possible treatments of Cushing's syndrome are to surgically remove the tumor or use radiation to shrink the over-producing ACTH tumor (Bastian 132).

Works Cited

- Bastian F, Glenn. *An Illustration Review Anatomy & Physiology: The Endocrine System*. New York, New York: Harper Collins College Publishers, 1993. Print.
- "Basics About Diabetes". *Center for Disease Control and Prevention*. Center for Disease Control and Prevention. 9 Sep. 2010. 7 Jan. 2011. <<http://www.cdc.gov/diabetes/consumer/learn.htm>>.
- Bowen, R. "Physiologic Effects of Insulin". *Pathophysiology of the Endocrine System*. Colorado State University, 9 Aug. 2009. Web. 18, Jan. 2011. <http://www.vivo.colostate.edu/ibooks/pathophys/endocrine/pancreas/insulin_phys.html>.
- Bronson, Mary H. *Glucose Health*. Columbus: McGraw Hill, 2001. Print.
- "Children with Diabetes: More Information." *Centers for Disease Control and Prevention*. Mar 2010. Web. 06 Jan. 2011. <<http://www.cdc.gov/DIABETES/projects/cda2.htm>>.
- "Diabetes Type 1." *Medline Plus*. U.S. National Library of Medicine, 2010. Web. 07 Jan 2011. <<http://www.nlm.nih.gov/medlineplus/diabetestype1.html>>.
- "Fluoride & the Pineal Gland." *Fluoride Action Network*. n.d. Web. 06 Jan. 2011. <<http://www.fluoridealert.org/health/pineal/>>.
- Gura, Trisha. *Body: The Complete How it Grows, How it Works, and How to Keep it Healthy and Strong*. Washington DC: National Geographic Society, 2007. Print.
- "Homeostasis: Biology Encyclopedia - Cells, Body, Examples, Function, Human, Process, System, Organisms, Blood." *Biology Reference*. n.d. Web. 07 Mar. 2011. <<http://www.biologyreference.com/Ho-La/Homeostasis.html>>.
- "Homeostasis." *Biology Online*. 2008. n.d. Web. 17 Jan 2011. <www.biology-online.org/dictionary/homeostasis>.
- "Hypothyroidism." *NIDDK: National Endocrine and Metabolic Diseases Information Service*. May 2008. Web. 07 Jan. 2011. <<http://www.endocrine.niddk.nih.gov/pubs/Hypothyroidism/>>.
- "Insulin Basics." *Living with Diabetes*. American Diabetes Association, 2010. Web. 07 Jan 2011. <<http://www.diabetes.org/living-with-diabetes/treatment-and-care/medication/insulin/insulin-basics.html>>.
- Kharratian, Datis Randy. *Why Do I Still Have Thyroid Symptoms?* Garden City, NY: Morgan James Pub., 2009. Print.
- Perth, Carol Mattsom. *Pathophysiology* 2nd Edition. Philadelphia: J. B. Lippincott Company, 1986. Print.
- "The Endocrine System: Endocrine Glands and Types of Hormones." *The Hormone Foundation*. 2011. n.d. Web. 06 January 2011. <<http://www.hormone.org/Endo101/page2.cfm>>
- Starr, Mark. *Hypothyroidism Type 2: the Epidemic*. Columbia, MO: Mark Starr Trust, 2010. Print.
- Tortora, Gerard J., and Sandra Reynolds. *Principles of Anatomy and Physiology*. New York: Harper Collins College, 1993. Print.

The Skeletal System

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The skeletal system is an important system spreading throughout most of the body, and is mainly comprised of a series of connecting pieces known as bones. The bones have many functions in the body, such as providing support and protection for the organs of the other body systems. In coordination with the muscular system, bones also help provide movement for the body. They also help in the storage of calcium. There are 206 bones in the adult body, and they vary in shape and size depending on the purpose that they serve (The Skeletal System).

The bones are made up of two different parts - compact bone and spongy bone. These two different types of bone work together to serve the functions of the system. The internal part of the bone is used in the creation of bone marrow (The Skeletal System). Bone marrow is a material inside of many bones that creates new blood cells (Bronson 383).

Aside from the bones, there are also other tissues that act as connector pieces between the bones, creating connections between bones known as joints. Many joints act as movable sections in the skeleton, such as the joints in the arms and knees. There are three main connector tissues - cartilage, ligaments, and tendons (The Skeletal System). Cartilage is an important tissue that can be found between bones in the joints and in other small clusters such as in our nose. Cartilage also serves a purpose in the creation of bones; all bone in the body was formed from cartilage during development as a baby inside the womb in a process known as ossification (Bronson 383).

Ligaments and tendons are two other tissues that connect the bones in the system to each other and to other parts of the body. Ligaments are strings of flexible material that connect the bones of the system to one another. Tendons connect the bones to muscles. The connections between the bones and muscles allow the body to move properly at the joints (Bronson 383).

Juvenile Rheumatoid Arthritis (JRA)

Juvenile Rheumatoid Arthritis (JRA) is a chronic autoimmune disease affecting the joints. An autoimmune disease is when the immune system attacks the body's organs and tissues. As it says in its name, the onset for this type of arthritis is childhood. JRA is when the joints in the body are inflamed. The causes of JRA are genetics, age, weight, and involvement with sports. The symptoms are rashes on the skin, inability to move where joints are, numbness, pain, and swelling. The treatments for JRA are physical therapy, medication including steroids, and surgery. JRA can cause chronic pain but symptoms can lessen if treated properly (Stead, et al. 392-93).



- Skeleton:
- | | |
|------------|----------------|
| 1. Skull | 5. Metacarpals |
| 2. Humerus | 6. Femur |
| 3. Ulna | 7. Tibia |
| 4. Radius | 8. Fibula |
| | 9. Metatarsals |



The human hand, a part of the appendicular skeleton, is composed of many smaller bones.

As stated before, the skeletal system is made of two different types of bones. There are long bones and short bones. Both long and short bones are made of compact bone and spongy bone. The major long bones include: the femur, tibia, fibula, humerus, radius, ulna, metatarsals, and the metacarpals. Short bones include the phalanges, which are bones in the fingers. Also, there are flat and irregular bones, which protect the organs and attach muscles to bones (The Skeletal System).

The inside of the bone contains bone marrow, which is an important material in the skeletal system. There are two types of bone marrow: red bone marrow and yellow bone marrow (Bronson 383). Red bone marrow is a material that produces blood cells and is found in spongy bone at the end of long bones. Red bone marrow produces over 100 billion red blood cells per day (Restak 77 and Gray 1096). Yellow bone marrow is used in the storage of fats and is found in compact bone. The fats are used for energy during times when it is needed (Gray 1097). Yellow bone marrow is found in the shafts of long bones (Restak 77).

The bones connect together to form a large system known as the skeleton. There are two main sections of the skeleton. The first of these two sections is the axial skeleton, which provides a shield for the organs of the torso and head. Some bones in the axial skeleton include the skull, the ribs, and the vertebrae (The Skeletal System).

The second of these two parts of the skeleton is the appendicular skeleton, which provides a way to connect the appendages, such as the arms and legs, to the body. Some bones in the appendicular skeleton include the humerus, the radius, and the ulna, which are all bones of the arm (The Skeletal System).

Scoliosis

Scoliosis is abnormal curvature of the spine or backbone. It is normally found in children of normal health. Scoliosis affects four in one thousand people and can run in families (Weinstein). There are two types of scoliosis. First, there is structural scoliosis, which is where the cause is unknown or it may be caused by another disease or outside force. Second, there is nonstructural scoliosis, which is where it may be caused by an underlying problem, such as muscle spasms or leg length differences (Weinstein).

Symptoms of scoliosis include curvature of the spine, headache, muscle/joint pain, or problems moving. Treatment options include visiting a chiropractor, or other therapeutic doctor, or wearing a brace. Also, a person might have surgery done to add rods into the back to help straighten the spine (Weinstein).



Compact bone, surrounding the spongy bone and bone marrow

Bone Cancer

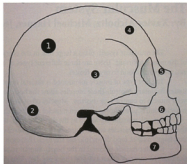
Bone cancer is a type of cancer that develops in the bones of the skeleton. Cancer is a serious disease that is classified by the uncontrollable spread of certain diseased cells. There are many different kinds of bone cancer, but these can be separated into two main types – primary and secondary. A primary bone cancer is when the cancerous cells start to spread from the bone, while a secondary bone cancer is a different kind of cancer that spreads to the bone from another part of the body (Bone Cancer).

One of the most common types of primary bone cancer is Ewing's Sarcoma, a cancer that is mainly prevalent in males and is the most common type of bone cancer to occur during the first ten years of life. It is characterized at first by aching of the bones, unwanted weight loss, tiredness and drowsiness, and fever. The symptoms are caused, like in most cancers of all systems, by a tumor developing in the bone. It can lead to death if not treated and controlled (Stead 398-399).

There are different types of therapies used to treat Ewing's Sarcoma and other cancers of the bone (Stead 399). One major treatment option is chemotherapy, which is a process that uses a special drug to stop the spreading of the cancerous cells that are causing the disease (Cancer Chemotherapy). Another popular treatment therapy is radiation therapy, or radiotherapy. This is a process where radiation is used to kill the cancerous cells by altering their DNA. However, there are risks for both therapies, as they can affect non-cancerous cells in addition to cancerous cells (Radiation Therapy for Cancer).

Work Cited

- "Bone Cancer: National Cancer Institute." *National Cancer Institute*. n.d. Web. 06 Jan. 2011. <<http://www.cancer.gov>>.
- Bronson, Mary H. *Glencoe Health*. Columbus: McGraw Hill, 2011. Print.
- "Cancer Chemotherapy." *National Institute of Health*. n.d. Web. 07 Jan. 2011. <<http://www.nlm.nih.gov/medlineplus/cancerchemotherapy.html>>.
- Gray, Henry. *Gray's Anatomy: Classic Collector's Edition*. New York: Crown Publishers Inc., 1977. Print.
- "Radiation Therapy for Cancer." *National Cancer Institute*. n.d. Web. 07 Jan. 2011. <<http://www.cancer.gov/>>.
- Restak, Richard, et al. *Body: The Complete Human*. Washington, D.C.: National Geographic Society, 2007. Print.
- Stead, Latha et al. *First Aid for the Pediatrics Clerkship*. New York: McGraw Hill Companies Inc., 2008. Print.
- "The Skeletal System." *Minnesota State University*. n.d. Web. 14 Dec. 2010. <http://www.mnsu.edu/emuseum/biology/humananatomy/skeletal/skeletal_system.html>.
- Weinstein, Stuart. "Questions and Answers about Scoliosis in Children and Adolescents" *National Institutes of Health*. *Scoliosis*. July 2008. Web. December 2011. <http://www.niams.nih.gov/Health_Info/Scoliosis/default.asp>.



- Skull:
- | | |
|--------------|-------------|
| 1. Parietal | 5. Nasal |
| 2. Occipital | 6. Maxilla |
| 3. Temporal | 7. Mandible |

The Muscular System

By: Xavier

Michael

Jessica

Isaac

and Wes

The muscular system plays a large role in the everyday functioning of the body. It is one of the largest systems in the body and one of the most important. There are three different types of muscles: skeletal, smooth, and cardiac muscle. Muscles allow the body to move, eat, and pump blood to organ tissues.

The first type of muscle mentioned is skeletal muscle, which surrounds the bones. Skeletal muscles appear striated or striped and are under voluntary control. These muscles allow the body to move by performing opposite actions. When you want to move, your brain tells your muscle to contract, or shorten. Muscles often work together to move parts of the body. One muscle extends, while a complementary muscle contracts, or shortens. When muscles contract, they pull the bones with them, which results in movement (Bronson 388).

Smooth muscles are found in the digestive tract, the urinary bladder, the lining of blood vessels, and the passageways that lead into the lungs. These muscles are involuntary muscles. Involuntary muscles are muscles that you do not control on purpose. For example, the esophagus pushes food down into the stomach (Bronson 388).

Cardiac muscle is found in the heart. Similar to skeletal muscles, it also appears striated under a microscope. These muscles cause the heart to contract about 100,000 times per day. This gives blood to the body (Bronson 388).



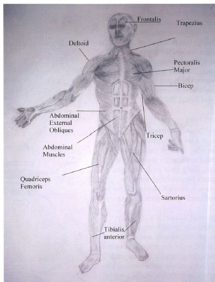
Skeletal Muscle Cell



Cardiac Muscle Cell

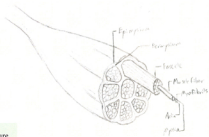


Smooth Muscle Cell



The Muscles of the Human Body

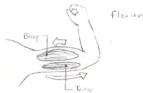
As stated before, the muscular system helps the body throughout the day. Each skeletal muscle has another muscle on the other side of the bone it is attached to. For example, the arm has two muscles, the biceps and triceps. When you bend your arm, the biceps flex or tighten and become shorter and the triceps extend or lengthen. When the arm straightens, the triceps flex and the biceps extend. It is this simple operation that allows actions to be completed, including lifting a glass and putting it down. The body is covered in muscles that allow the movement of the various body parts, and when muscles coordinate, they allow for complicated movements, such as running and walking (Bronson 388 and Restak 107-108).



Compartment Syndrome

Compartment syndrome is a condition caused by increased pressure in a muscle compartment or physical trauma and leads to muscle and nerve damage and problems with blood flow. In the arms and legs, there are layers of tissue named fascia. Fascia do not expand so any extra pressure in that section of the limb leads to increased pressure. This presses on the muscles, blood vessels, and nerves and when this pressure becomes high enough, blood flow becomes blocked leading to permanent injury. Extended exposure to this pressure can lead to the limb dying and needing amputation (Compartment Syndrome).

Compartment syndrome is not an age onset disease. It is caused by brute force trauma to a certain muscle compartment. Symptoms of compartment syndrome include decreased sensation, paleness of skin, severe pain that gets worse, and weakness. To help heal this disease, surgery is absolutely mandatory. To relieve the pressure on the fascia, long, surgical cuts are made through the fascia. The wounds are then left open until the tissue swelling has decreased and the wounds are closed in a second surgery. The second surgery is usually 48-72 hours after the first. Skin grafts are usually needed to close the incision. A cast or bandage is usually put on the limb that received the surgery, but if the cast or bandage is causing issues, it should be loosened or cut off in an attempt to relieve the pressure (Compartment Syndrome).



Strains and Sprains

A strain is a condition in which a muscle is stretched more than normal, and muscle fibers are torn. Strains are often referred to as "pulling a muscle." A person with a strain often experiences pain and stiffness in the affected area, accompanied by bruising around the sprain. Some ways to treat a strain include resting, icing the affected area, wrapping the strained area, and keeping the affected area elevated above the heart. This same concept applies to sprains, in which the ligaments in the joints are stretched beyond their normal capacity (Sprains and Strains).

Works Cited

Bronson, Mary. *Glencoe Health*. Columbus, McGraw Hill, 2010. Print.

"Causes of DBMD, NCBDDD, CDC." *Centers for Disease Control and Prevention*. Sept. 2009. Web. 06 Jan. 2011. <<http://www.cdc.gov/ncbddd/duchenne/causes.htm>>.

"Compartment Syndrome." *National Center for Biotechnology Information*. n.d. Web. 4 March 2011. <<http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002204/>>.

"NINDS Muscular Dystrophy Information Page." *National Institutes of Health*. 29 Dec. 2010. Web. 04 March 2011. <<http://www.ninds.nih.gov/disorders/md/md.htm>>.

Reece, Dean. "Muscular Dystrophy." *University of Maryland Medical Center*. 2006. Web. 04 Feb. 2011. <<http://www.umm.edu/altmed/articles/muscular-dystrophy-000113.htm>>.

Restak, Richard et al. *Body the Complete Human System*. Washington DC, National Geographic Society, 2007. Print.

"Sprains and Strains: MedlinePlus." *National Library of Medicine - National Institutes of Health*. n.d. Web. 04 Mar. 2011. <<http://www.nlm.nih.gov/medlineplus/sprainsandstrains.html>>.

"What Is DBMD, NCBDDD, and CDC." *Centers for Disease Control and Prevention*. 16 Sept. 2009. Web. 06 Jan. 2011. <<http://www.cdc.gov/ncbddd/duchenne/what.htm>>.

Duchenne/Becker Muscular Dystrophy

Duchenne/Becker muscular dystrophy, or DBMD, is a disease that can be passed on through families. The gene that causes DBMD is found in the X chromosome. Males are more likely to get DBMD than females. DBMD is caused by abnormal dystrophin, which is found inside the muscle cells and helps support the membrane of muscle cells. DBMD causes the fibers in the muscles to split, like hair getting split ends (What Is DBMD).

Children are more likely to get DBMD than other types of muscular dystrophy. Signs of DBMD in early childhood relate to children's leg muscles. For example, they may have a delay in walking or may fall often. As the child grows up, muscle strength decreases and worsens. A child may become unable to walk and will rely on a wheelchair to get around. Other symptoms of DBMD include fatigue, mental retardation, muscle weakness, frequent falls, difficulty standing up or climbing stairs, and wasted body muscles (What is DBMD).

There is no definite cure for DBMD, but people can take steroids to reduce how quickly DBMD worsens. Also, individuals can get treatments for DBMD. Treatments include physical therapy, and orthopedic appliances, which can help with mobility (Reece).

The Circulatory System

By: Micaela

Quintina

Karmen

and Tiara

The circulatory system transports blood and oxygen throughout the body. Blood carries oxygen from the lungs and nutrients from food to the cells in the body. The circulatory system also helps remove waste products such as CO_2 from the cells. Blood carries CO_2 from the cells to the lungs in order to be exhaled, and takes waste products to the kidneys for removal from the body (The Human Heart).

The heart, the main organ in the circulatory system, contains four chambers, which help pump blood throughout the body. The blood is pumped away from the heart through the arteries, passes through the capillaries, and returns to the heart through the veins (The Human Heart). The top two chambers of the heart are called atria and the bottom two chambers are called ventricles. There is also a wall of tissue called the septum that separates the four chambers. The right atrium and the right ventricle receive blood from the body and pump blood to the lungs. The left atrium and left ventricle receive blood from the lungs and pump blood to the body. There are two additional structures in the circulatory system called arteries and veins. The arteries carry blood away from the heart and the veins carry blood back to the heart. Another important structure is the capillaries, which connect the arteries and veins. Blood flows from the arteries to the capillaries. In capillaries, oxygen is exchanged for carbon dioxide. The capillaries then carry blood to the veins so it can be transported back to the heart (Heart Anatomy, The Human Heart).

There are four important valves in the heart. These valves are the tricuspid, pulmonary, mitral, and aortic valves. The tricuspid is responsible for flow of blood from the right atrium to the right ventricle. The pulmonary valve allows blood to flow out of the heart towards the lungs. The aortic valve allows blood to be passed from the left atria to the left ventricle. The mitral valve lets blood from the lungs pass through the left atrium and into the left ventricle (Heart Anatomy, Bronson).

The health of your heart is essential for living a long and disease-free life. Many of us, however, do not give thought to the foods that we eat or the exercise we DON'T do. Knowing exactly what you can do to keep a healthy heart will benefit you for the rest of your life. To do so, you may need to make lifestyle changes.

Two obvious ways to maintain a healthy heart are to eat right and exercise regularly. Like any muscle, your heart works best with routine exercise. Exercise that works the heart and lungs will improve the way your body uses oxygen, as well as reduce stress, lower cholesterol, and help lose and maintain weight. Performing exercises such as running, swimming, stair-climbing, bicycling, and dancing are a few fun activities you can do to work the heart (Health and Wellness).

To eat healthy, food doesn't have to be bland and tasteless. You can improve your diet just by changing a few minor details. Some ideas include eating less fat, less salt, and more fiber. A few ways you can reduce fat and salt intake are by eating fish more often than you eat red meat, avoiding foods containing hydrogenated oil, palm oil, or coconut oil, eating fewer high-dairy products, and avoiding adding salt to the food you are cooking; instead, use natural herbs and flavorings (Health and Wellness). Making a few minor adjustments in your schedule and menu will vastly improve the health of your heart and the overall health of your body. You will feel better, perform better in daily activities, and most of all; your body will thank you.

The heart, which is roughly the size of a fist and located in the center of the chest, pumps 7,000 liters of blood through the body each and every day. This powerful pump forces blood through vessels called arteries and much smaller vessels called capillaries. These blood vessels assist in transporting waste, nutrients, gas, and electrolytes to various parts of the body to pick up waste or provide nutrition. These structures, the heart and its vessels, form the circulatory system (Johnson, The Human Heart).

There are three distinct parts of the circulatory system: pulmonary circulation, coronary circulation, and systematic circulation (Johnson). The first part, pulmonary circulation, is the portion of the circulatory system which carries oxygen-depleted blood away from the heart to the lungs. Blood vessels from areas throughout the body bring blood full of waste to the heart to be pumped to the lungs. First, this blood enters the right atrium through a large vein called the vena cava. The vena cava returns deoxygenated blood from the body into the heart. Once the right atrium is filled with this blood, it pushes the blood to the right ventricle. From here, it will be transported to the lungs to be oxygenated. To do this, the atria contracts to push blood to the ventricle. The ventricle then contracts to push blood to the lungs. The heart is able to contract because it is a muscle.

Once in the lung capillaries, the exchange of oxygen and carbon dioxide take place. Fresh, oxygen-rich blood returns to the heart through the pulmonary veins, which are large blood vessels of the circulatory system. This time, however, the blood vessels enter through the left atrium. Then the blood is transported to the left ventricle where it is transported to the main artery; the aorta. The aorta is a large trunk artery that carries blood from the left ventricle of the heart to branch arteries. Now that the blood is oxygenated and full of nutrients, it will be transported to the various parts of the body (Johnson, Heart Anatomy, The Human Heart). The second part is coronary circulation. Coronary circulation is essentially what was explained just above. It involves the transport of blood through the heart and its four chambers. Coronary circulation is only one part of the overall circulatory system.

The third and final part is systematic circulation. Systematic circulation supplies nourishment to all of the tissue excluding the heart and the lungs. Blood vessels deliver oxygen and nutrients to the tissue through the heart's main artery, the aorta. During systematic circulation, blood passes through the kidneys. This phase is known as renal circulation. In this phase, the kidneys filter the waste from the blood. The liver filters sugars from the blood, storing them for later. The sugars from the blood will be converted into glucose, which acts as a power source for the body (The Human Heart).

Hemophilia

There are two types of hemophilia: type A and type B. Hemophilia is passed down genetically and is almost always genetically contracted by men. Hemophilia is an X-linked recessive disease so it is more common in males than in females. Type A hemophilia is caused by a lack of the chemical clotting Factor VIII and occurs in one in five thousand men. Type B hemophilia is caused by a lack of the chemical clotting Factor IX and is found in one in twenty-five thousand men. Both of these types have the same effect, which is a lack of thrombin. Thrombin is a catalyst for fibrin clots. Hemophilia currently has no known cure (What is Hemophilia, Bronson).

The symptoms of hemophilia are varied and depend on how much clotting factor (VIII or IX) is missing. For someone who has 5-30% of the normal clotting factor (VIII or IX) the symptoms are fairly minimal with bleeding only caused by significant trauma and no chance of random bleeding. For someone who has 1-5% of normal clotting factor (VIII or IX) the symptoms are moderate and require medium amounts of trauma to cause bleeding. Someone who has less than 1% of normal clotting factor (VIII or IX) may have incidents of unprovoked bleeding and only require light trauma to initiate bleeding. Treatments include replacement therapy for the clotting factors (What is Hemophilia).



The Heart

1. Left common carotid 2. Barchiocephalic trunk 3. Aortic arch 4. Superior vena cava 5. Right pulmonary artery
 6. Right superior & inferior pulmonary veins 7. Right atrium 8. Inferior vena cava 9. Left atrium
 10. Left superior & inferior pulmonary veins 11. Left pulmonary artery 12. Arerial ligament
 13. Aorta 14. Left sub clavian aorta

Heart Murmurs

Heart murmurs are a whooshing sound that the heart makes when extra blood is pushed through it. It's just an extra sound along with the lub-dub-lub-dub sound when the heart beats. Heart murmurs usually affect children from the ages 3-7 and are rare in adults. A heart murmur is caused when there is an extra amount of blood flowing in the heart. (Heart Murmur).

Children and adults who have the soft heart murmurs don't have symptoms besides the murmur itself. Children and adults who have louder heart murmurs usually have the following symptoms: poor eating and abnormal growth (infants), shortness of breath (usually occurs during physical activity), excessive sweating for no reason, chest pain, dizziness or fainting and a bluish color usually on the fingers and lips (Heart Murmur).

Cardiomyopathy

Cardiomyopathy is the diseased state of the heart involving flaws in the muscle fibers, which contract with each heartbeat. There are two ways that a person could get cardiomyopathy. The first is when the heart muscle cells themselves are abnormal. The second way can occur through certain factors affecting the heart such as infections, low blood flow, low blood oxygen, and high blood pressure. One in every 100,000 children in the U.S. under the age of 18 is diagnosed with cardiomyopathy (About the Disease).

The symptoms of cardiomyopathy vary as it is a complex disease and verifying signs can be difficult in babies or young children who cannot communicate their feelings. Some symptoms include, but are not limited to: breathlessness, swelling of the lower extremities, bloating of the abdomen, fatigue, irregular heartbeats, and dizziness. Children may be diagnosed following the detection of a heart murmur or may undergo a special screening if a family member is found to have cardiomyopathy. A child with this disease does not always have a heart murmur. Murmurs occur in about a third to half of hypertrophic cardiomyopathy patients and are usually due to the obstruction of a ventricle or the leaking of the heart valves (About the Disease).

Unfortunately, there is no cure or treatment that can return the heart to its normal state or guarantee long-term survival. The vast majority of children do not show any recovery in heart function. If detected in earlier stages, cardiomyopathy may be controlled with long-term drug therapy and the placement of a pacemaker/defibrillator (About the Disease).

Works Cited

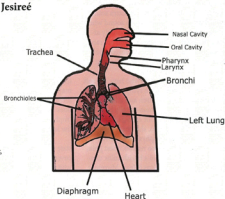
- "About the Disease." *Children's Cardiomyopathy Foundation*. 2008. Web. 04 January 2011. <<http://www.childrenscardiomyopathy.org/site/vital.php>>.
- Bronson, Mary. *Glencoe Health*. Columbus: McGraw Hill, 2011. Print.
- "Health and Wellness." *Heart Healthy Women*. n.d. Web. 05 Jan 2011. <<http://www.hearthealthywomen.org/health-and-wellness.html>>.
- "Heart Anatomy." *Texas Heart Institute at St.Lukes Episcopal Hospital*. July 2010. Web. 02 Jan 2011. <<http://www.texasheartinstitute.org/HIC/Anatomy/anatomy2.cfm>>.
- "Heart Murmur." *National Heart, Lung, and Blood Institute Diseases and Conditions Index*. August 2008. Web. 07 January 2011. <http://www.nhlbi.nih.gov/health/dci/Diseases/heartmurmur/hmurmur_what.html>.
- "What Is Hemophilia?" *National Heart, Lung and Blood Institute*. n.d. Web. 06 Jan. 2011. <http://www.nhlbi.nih.gov/health/dci/Diseases/hemophilia/hemophilia_what.html>.
- "The Human Heart." *The Franklin Institute*. 2011. Web. 02 Jan 2011. <<http://www.fi.edu/learn/heart/index.html>>.
- Johnson, Delos. "The Circulatory System." *Global Classroom*. n.d. Web. 05 Jan 2011. <<http://www.globalclassroom.org/hemo.html>>.

The Respiratory System

By: Simon Rick Taylor and Jesireé

The respiratory system is comprised of the organs that help a person breathe. The purpose of breathing is to deliver oxygen to cells and remove carbon dioxide. Red blood cells pick up the oxygen from the lungs and distribute it to other cells in the body. The red blood cells also pick up carbon dioxide from the cells of the body and deliver it to the lungs so it can be exhaled (Bronson 418). The lungs are the main organ in the respiratory system. The lungs are protected by the rib cage. Below the lungs lies a muscle called the diaphragm. The diaphragm is the main muscle for breathing. When a person inhales the diaphragm flattens, which enlarges the lung cavity and pulls air into the lungs. When a person exhales the diaphragm expands and makes the space for air in the lungs smaller, thus pushing air out of the lungs (Bronson 418).

The trachea, also known as the windpipe, filters the air. The windpipe is the main airway to the lungs and it divides into two tubes, the left and right bronchi. The epiglottis is the tissue that closes over the windpipe (Bronson 418). The epiglottis covers over the windpipe in order to prevent food from entering the lungs when swallowing (Epiglottis). The bronchi are a pair of air tubes that carry air directly into the lungs. Before air reaches the lungs it goes through the mouth or nose, past the epiglottis, into the trachea, through the vocal cords, enters the larynx and flows to the bronchi where air passes through the lungs to the bronchioles, and finally the alveoli. Alveoli are grape-like air sacs where gas exchange occurs (Bronson 418).



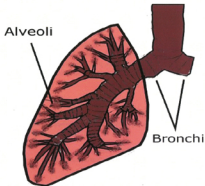
Bronchiole



Asthma

Asthma is an inflammation of the airways caused by either an allergic reaction or by sudden pressure on the respiratory system which causes the airways to close. Asthma can make it harder for a person to breathe because oxygen isn't getting to the lungs. Symptoms of an asthma attack include repeated wheezing, coughing, tightness in the chest, and shortness of breath. In an asthma attack, the muscles around the airway tighten and the airway narrows. Asthma can affect people of all ages, but about 6 million people diagnosed with asthma are children (Asthma, What is it?). According to Stead, et. al., "asthma is the most common chronic lung disease in children" (Stead et. al. 203).

Many different things can cause asthma. Some causes include environmental factors and genetic predisposition for asthma. The most common symptoms of asthma include: coughing, wheezing, trouble breathing, and chest pain. The more these symptoms occur the more severe the asthma condition is diagnosed. Treatment for asthma varies based on the type and severity of the individual's asthma. Some treatments include: inhalers, corticosteroids, and and cholinergic agents (Stead et. al. 203).



Tuberculosis

Tuberculosis (TB) is one of the most common diseases of the respiratory system. Tuberculosis is a type of bacteria that attacks the lungs. TB is transmitted through contact with the bacteria, and has more potential to spread in densely populated areas. Symptoms of tuberculosis include cough, fever, fatigue, night sweats, and weight loss.

When a person is first infected with *Mycobacterium tuberculosis*, the bacteria that causes TB, the immune system surrounds the disease. This may cause the patient to not show symptoms for many years. If a person is infected with TB and does not show symptoms, this is called the latent stage (Bronson 421). The active stage starts when the person's immune system is weakened either by age (children, elderly) or by factors that affect individuals who are immunocompromised (HIV, AIDS). The main organs that are attacked by the disease are the lungs. Treatment options for tuberculosis consist of taking medicines such as isoniazid, rifampin, pyrazinamide, ethambutol, and streptomycin (Bronson 421).

Influenza

Influenza, also known as the flu, is a disease that affects the respiratory system. This infection targets the bronchi, the nose, the lungs and throat, all major parts of the respiratory system. Influenza is a transmitted virus and is airborne, which makes it easy to catch or spread. When a person with influenza coughs or sneezes, the virus is put into the air for anyone to catch. It is possible to catch this virus by touching an infected surface or coming in close contact with the infected person. Once he or she breathes in the virus, it moves through the respiratory tract. In the respiratory tract there are small hairs called cilia. Influenza virus overpowers the cilia and mucus, to work its way through the respiratory tract (Seasonal Influenza).

Once the virus is in the body it takes over the cells, multiplies, and infects cells and tissues in the body. With the body being infected, it is unable to fight off the germs and viruses that try to attack it. Tissues in the respiratory system become infected and inflamed and the mucus covered cilia becomes useless. The body's protective instincts become aware of the virus and immediately send white blood cells to blanket and protect the body by fighting off the virus. During this process, cells release histamine. Histamine is a chemical that causes a large amount of blood to flow to the infected areas in the body causing the pain and swelling most people experience, typically in the throat (Seasonal Influenza). There are many different cells in the body that send messages back and forth causing the many other symptoms of influenza. For example, the high fevers are a result of new cells being developed and old cells being repaired. Symptoms of influenza include nausea, vomiting, headaches, weakness, chills, coughing, sore throat, and fevers (About the Flu). Symptoms usually last about a week for people with strong immune systems. Those with weaker immune systems usually keep the virus in their body for longer periods of time (Stead 185-186).

Most people have a natural immunity to influenza. With this immunity, consequences such as hospitalization, death, or other infections can be avoided. Common victims of influenza consist of children under the age of five because their immune systems are not fully developed and are not as strong as adult immune systems. Other victims include hospitalized patients, people with weak immune systems, and adults over the age of 65. Thankfully, vaccines have been made available for influenza. The best way to avoid influenza is to get a seasonal flu shot every year (Stead 185-186).

Works Cited

- "About the Flu." *Flu.gov*. n.d. Web. 07 Feb. 2011. <<http://flu.gov/individualfamily/about/index.html>>.
- "Asthma, What Is?" *National Heart, Lung and Blood Institute*. February 2011. Web. 18 Jan. 2011. <http://www.nhlbi.nih.gov/health/dci/Diseases/Asthma/Asthma_WhatIs.html>.
- Beonson, Mary. *Glencoe Health*. Columbus: McGraw-Hill, 2011. Print.
- "Epiglottitis." *Genetics Home Reference*. February 2011. Web. 18 January 2011. <<http://ghr.nlm.nih.gov/glossary=epiglottitis>>.
- "Respiratory System: Oxygen Delivery System" *The Human Heart*. n.d. Web. 16 Dec. 2010. <<http://www.fi.edu/learn/heart/systems/respiration.html>>.
- Stead, Latha et al. *First Aid for the Pediatrics Clerkship*. New York: McGraw Hill Companies Inc., 2008. Print.
- "Seasonal Influenza (Flu)." *Centers for Disease Control and Prevention*. January 2011. Web. 07 Feb 2011. <<http://www.cdc.gov/flu/professionals/infectioncontrol/longtermcare.htm>>.

The Digestive System

By: **Curtis** **Gabby** **Jacob** **Tom** **Kameron**
and David

The function of the digestive system is to break down the food that is consumed. The digestive system consists of organs that are in the digestive tract and organs outside of the digestive tract that help digestion. Without the digestive system, the body would not be capable of breaking down food and getting the needed nutrients.

The organs in the digestive tract include the mouth, esophagus, stomach, small intestine, and large intestine. The organs that help with the digestion are the pancreas, liver, and gallbladder. The process of digestion starts with the mouth and is completed by going through the small intestine and waste traveling through the large intestine (Your Digestive System).

You can keep your digestive system clean and healthy by eating healthy food, such as fruits, vegetables, and fiber. Fiber regulates the digestive system; fiber can be found in foods like cereal and bread. Another way to keep the digestive system healthy is by not drinking alcohol. Alcohol can harm the liver, which is essential for digestion (Your Digestive System).

Irritable Bowel Syndrome

One disease of the digestive system is irritable bowel syndrome (IBS). IBS is a gastrointestinal disorder that can be identified by abdominal pain or irregular bowel movements. Symptoms of IBS include intestinal bloating, diarrhea, constipation, and the feeling of not having all of your waste removed. This disease is not life threatening but its symptoms can cause a person discomfort and distress. The cause of IBS is unknown but it is believed that people with IBS are more sensitive to gas or stool in the colon. IBS can affect children but it is more commonly found in adults. There is no cure for IBS but treatments for it include dietary changes. Dietary changes usually involve losing weight and eating healthier foods that help with digestion, such as fiber. Medications also help reduce the symptoms of IBS (Hyams).

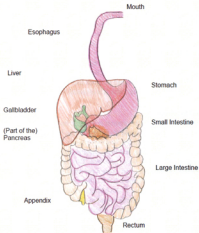
Abdominal Hernia

An abdominal hernia is a muscular injury which causes immense pain, vomiting, nausea, and a visible bulge in the abdominal region. It usually occurs when one is doing a physically straining activity such as lifting a heavy object, coughing, or straining during bowel movements. The reason behind it is that the abdominal wall, which is a large muscle around your bowels, is ruptured or torn, and a part of the small intestines are forced through the hole (Hernia).

The injury is common, and it has a rather easy surgery to fix it and the recovery is short. The surgery consists of removing the small intestine from the hole, and sealing the wound in the muscle wall. It can happen to anyone though it is more prevalent in professions that require heavy lifting, such as construction. There is also a chance that the intestines will become looped and then strangulated by the hernia. This will result in that portion of the intestines losing blood and the patient will have to endure surgery to regain normal digestion (Hernia).

You are hungry so you eat food. The food goes in your mouth and you chew. The teeth break down the food you are eating. The saliva is made up of enzymes that also help break down the food (Netter 63). Saliva also makes things flow more smoothly down the esophagus (Netter 63). The esophagus is a 10-inch muscular tube that pushes the food down to the stomach (Bronson 424). The stomach is a muscle that contracts and works the food inside it like a washing machine. It then fills up with hydrochloric acid that helps break down the food even more (Netter 66). Hydrochloric acid also kills some of the bacteria that are ingested when you eat.

Once the food is broken down enough, it enters the small intestine where the nutrients are absorbed into the tissue (Bronson 424, 425). The liver produces bile, which aids the digestion of fats (Netter 68). The bile is stored in the gallbladder (Netter 69). When food enters the small intestine, bile is released into the small intestine as well. The waste that is left over after the nutrients are absorbed by the small intestine flows from the small intestine into the large intestine (Bronson 424). The large intestine pulls the water out of the waste (Bronson 425). The waste then is excreted through the rectum.



Celiac Disease

Celiac disease occurs when the small intestine cannot absorb nutrients from foods. People with this disease cannot handle gluten. Gluten is a protein in wheat, rye, and barley. When people with celiac disease eat food with gluten, their immune system begins to damage the small intestine. Celiac disease runs in families. Sometimes it begins for the first time after giving birth, surgery, pregnancy, viral infection, or a large amount of emotional stress (Celiac Disease).

Symptoms are different for every person. For the digestive system, the symptoms are more common in young children or infants, and are not as common in adults. There may be abdominal pain, diarrhea, vomiting, constipation, or weight loss. Also, irritability is commonly a symptom in children. Since symptoms for the digestive system are rare for adults, other symptoms can be joint pain, arthritis, bone loss, depression or anxiety, and tingling numbness in hands and feet. It usually first occurs between six months and two years (Celiac Disease).

The treatment for Celiac disease is to be on a gluten-free diet. For most people, going on a gluten-free diet will stop symptoms, heal what the symptoms have done, and prevent symptoms from happening again (Celiac Disease).

Works Cited

- Bronson Ph.D., Mary H. Glencoe Health. Columbus: McGraw Hill, 2011. Print.
- "Celiac Disease." National Digestive Diseases Information Clearinghouse. Sept. 08. Web. 04 March 2011. <<http://digestive.niddk.nih.gov/ddiseases/pubs/ceeliac/>>.
- "Crohn's disease." National Digestive Diseases Information Clearinghouse. February 2006. Web. 10 January 2011. <<http://www.digestive.niddk.nih.gov/ddiseases/pubs/crohns/index.htm>>.
- Hyams, Jeffrey. "Irritable Bowel Syndrome in Children." National Digestive Diseases Information Clearinghouse. Nov. 2008. Web. 7 Jan. 2011. <<http://www.digestive.niddk.nih.gov/ddiseases/pubs/ibschildren/index.htm>>.
- "Hernia." National Digestive Diseases Information Clearinghouse. Nov. 5 2010. Web. 02 Mar. 2011. <<http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001956/>>.
- Netter, Frank H., and Carlos A. G. Machado. Netter's Atlas of the Human Body. Hauppauge, NY: Barron's, 2006. Print.
- "Your Digestive System and How It Works." National Digestive Diseases Information Clearinghouse. April 2008. Web. 07 Jan. 2011. <<http://digestive.niddk.nih.gov/ddiseases/pus/yrdd/>>.

Crohn's Disease

Crohn's disease is a disease that causes inflammation in the digestive tract. Crohn's disease is caused by the body's immune system mistaking food, bacteria, and other substances as foreign intruders. The body's immune system attacks these invaders and in the process, white blood cells accumulate along the intestinal lining. This causes chronic inflammation in the digestive tract. While it can affect the entire digestive tract, it most commonly affects the intestines where blockages can easily occur. Crohn's disease causes the intestinal wall to thicken, thus narrowing the passage way. The most common symptoms for someone with Crohn's disease include abdominal pain, often in the lower right side, and diarrhea. Other symptoms that may occur include rectal bleeding, weight loss, arthritis, and skin problems (Crohn's Disease). Children who have Crohn's disease could suffer from complications later in development.

Treatment for Crohn's disease can include drug therapy, nutrition supplements, or surgery (Crohn's Disease). A person with Crohn's disease should avoid fatty foods, spicy foods, or foods high in fiber because they can set off the symptoms of Crohn's disease (Crohn's Disease).

The Excretory System

By: Bradley

Gabe

Angel

and Marielle

The excretory system performs the essential bodily function of waste removal. All organs in this system are located in the lower half of the abdomen. Without the excretory system, the body would become filled with toxins and could not function. There are several major organs in this system: the liver, kidneys, bladder, large intestine and anus. Some of the functions of this system are made possible by the bacterial colonies living inside the body (Long 144). The skin is also part of this system, as sweat can eliminate some excess water and salt. Skin will be covered in the integumentary system chapter. There are two major pathways in the excretory system: one is linked to the circulatory system and begins with the kidney, and the other is linked to the digestive system and begins with the large intestine (Bronson 249).

Part of the excretory system is the urinary system, which includes the kidneys, ureters, bladder, and urethra. The main job of the kidneys is to filter the waste out of the blood and make urine (Bronson 430). Blood passes into the kidneys from the renal artery, and is scrubbed by the nephrons, which are inside the kidneys. Impurities and toxins are removed from the blood by the nephrons and are collected as urine. Urine is the liquid waste from the body. The urine then moves out of the kidney through the ureters and is stored in the bladder. They are tubes that connect the kidney to the bladder. The ureters pump the urine into the bladder by the tightening of muscles in the ureteric walls (Bronson 430). The bladder is hollow and muscular and can store up to two cups of urine for two to five hours. Then the sphincter muscles close tightly around the opening of the bladder, which leads to the urethra. The urethra is the tube that leads from the bladder to the outside of the body (Bronson 430-431).

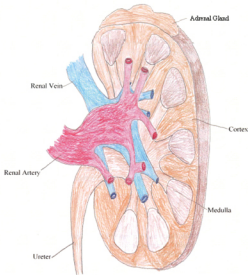
The liver, while primarily associated with the circulatory system, is also part of the excretory system. The liver cleans the blood, and also breaks down toxins produced by the body (Bronson 430).

The excretory system also includes the large intestine. The large intestine removes the solid waste from the body. The large intestine is connected to the small intestine. Within the large intestine, there are bacteria that are responsible for changing the undigested food from the small intestine into solid waste or feces for excretion (Bronson 430). Waste is moved through the intestine by muscle contractions (Long 132). The large intestine absorbs all remaining water before packing what is left into fecal matter, storing it in the rectum. A muscle called the sphincter, which is like the neck of a balloon, closes off the end of the rectum preventing anything from coming out. Muscle contractions are used to remove waste later on (Long 133).

Kidney Stones

Kidney stones are small crystals formed by mineral waste in the urinary tract. Kidney stones are most common in people who are dehydrated. When urine develops with a higher than normal ratio of minerals to liquid, tiny crystals begin to form. These crystals pass through the urinary tract. Some formations of crystals create kidney stones that block the urinary tract from letting waste get through the system. Most kidney stones are formed from calcium. Both children and adults can develop kidney stones. Symptoms of kidney stones include pain in the lower back, vomiting, and bloody, odd-colored, or smelly urine (Kidney Stones).

After having one kidney stone, a person is more likely to have another one. Some different ways of decreasing a person's risk of getting a kidney stone include lowering salt and soda intake, increasing the amount of water and dairy products consumed per day, and reducing protein intake to less than 50 grams of protein a day. If a stone is formed, doctors will advise drinking large amounts of fluids to try to let it pass. In the event that it does not pass, the stone will be removed by surgery (Kidney Stones).



Chronic Renal Failure

Chronic renal failure (CRF) happens when the nephrons in the kidneys are not properly working (Bronson 430). The nephrons shut down when the kidneys are being attacked by an outside force. The signs and symptoms in children who have CRF are fatigue, growth failure, headache, and weariness (Stead and Kaufman 256).

Some of the causes for CRF include hereditary disease, urination problems, diabetes, high blood pressure, and birth defects. The main causes for children age four and under are hereditary diseases and birth defects. Hereditary diseases are the leading cause of CRF between the ages of five and fourteen (Overview of Kidney Diseases).

CRF, or chronic kidney failure (CKF), can affect both adults and adolescents. Adults are at higher risk of CRF/CKF than adolescents but unfortunately adolescents are affected. Every year, approximately two new cases of CRF/CKF occur in every 100,000 children. To some extent, ethnicity and gender impact the risk of chronic kidney failure. According to statistics, African American teenagers are three times more likely to experience CRF than Caucasian teenagers. Also, boys are at higher risk than girls (Overview of Kidney Diseases).

The two treatments available for CRF are dialysis and transplantation. Dialysis involves a machine filtering the blood since the kidney can not filter it. Living and deceased donors can provide a healthy kidney to patients in a process called kidney transplantation. The patient undergoes surgery to get a new, healthy kidney that does the job that their original kidneys were supposed to (Overview of Kidney Diseases). It is highly important that a patient who is about to get a kidney transplant takes his or her medications so that the new kidney will not be rejected by the body (Overview of Kidney Diseases).

Works Cited

Bronson, Mary. *Glencoe Health*. Columbus: McGraw Hill, 2011. Print.

"Kidney Stones - PubMed Health." *National Center for Biotechnology Information*. 14 Jan. 2009. Web. 02 Mar. 2011. <<http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001493/>>.

Long, Melanie Sarah. *Gastrointestinal System*. 2nd ed. London: Mosby, 2002. Print.

"Overview of Kidney Diseases in Children." *National Institutes of Health*. 2006. Web. 4 March 2011. <<http://kidney.niddk.nih.gov/kudiseases/pubs/childkidneydiseases/overview/>>.

The Integumentary System

By: Jerusa
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Norton

and Josh

Stefan

Mariah

Have you ever wondered what your skin is made of? The skin is only one part of a body system called the integumentary system. The purpose of this system is to keep harmful bacteria and other materials from getting inside the body, to regulate body temperature, and to eliminate waste products. Skin, glands, hair, nails, and pain receptors are all part of the integumentary system. The skin is the largest organ. The skin regulates body temperature by sweating. Sweat is produced by the sweat glands. The skin protects our inner organs from diseases, chemicals, and other dangerous substances from the outside world. Skin also contains melanin, which serves as protection against ultraviolet light, which can harm skin (Farabee, Integumentary System). To keep the skin and the integumentary system healthy, bathe regularly, use lotion to keep the skin from becoming dry or cracked, and use sunscreen to protect against sunburn. Also, if getting body piercings or tattoos, make sure that the needles and equipment are properly sterilized.

There are three layers of skin: the epidermis, dermis, and hypodermis (Wrenn). The outermost layer is the epidermis. The epidermis is made of skin cells that serve as a protective barrier to nerves in the dermis. The epidermis is composed of keratinocytes, which protect the skin and help to make it waterproof (Wrenn). When these cells die they are pushed to the outer layer of the skin. The dead cells are replaced constantly by new skin cells. The epidermis does not have its own blood supply because the dead cells do not need blood. The middle layer of the skin is called the dermis. The dermis is where the sweat glands and ducts, hair follicles, blood vessels, and nerves are located. The dermis and the epidermis are separated by a "basement membrane." The basement membrane is important because it locks the epidermis and the dermis in place (Wrenn). The innermost skin layer is the hypodermis. The hypodermis serves as a connector between the skin, muscles and bones. The hypodermis also stores blood vessels and nerves (Martin and Shier).

The hair and nails also play an important role in the integumentary system. The nails are the protective covering over the ends of the fingers and toes. They are made by cells reproducing and keratinizing to form a hard nail plate (Martin 177). The hair has a very important job. The hair is mainly used to help the body maintain homeostasis. Hair helps to keep the body at its appropriate temperature. The hair starts at the root, which is in the dermis, and extends through the epidermis until it is exposed. The hair root is where the cells grow and divide, thus causing the hair to grow longer. After the hair exits the roots it keratinizes and eventually dies. You may wonder why your hair is more prevalent on certain parts of your body. The reason for this is that the hair in certain locations is very fine, thus making hair harder to see in some areas compared to others (Martin 178).

Did you know that the human body has 3 to 4 million sweat glands? In the integumentary system there are two major types of glands called the sebaceous glands and the sweat glands. Sebaceous, or oil, glands are commonly connected with hair follicles, lips, and eyelids. Sebaceous glands are located in the dermis layer of the skin. These glands are mostly found in clusters upon the face, chest, and neck. When sebaceous glands are very oily they start to form bumps on the skin called acne. Acne occurs when the skin's pores become infected with bacteria and swell (Wrenn, Integumentary System).

Sweat glands are categorized into two types, eccrine or apocrine. Eccrine sweat glands are the most common sweat glands. Eccrine glands are found on the skin's surface around the head, hands, and feet. Apocrine glands, on the other hand, are usually found near the genital and armpit areas. Both types of glands secrete oily substances commonly known as sebum. Sebum helps keep the skin and hair on the body stay moist. When the sweat glands activate due to heat, the body starts to perspire or sweat. The heat causes the body temperature to rise, which opens up the sweat pores and releases sweat. As the sweat slowly evaporates from the skin, the body slowly cools. When the body returns to its normal temperature, the sweat pores close so that perspiration will stop (Integumentary System, Starr, et. al. 548).

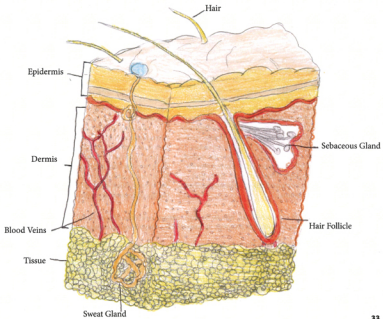
Alopecia

Have you ever awakened to find a clump of your hair on the pillow? Is it a disease or just your sibling playing a mean practical joke? If it's not your sibling, it could be a disease called alopecia. Alopecia is a disease that causes clumps of hair to fall off the head or body. The most common type of alopecia is alopecia areata. In this form, hair falls out of the head in small patches (Alopecia Areata).

The loss of hair is initiated by a person's immune system. The immune system usually protects the body from harm, but in alopecia, it starts attacking hair follicles. When the immune system attacks it is called an immune response. The immune response causes the hair to fall out. A hair follicle is the structure of the hair starting from the root (Alopecia Areata).

This disease can develop in anyone. Onset of alopecia often starts in childhood. The National Institutes of Health claims, "Alopecia areata affects nearly 2 percent of Americans of both sexes and of all ages and ethnic backgrounds" (Alopecia Areata). Genetics have also been shown to be a risk factor. The main symptom of alopecia is losing hair in clumps. The patches are usually about the size of grapes or larger. When the immune system attacks the hair, it becomes brittle, broken, and can easily be pulled out.

Photochemotherapy, anthralin, and corticosteroids are some treatment options. In photochemotherapy, a light-sensitive drug is given to the patient before being exposed to ultraviolet light. About half of patients get hair growth but skin cancer may develop as a result of the treatment. Anthralin is a man-made substance that looks like tar. It changes the effect of the immune function after being applied for 20-60 minutes. Within 8 to 12 weeks, new hair growth is usually seen. Corticosteroids are anti-inflammatory drugs that suppress the immune system. Depending on the way they are given, the effects of the drug may vary, but new growth is seen in 4 to 8 weeks (Alopecia Areata). In many cases, however, the hair grows back on its own with or without medication.



Melanoma

Melanoma is the most dangerous skin cancer known. It affects pigment cells called melanocytes. The pigment cells do not grow correctly resulting in an overproduction and large amount of cells and tissue, which creates a tumor (Understanding Melanoma). The tumor can be benign (not life threatening) or malignant (life threatening). The causes of melanoma involve an excessive and deep exposure to the sun or ultraviolet radiation that causes the cells to divide uncontrollably and grow incorrectly (Melanoma).

Symptoms of melanoma include growths on the skin, such as moles or lumps, that are unusual and strange looking. The growth can be new or can form from an existing freckle or mole. The growth is typically black, brown, tan, pink, grey, or blue, odd-shaped, and rough or irregular edged (Understanding Melanoma). Melanoma affects people of all ages, however the chance of getting melanoma increases with age. Melanoma can be successfully treated in its earlier stages by surgical removal of the cells and tissues around the cancer. If melanoma has spread deeper into the dermis layer, the possibility of successful treatment is less likely, however there are still ways to prevent death from the cancer. These treatments include chemotherapy, immunotherapy, radiation treatments, or possible amputations (Melanoma).

Works Cited

- "Acne." *National Institutes of Health*. November 2010. Web. 06 Jan. 2011. <http://www.niams.nih.gov/Health_Info/Acne/acne_ff.asp>.
- "Alopecia Areata." *National Institute of Health*. July 2009. Web. 06 January 2011. <http://www.niams.nih.gov/Health_Info/Alopecia_Areata/alopecia_areata_ff.asp>.
- Farabee, M.J. "Integumentary System." *Estrella Mountain Community College*. 18 May 2010. Web. 16 Dec. 2010. <<http://www.emc.maricopa.edu/faculty/farabee/biobk/biobookintegusys.html>>.
- "Integumentary System." *Division of Life Sciences: Rutgers University*. n.d. Web. 17 Dec. 2010. <<http://lifesci.rutgers.edu/~babiartz/integ.htm>>.
- Martin, Terry R., and David Shier. *Hole's Human Anatomy & Physiology*. Boston: McGraw Hill Higher Education, 2007. Print.
- "Melanoma." *National Institutes of Health*. n.d. Web. 07 January 2011. <<http://www.nlm.nih.gov/medlineplus/melanoma.html>>.
- Starr, C., Taggart, R., Evers, C., and Starr, L. *Biology: The Unity and Diversity of Life*. Belmont: Brooks/Cole, 2010. Print.
- "Understanding Melanoma." *Skin Cancer Foundation*. n.d. Web 06 January 2011. <<http://www.skincancer.org/melanoma/All-Pages.html>>.
- Wrenn, Eric A. "Integumentary System." *University of Pittsburgh*. n.d. Web. 17 Dec. 2010. <<http://www.pitt.edu/~anat/Other/Integument/Integ.htm>>.

Acne

Acne forms when bacteria becomes caught in a plug. Plugs are formed when the hair, skin cells, and sebum bunch together. Acne only grows when the plug starts to break and deteriorate, giving the trapped bacteria more room to divide and grow. Acne can range anywhere from a pimple here or there to a severe acne breakout that requires medical treatment (Acne).

The causes of acne are unknown, although there are many factors that doctors think may play a role in the development of acne. Doctors believe that hormone level changes, oily makeup, and certain medicines may cause acne. Acne is easy to notice and diagnose because it is easily recognized visually. Some signs and symptoms include reddening of the skin, small bumps, and sensitive skin around the red areas (Acne).

Acne is a very prevalent disease. Over 80% of Americans between the ages of 11-30 have had an acne breakout at some point in their lives. It is one of the most common diseases known to humans (Acne). Acne can be treated in many ways. Some treatments include over-the-counter medication, prescription pills, facial washes, facial creams, and facial wipes. The most effective treatments are doctor prescribed treatments. Doctors may prescribe more than one treatment depending on the severity of the case (Acne).

The Reproductive System

By: Sam
Josh

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and Luke

Sierra

Gonorrhea

Gonorrhea is a sexually transmitted disease (STD), which mostly affects the reproductive system. It is caused by bacteria called *Neisseria gonorrhoeae*, which grow very well in the cervix, uterus, and fallopian tubes in women. It also affects the male reproductive system in the urethra. Gonorrhea can also develop in the mouth, throat, eyes, and anus (Gonorrhea).

Gonorrhea is a very common disease and any sexually active person can get it. More than 700,000 people get gonorrhea every year in the United States. Gonorrhea affects teens the most, according to the Center for Disease Control and Prevention (Gonorrhea).

Symptoms of gonorrhea can be of a wide range, and some people don't even show signs of it. In men the symptoms can include a burning sensation when urinating; a white, yellow, or green discharge from the penis; and swollen and painful testicles. For some men, it can cause epididymitis, which is a painful disease that can lead to infertility. In women, gonorrhea has similar symptoms. These symptoms can include a burning sensation when urinating, discharge from the vagina, and sometimes bleeding between periods. If not treated, it can lead to infertility in both males and females. Gonorrhea can also spread to the anus, which has similar symptoms: bleeding, itching, and sometimes discharge from the anus. There can also be painful bowel movements (Gonorrhea).

Gonorrhea can be cured with antibiotics. As time goes on, and more people are treated with current antibiotics, the surviving strains of gonorrhea are becoming harder and harder to treat. There are still remaining antibiotics that are effective, but it is very important that the infected person takes all of the prescribed antibiotics, to kill the infection (Gonorrhea).

The most effective way to prevent gonorrhea is to abstain from sexual activity. Another option is to use latex condoms or other forms of protection when having sexual intercourse, and to use them correctly (Gonorrhea).

The male and female reproductive systems are responsible for reproduction and producing the hormones responsible for reproduction. Reproduction is necessary for the continuation of human life. Reproduction is not possible until a person has gone through puberty. Puberty is a time when children, both male and female, start to develop the physical characteristics of an adult (Bronson 452).

The female reproductive system is responsible for nourishing developing fetuses and producing female sex hormones. Its main responsibility is to store human eggs (ova) until they are fertilized by male sperm (Bronson 452). The female reproductive system is capable of reproduction starting after puberty and ending after menopause, when a female is no longer able to reproduce.

The male reproductive system is responsible for two things: creating the male sex hormone (testosterone), and transferring sperm to the female reproductive system (Bronson 446). The male reproductive system does not start to produce sperm until a male hits puberty. Once this stage in life occurs, males can produce millions of sperm (Bronson 442).

The organs of the female reproductive system are the ovaries, the fallopian tubes, the uterus, the cervix and the vagina. The ovaries hold about 400,000 eggs (Restak 302). The organs in the male reproductive system are the penis, accessory glands, urethra, epididymis, vas deferens, testicles, and the scrotum (Marieb 546-9).

The Female Reproductive System

Ovarian Cysts

An ovarian cyst is a sac of fluid that can form on the ovary. In most women, it occurs between puberty and the mid-40's. Ovarian Cysts occur when the ovarian follicle (the sac that holds the egg) does not break open to release the egg; these sacs then continue to enlarge and can grow to be from 5-10 cm in size (Nolan, Ovarian Cysts).

The most noticeable symptom of an ovarian cyst is pain in either the back or abdomen. Though they are painful, ovarian cysts are benign, meaning not cancerous. These cysts also can lead to irregular periods. For most women, the cysts usually go away in about two months and do not usually require treatment. However, if an ovarian cyst ruptures or does not go away, surgery may be necessary. Prevention is easier and that can be accomplished by taking birth control pills. Nothing compares to regular check-ups, though, because doctors can run tests to make sure that the cyst is of manageable size. Doctors may provide treatments or recommend surgery, if the case is more serious (Nolan, Ovarian Cysts).



The female reproductive system holds and releases the eggs or ova. The egg starts in one of the ovaries, which are two "female sex glands that store the ova and produce female sex hormones" (Bronson 452). Once a month, a woman's ovary releases one mature egg. This process of releasing an egg is called ovulation. The egg then travels down the fallopian tubes to the uterus. The uterus is a hollow, pear-shaped organ where a baby will develop if the egg is fertilized or united with a male sperm (Bronson 452). After ovulation, the uterine lining builds up in order to support a fertilized egg, if necessary.

If the egg isn't fertilized, a baby doesn't develop and the egg dissolves. Menstruation then occurs, which is when the lining of the uterus breaks down, and the blood and tissue exit the body through the vagina. The vagina is the tube that connects the uterus to the outside of the body. If the egg is fertilized, an embryo develops, which will then develop into a baby. At birth, the baby travels through the vagina to the outside of the body (Restak 305).

Human Papillomavirus (HPV)

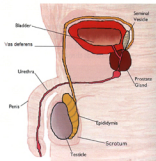
Human papillomavirus, also known as HPV, is an infectious disease. It is considered a sexually transmitted disease or STD because it is passed through sexual activity. There are more than 40 types of HPV. It is possible to get more than one type. Most people who have it are not even aware of it. HPV is usually not recognized immediately because there are few symptoms. Certain types of HPV cause genital warts. Different medications can help the symptoms of HPV, but since it is a virus, it cannot be cured (STD Facts).

Researchers have found connections between HPV and cancer. Some types of HPV can cause abnormal changes to some cells in the body, causing cancer. If certain types of HPV are acquired, the chance of getting cancer of the head, neck or genitals increases. Forty percent of females who have HPV get cervical cancer. There is a vaccine that helps prevent boys and girls from getting HPV. The types of HPV that cause cancer are totally separate from the types that cause warts, but it is possible get more than one type at a time (Shier et. al, 869).

The Male Reproductive System

The male reproductive system, as its name implies, is the male version of the system in charge of the reproduction of humans. The purpose of the system is to produce sperm to pass the person's DNA to his offspring. The reproductive system is broken up into nine different parts: the cowper's glands, epididymis, penis, prostate, seminal vesicles, scrotum, testes/testicles, urethra, and the vas deferens.

During puberty, sperm is produced and the testicle enlarges, along with growing pubic hair. The testes/testicles are also the organs that make sperm. They make the male sex hormone testosterone. It is normal for the testicles to be slightly different in size. The scrotum is a soft sac that contains and protects the testicles. The epididymis is a coiled tube that stores the sperm. The vas deferens are narrow tubes from the epididymis to the prostate gland. The prostate gland and cowper's glands make fluid that becomes part of semen. The seminal vesicle provides fluid filled with nutrients to the sperm. The urethra is a thin tube running from the bladder through the penis. The penis is an external organ with a tube in the center of it called the urethra (Iazzetti).



Testicular Cancer

Testicular cancer is a cancer that develops in or on the testicles. About 8,000 men are diagnosed with testicular cancer each year. Around four hundred men die from testicular cancer each year, most of which are between the ages of 20 and 40. Testicular cancer is the most common form of cancer for 15-35 year old men (Testicular Cancer: Question and Answer). The two main forms of testicular cancer are seminoma and nonseminoma. Seminoma is a cancer that forms in the testicle while nonseminoma is multiple groups of testicular cancers that develop in the germs that develop into sperm and is named for the type of cell it is (Testicular Cancer: Question and Answer).

Testicular cancer is found mainly in men who have abnormal kidneys or male reproductive organs. Also, if they had un-descended testicles or the testicles did not descend into the scrotum properly, they will be at an increased risk. Most of the men with testicular cancer find out about it through self-exams or a doctor may find it during normal physical checkups. Having testicular cancer may result in different symptoms including pain and/or discomfort in the scrotum, a lump that swells on the testicle that does not cause pain, or heaviness of the scrotum (Testicular Cancer: Question and Answer).

Depending on the symptoms, testicular cancer can be treated either by radiation therapy and/or by chemotherapy, along with surgery. Surgery involves removing the testicle. A man may still have children with at least one healthy testicle. Radiation therapy uses high-energy rays to eliminate cancer or shrink the tumor (Testicular Cancer: Question and Answer). Chemotherapy, when used to fight testicular cancer, is an anticancer drug. The drug is given to a patient by injection into a vein. Just like radiation therapy, is usually given after surgery to eliminate any of the cancer cells left behind (Testicular Cancer: Question and Answer).

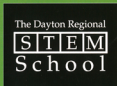
The pathway of the male reproductive system follows the path of sperm. Sperm is created in the testes, also known as the testicles. It is then transferred to the epididymis, a comma-shaped structure that sits on top of the testes, to be stored (Dugdale). The sperm is then transferred through the vas deferens. The sperm then travel past the seminal vesicles and the Cowper's glands. These glands produce liquids that nourish the sperm. The sperm and these nourishing liquids now travel past the prostate gland, which secretes a substance that mixes with the sperm and the other liquids, creating semen. The semen now goes to the urethra. The urethra is a tube similar to the vas deferens, but it extends through the penis outside the body. It takes the sperm out of the body through the penis (Jazzetti 151, 154).

Genital Herpes

Genital herpes or herpes simplex virus (HSV) is a highly contagious sexually transmitted disease (STD). There are two types: Type 1 (HSV-1) and Type 2 (HSV-2). Type 2 is most commonly found in the genitals, whereas Type 1 is commonly found in the mouth. The Center for Disease Control and Prevention claims that genital herpes affects about 16.2% of Americans or around one in every six Americans between the ages of 14 and 49. HSV-2 causes one or more painful blisters on the genitals. The blisters will take anywhere from 1 to 4 weeks to heal. During the first outbreak, the blister should heal itself in about 1 to 4 weeks with further outbreaks generally lasting for shorter periods of time. The causes of genital herpes are any genital contact with someone who is infected with HSV-2. Currently, there is no known cure for genital herpes, but there are medicines that will give the patients fewer outbreaks, and will decrease the pain and time in which the outbreak is present (STD Facts - Genital Herpes).

Works Cited

- Alcama, Edward. "The Male Reproductive System." *Biology Coloring Workbook*. New York: Random House, 1997. 272. Print.
- Bronson, Mary. *Glencoe Health*. Columbus: McGraw Hill, 2001. Print.
- Centers for Disease Control and Prevention. *Centers for Disease Control and Prevention*. n.d. Web. 3 Jan. 2011. <<http://cdc.gov/>>
- Dugdale, David C. "Pathway of Sperm." *University of Maryland Medical Center*. 8 Feb. 2008. Web. 17 Dec. 2010. <umm.edu/imagepages/19073.htm>.
- "Gonorrhea - CDC Fact Sheet." *Centers for Disease Control and Prevention*. 01 Sept. 2010. Web. 03 Jan. 2011. <<http://www.cdc.gov/std/gonorrhea/default.htm>>.
- Jazzetti, Giovanni, and Enrico Rigutti. "Reproduction." *Human anatomy*. Cobham, Surrey: Taj Books, 2006. 151. Print.
- Nolan, C. and Saladin, K. *Clinical Applications Manual to accompany Anatomy and Physiology: The Unity of Form and Function*. 169. 2001: New York, NY. Print.
- "Ovarian Cysts: FAQs." *National Women's Health Information Center*. Sept. 2008. Web. 07 Jan. 2011. <[womenshealth.gov/faq/ovarian-cysts.cfm](http://www.womenshealth.gov/faq/ovarian-cysts.cfm)>
- Restak, Richard, et. al. *Body: The Complete Human*. Washington D.C.: National Geographic, 2007. Print.
- Shier, Butler, and Lewis, Ricki. *Hole's Human Anatomy & Physiology*. New York: McGraw Hill, 2010. Print.
- "STD Facts - HPV." *Centers for Disease Control and Prevention*. 24 Nov. 2009. Web. 18 Jan. 2011. <<http://www.cdc.gov/std/HPV/STDFact-HPV.htm>>.
- "STD Facts - Genital Herpes." *Centers for Disease Control and Prevention*. n.d. Web. 07 Jan. 2011. <<http://www.cdc.gov/std/Herpes/STDFact-Herpes.htm>>.
- "Testicular Cancer: Question and Answer." *National Cancer Institute*. January 6, 2011. Web. May 24, 2004. <cancer.gov/cancertopics/factsheet/Sites-Types/testicular.htm>
- Wile, Jay and Shannon, Marilyn: p. 483-485. "Reproduction." *The Human Body*. Anderson IN: Apologia Educational Ministries, Inc.



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