**Human Anatomy**

Students Name

Institution

Professor

Course

Due Date

**Anatomy**

The word anatomy is of Greek origin, from the word *anatome* that directly translates to ‘to dissect’. Anatomy is one of the fields in biology and medicine, focusing on identifying and studying structures of the body and their relations to one another. This field existed more than 2000 years ago in Greece and is now widely divided to three; human anatomy, animal anatomy and plant anatomy. Focusing on human anatomy, it narrows down to gross and microscopic anatomy as major subspecialties and various comparatively minor ones such as developmental anatomy and embryology.

Gross anatomy (also known as topographic or macro anatomy) involves studying structures that can be seen with the naked eye. The structures are not microscopic. On the other hand, microscopic anatomy (also known as histology) involves finer details in that it is the study of cellular and tissue components of living organism. It requires acquisition of thin transparent tissue specimen from living organism that is examined under magnifying lenses such as microscopes. Dyes are used on the specimen to enhance visibility. Histology has wide variety of uses, from teaching students, diagnosis, autopsy to archeology.

Gross anatomy is organized into major body systems for systematic studying. They include skeletal, muscular lymphatic, respiratory, digestive, nervous, endocrine, cardiovascular, urinary, reproductive and integumentary systems. These systems, dependent on each other, work together to achieve a steady equilibrium in the body function, a state known as homeostasis (Tortora & Derrickson, 2019). This is what enables the body’s internal environment to be maintained in the the physiological range despite the continuous changes in the external environment.

To better understand anatomy, it is important to first look at the basic structural organization of a living organism. Beginning with atoms, molecules and compounds that together make a cell which is the basic unit of the human body. Cellular level is the smallest independent level, carrying out biochemical activities that will collectively drive the functioning of the living organism (Tortora & Derrickson, 2019). A group of same cells with a specific function make up a tissue. Tissues are divided into muscle, epithelial, nerve, and connective depending on their distinct characteristics and functions (Behnke & Plant, 2021). Two or more tissue types that work harmoniously towards a certain function form an organ. A system is the next level containing multiple organs that function together to achieve a specific function. For instance; digestive system contains many organs such as the mouth esophagus, stomach liver, etc. that work together to digest food after ingestion. The final level is the organism level made up of the multiple systems.

The human body has 11 organ systems each having distinct function for the survival of the species. Which means a defect in one of the systems can impact the normal functioning of the organism as a whole and should be corrected quickly before it causes much damage.

The integumentary system is composed of hair, skin nails and glands. It is responsible for shielding the body against mechanical damage, maintaining the body temperature at optimum levels (around 36 degrees Celsius), and housing tactile receptors, baroreceptors and nociceptors.

Bones cartilage ligaments and tendons are part of the skeletal system. These are essential for weight bearing, shielding internal body organs especially the delicate viscera, facilitating movement, and acting as storage for minerals such as calcium and phosphorus (Behnke & Plant, 2021)

Muscular system is composed of smooth, skeletal and cardiac muscles, that aid in both voluntary and involuntary movement. Metabolic activities of the muscles generate heat in the body. They also play a role in maintenance of posture.

Brain, spinal cord and nerves are components of the nervous system. They control the functions of the body, convey information through electrical signals thus helping perceive sensations, control motor functions and cognitive functions.

Cardiovascular system comprises of the heart, blood vessels and the heart. The heart pumps blood that passes through the blood vessels to all the body organs. Blood transports respiratory gases, metabolic wastes, hormones to their target sites and nutrients after they are absorbed from the digestive tract. Blood also transports immune cells to the site of infection or injury, maintains proper electrolyte balance, optimum pH and temp regulation.

Reproductive system has different components for males and females. In males, the system comprises of testes, seminal vesicle, prostate, penis, vas deferens, urethra and bulbourethral glands. In females it comprises of ovaries, fallopian tubes, uterus, vulva, mons pubis, labia and clitoris. These organs work to produce gametes, fertilize them, harbor organism during prenatal development and eventually give rise to off spring.

Endocrine system is made up of glands that synthesize hormones to maintain homeostasis. Some of these glands include thyroid, parathyroid, pituitary, endocrine pancreas, adrenal and reproductive glands. Hypothalamus in the brain convey messages to the pituitary through hormones or nerve impulses, regulating release of pituitary hormones. The hormones reach virtually all the body cells because they circulate in the blood stream. However, hormones bind to specific receptors on target tissues to exert function. This system is responsible for regulating body functions such as metabolism, growth and reproduction.

Lymphatic organs such as spleen and thymus, lymph nodes and lymph vessels are part of the lymphatic system. Lymphatic organs filter blood to remove foreign particles and defected blood cells. Interstitial fluid is returned into the blood stream specifically to the venous circulation.

Respiratory system helps in gaseous exchange between the body and the atmosphere. It is responsible for the uptake of inhaled oxygen into the blood stream and release of carbon (iv) oxide into the exhaled air. The organs contained in the system are lungs, trachea, bronchi and diaphragm.

Organs of the digestive system include mouth, esophagus, stomach, intestines, liver and pancreas. This system helps body acquire nutrients and energy from ingested food and defecates waste material.

Kidneys, ureters, bladder, and urethra are part of the urinary system. Excretion of waste products, blood filtration, electrolyte balance, and regulation of blood pressure are the part of the system’s functions.

Interactions between these systems is necessary to keep the body at equilibrium. This is made possible by the endocrine system and the autonomic nervous system. The autonomic nervous system controls the heart’s pumping activity, (specifically the heart rate), blood flow and digestion. These are the involuntary body functions. Neurotransmitters from nerves are used to interact with other systems and control their actions. The endocrine system is controlled primarily by the hypothalamus to release hormones into the blood stream. The hypothalamus secretes hormones to the pituitary gland that stimulate it to produce various hormones. Pituitary hormones travel thru the blood stream to various endocrine glands such as thyroid, and either inhibit or stimulate secretion of the various hormones from the glands. Thyroid gland, for example, when acted upon by thyroid stimulating hormone, (pituitary hormone), increases metabolism in target cells.

Organ systems interactions are very important for human survival. An example is seen in the body’s action to digest food. When one ingest food, the digestive system requires adequate perfusion to break down food and absorb nutrients. Arrival of food in the gut generates nerve impulses that are propelled to the brain. The brain is responsible for the increased cardiovascular activity and vasodilation of blood vessels that supply organs of digestive system. The smooth muscles of the digestive tract, which are part of the muscular system have rhythmically contract to push food down the gut. Absorption of nutrients majorly occurs in the intestines and the remaining waste material excreted as feces.

Understanding anatomy is important in disease diagnosis and treatment. Most of the times presence disease affects anatomy. A disease that causes blockage of blood vessels causes tissue death due to hypoxia organs with necrotized tissues can be visible anatomically hence help in diagnosis. Anatomical changes, may also cause a disease. Mechanical trauma to the skin limits its function as a shield against infection. It becomes easier for pathogens to enter the body. Therefore, various methods of viewing internal organs without technical procedures such as surgeries have been developed such X-rays and ultrasonography to aid in diagnosis and monitoring treatment. These can be used to visualize skeletal injuries.

In conclusion, anatomy is an important field in biology that helps us understand the complexity in the human body and a basis for comprehending its physiology. The organ systems have important functions and therefore essential maintenance of them through exercising, consistent checkup is good for health improvement. Each system is crucial in maintaining homeostasis and ensuring overall body functioning. They communicate with each other through hormones and the nervous system for proper coordination to maintain a healthy being. The study of anatomy has facilitated breakthrough in various fields such as medicine and archeology.

**References**

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Tortora, G. J., & Derrickson, B. H. (2019). *Introduction to the human body*. John Wiley & Sons.