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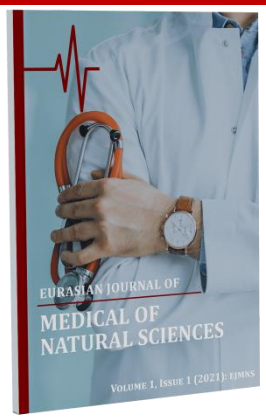

HUMAN ANATOMY

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ABSTRACT

This professional article embarks on a comprehensive exploration of human anatomy, unraveling the intricacies of the body's structure and organization. From the macroscopic view of organs and systems to the microscopic realm of cells and tissues, the article navigates through the complexities of the human form. Emphasizing the integration of anatomy with clinical applications, it sheds light on the significance of understanding human anatomy in medical practice, research, and education.

Introduction: The human body is a complex and intricate piece of engineering in which every structure plays a precise role. There are approximately 200 bones, 650 muscles, 79 organs, and enough blood vessels to circle the Earth twice!

In this article, we'll take a look at what this subject means and how you can tackle it in the most logical way.

First things first, what is anatomy and where did it all begin? The term 'anatomy' derives from ancient Greek meaning 'dissection' or 'to dissect' and involves the study of the structure of the human body. This 2000 year old scientific discipline sprung to life in Ancient Egypt and was increasingly developed across the ages by anatomy heavyweights like Galen, Leonardo da Vinci, Vesalius, and many others.

Learning such a complex subject can only be accomplished by taking small and logical steps. What's the best place to start? By mastering the basics, such as directions, movements, body planes, and overall anatomical terminology.

In a nutshell, three main anatomical planes divide the body into frontal, lateral, and transverse views. These views showcase the position and relations between anatomical structures, which are described by precise terms, for example superior, inferior, lateral, and many others. Movements can also be described by standardly accepted terms, such as flexion and extension. With this vocabulary up our sleeves, it's time to dive deeper into the subject

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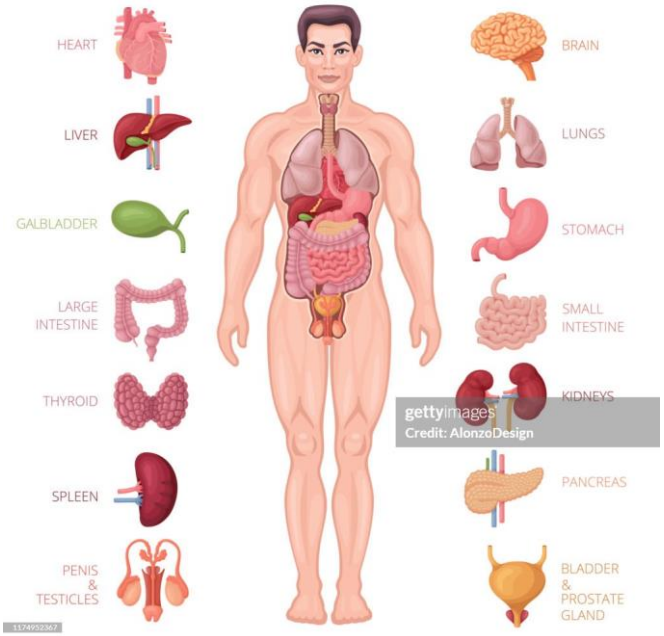
and find out more about its learning approaches. Human anatomy consists of two main divisions:

Macroscopic or gross anatomy. Microscopic anatomy



Regional anatomy

Let's begin by taking a look at macroscopic or gross anatomy. As the name suggests, this branch deals with large structures that are mostly seen with the naked eye. It describes where every human body structure is located (topography), similar to how a geographic map of an area shows all the landmarks in a particular perimeter. Not only that, but it also describes how the structures are connected to each other, their starting and end points, their layering, and so on. There are two fundamental approaches to studying gross anatomy: a regional and a systemic one.

Regional anatomy organizes the body into several body parts or regions: upper limbs, lower limbs, trunk (thorax, abdomen, pelvis, back), head, and neck. This approach divides teaching and learning into discrete regional didactic areas, each one containing its respective bones, joints, muscles, arteries, veins, nerves, lymphatics, and organs. Let's take a look at all these regions and learn some basics about each one.

Upper limb

Let's begin by talking about the extremities, the structures responsible for interacting with the environment, locomotion, weight bearing, and many more. The upper limb consists of four main parts: shoulder, arm, forearm, and hand. In turn, the mobility of the limb is provided by the shoulder, elbow, and wrist joints onto which various muscles act. However, their action depends on innervation, and their viability on proper nutrition and blood supply.

Lower limb

The lower limb has four main parts, called the hip, thigh, leg, and foot. The flexibility is provided by the hip, knee, and ankle joints which allow you to kick, jump, squat, and shake it on the dance floor. The lower extremity contains some of the most powerful muscles in the human body, which are organized into various compartments. Significant vessels like

the femoral artery and the longest nerve in the human body, the sciatic nerve, supply this limb.

Trunk and back

The upper and lower limbs are attached to an anatomical structure called the trunk, commonly known as the torso. The trunk is composed of several regions called the thorax, abdomen, pelvis, and back. Running through the center of the back is the vertebral column which contains the spinal cord. Large back muscles such as the trapezius, latissimus dorsi, and rhomboids as well as deeper, smaller ones are attached to various points of the vertebral column. The musculature of the back helps you maintain your posture, bend your trunk, move your arms, shrug your shoulders, and much more.

Large abdominal muscles, for example the rectus abdominis also contribute to the trunk. This is the famous 'six-pack' that many fitness enthusiasts strive for.

Thorax

In the previous section we've learned about the regions comprising the trunk, three of which were the thorax, abdomen, and pelvis. Let's discuss each one very briefly. You've probably heard the expression 'my heart is beating out of my chest'. However, what is the chest? In the world of anatomy, the chest is called the thorax and it is located between the neck and the abdomen. This region can be considered the epicentre of the circulatory system and the primary player in breathing, the latter function being mainly controlled by the diaphragm. The thoracic wall protects the internal contents and also supports the breasts.

The thorax is as complex on the inside as it is on the outside. Internally it consists of the thoracic cavity that, first and foremost, houses the lungs. These two vital organs are enveloped by membranes called the pleura and they are responsible for breathing. Altogether, the lungs occupy a surface area equivalent to the size of a tennis court. Sandwiched between the lungs is the mediastinum, a space that contains blood vessels, nerves, lymphatics, and most importantly, the heart. This vital organ is enclosed inside a sac called the pericardium and pumps 5 liters of blood every minute of your waking day through the entire body.

Abdomen and pelvis

Continuing inferiorly to the thorax, we come across the abdomen and pelvis. These two regions are often taught separately for didactic purposes, but their contents blend together into one large abdominopelvic cavity. Internally, it is lined by a membrane called the peritoneum which wraps around many structures, making them intraperitoneal. The ones located outside the membrane are named extraperitoneal. The largest organ system located here is the gastrointestinal tract. The intestines, which are mainly responsible for absorption, snail through these regions for a total of 7.5 meters, the equivalent of four human beings stacked upright on top of each other.

Four accessory organs that help the gastrointestinal tract to perform its functions are located inside the abdominopelvic cavity. These are the liver, gallbladder, pancreas, and spleen. They help especially with the digestion of proteins and fats, as well as metabolic processing.

It's easy to think that the abdomen and pelvis are overfilled with the gastrointestinal tract, but there's even more! Organs like the kidneys, ureters, urinary bladder,

and female and male reproductive structures are also located here. They form entire systems that work in unison to ensure that you eliminate wastes, react to stressful or scary situations, and reproduce.

Your abdomen and pelvis are the home to some of the body's largest blood vessels. Since they supply major organs and even more distal body parts, they are large caliber structures transporting liters of blood. For example, if either the aorta or a renal artery ruptures during a traumatic event, the person would die in several minutes. Important nerves can also be found in these regions, controlling the activity of the abdominopelvic organs and allowing you to feel pain.

Head and neck

Apart from the appendages, the trunk extends into two additional regions that function in perfect unison: a robust and flexible neck that sustains a five-kilogram head, which encompasses the brain. It's crucial to master these areas because the neck is where vital blood vessels and nerves pass through on their journey from the head to the rest of the body.

After reviewing some fundamentals, let's concentrate on the head. It is made up of a number of connected bones that make up the cranium, or bony skull, some of which form the facial skeleton and some of which enclose the brain. The eyes, nose, ears, and mouth are a few of the structures that are connected to the head. They can do many things, like see, smell, hear, eat, and speak, to name just a few.

Do you know why, after crying, you blow your nose or why you can taste nasal drops? This is a result of some of the aforementioned structures speaking with one another directly. Find out how by reading on!

The neck is a passageway connecting the thorax and head. The pharynx, also referred to as the throat, remains into the nasal and oral cavities. Liquids, food, and air can move more easily through this muscular passage and toward your trachea (windpipe) and esophagus (food pipe). The neck contains numerous cartilages, muscles, organs, blood vessels, and nerves in addition to the pharynx. The larynx, or voice box, the thyroid, the hyoid muscles, the carotid arteries, the jugular veins, and the cervical plexus constitute the important structures.

Neuroanatomy

It is crucial that one comprehends the anatomy of every part of the human body. But how does the brain send signals to other areas, like the hand, to initiate a movement or detect objects? via nerves, a notion that neuroanatomy explains. The human body's nervous system regulates all internal processes. It is involved, for instance, in higher-order thinking processes like consciousness and emotional behavior as well as physiological processes like body temperature and voluntary movements.

There are two structural divisions of the nervous system: the peripheral and the central. The brain and spinal cord, which are covered in layers known as meninges and submerged in cerebrospinal fluid, constituents of the central nervous system (CNS). The brain, which consists of the cerebrum, brainstem, cerebellum, and subcortical structures, is the master regulator of the body. The largest region of the human brain, the cerebrum is made up of five lobes and is where cognition is processed.

All regions of the brain are equally vital, though. Are you familiar with the main character which revives a patient who was in a coma or "vegetative state"? It's only the brainstem because the cerebrum isn't working properly.

The spinal cord runs through the vertebral column and is the brainstem's continuation. Cervical, thoracic, lumbar, the sacral, and coccyx are its five regions. Nerve impulses are carried to and from the periphery by spinal nerves, which protrude from the spinal cord through the vertebrae. Neuronal pathways known as tracts allow communication between the brain and spinal cord. While descending tracts move information away from the brain, ascending tracts move information from the periphery up towards the brain.

All of the brain's outermost layers are collectively referred to as the peripheral nervous system (PNS). It is composed of the 31 pairs of spinal nerves previously mentioned, all of their branches, and 12 pairs of cranial nerves. Every anatomical structure in the human body is innervated by the PNS.

The human body's regions are incredibly complex, as you can see. Starting at the top, the brain integrates and controls everything through the nervous system, while the head permits you to gather information through sensory structures in addition to other ways. Because the head rests on the neck, structures moving to and from the thorax have a path to pass through. The trunk, which consists of the thoracic, abdominal, pelvic, and back regions, is located beneath the neck. The trunk helps to support the body, makes movement easier, and shields the body's internal organs, blood vessels, and nerves, all of which are located inside the correct cavities. It has two upper and lower limbs attached to it, which enable you to move, engage with your surroundings, and perform a variety of other human activities.

Systemic anatomy

Regional anatomy, which divides our body into various regions, has been talked about. But the human body also has physiological systems, which are made up of numerous anatomical structures and span several regions. The second branch of human anatomy, known as systemic anatomy, divides the body into distinct organ systems that cooperate to perform a single task. The ten systems are named lymphatic, neurological, endocrine, circulatory, respiratory, digestive, urinary, reproductive, and musculoskeletal (skeletal, muscular).

The systemic approach, in contrast to its predecessor, separates research into domains that address particular functions as opposed to places or proximity. This method examines anatomy from a more physiological standpoint, focusing on the structures that work together to perform a single function of the body. For instance, the nervous system encompasses all of the body's nerves, which span various regions from the brain to the lower limb

Integumentary system

The skin and its related appendages, involving hair follicles, nails, sweat glands, and sebaceous glands, make up the integumentary system. It performs a number of tasks, such as protection, tactile and thermal perception, and sweating-induced temperature regulation.

Electrical impulses are carried by nerves, allowing communication between the brain, spinal cord, senses, and all unrelated anatomical structures. Through communication, humans are able to sense and feel their surroundings, think, and carry out a wide range of other expert cognitive functions.

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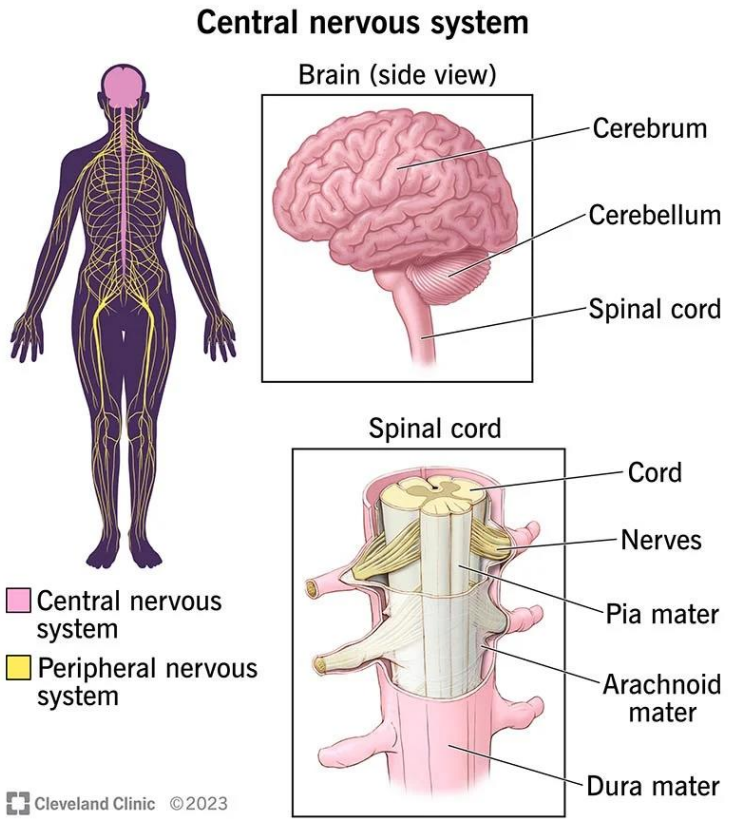

Human Anatomy: A Journey into the Architectural Marvels of the Body

Traveling through the complex terrain of human anatomy reveals the wonders that make up the body's blueprint. The goal of this article is to present a comprehensive analysis of human anatomy, covering all levels of organization, from the microscopic beauty of cells and tissues to the grandiosity of organ systems.

Macroscopic Anatomy: Looking into the Perceptible Domain

Often called gross anatomy, macroscopic anatomy examines structures that are visible to the unaided eye. The focus of this investigation is organs, each with their own forms and purposes. As we transport through the anatomical landscape, the circulatory system, respiratory system, nervous system, and others come to life.

Microscopic Anatomy: A Glimpse into Cellular Realms

Venturing into the microscopic realm, we encounter histology—the study of tissues and cells. Here, the intricacies of cell types, their functions, and the arrangement of tissues within organs become apparent. Histology serves as the bridge between macroscopic anatomy and the understanding of physiological processes at the cellular level.

Clinical Applications: Anatomy in Practice

The application of anatomical knowledge extends to the clinical realm. Clinical anatomy involves translating anatomical understanding into medical practice, aiding in the diagnosis and treatment of various health conditions. From interpreting radiological images to considering anatomical variations, clinical anatomy is pivotal in ensuring effective patient care.

Anatomy Education: Nurturing Future Practitioners

Teaching anatomy is a dynamic endeavor. This section explores innovative approaches and methodologies in anatomy education, recognizing the importance of cultivating a solid foundation for future healthcare professionals. Ethical considerations in cadaveric dissection and the integration of technology in anatomy instruction are integral components of this discussion.

Conclusion: Unveiling the Tapestry of Life

Human anatomy serves as the cornerstone of medical knowledge, offering insights into the complexities and wonders of life. This article endeavors to provide a holistic view of human anatomy, emphasizing its relevance in clinical practice, education, and the ongoing pursuit of unraveling the mysteries of the human body. As we conclude this exploration, we acknowledge the continuous evolution of anatomical understanding and its enduring significance in shaping the future of healthcare.

References:

1. Saladin, K. S. (2018). Anatomy & Physiology: The Unity of Form and Function. McGraw-Hill Education.
2. Drake, R. L., Vogl, W., & Mitchell, A. W. M. (2014). Gray's Anatomy for Students. Elsevier.
3. Standring, S. (2016). Gray's Anatomy: The Anatomical Basis of Clinical Practice. Elsevier.
4. Tortora, G. J., & Derrickson, B. (2017). Principles of Anatomy and Physiology. John Wiley & Sons.
5. Netter, F. H. (2019). Atlas of Human Anatomy. Elsevier.
6. Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2018). Essential Clinical Anatomy. Lippincott Williams & Wilkins.
7. Sadler, T. W. (2018). Langman's Medical Embryology. Wolters Kluwer.
8. Ross, M. H., & Pawlina, W. (2018). Histology: A Text and Atlas. Wolters Kluwer.
9. Drake, R. L., Vogl, W., & Mitchell, A. W. M. (2019). Gray's Atlas of Anatomy. Elsevier.
10. Snell, R. S. (2018). Clinical Anatomy by Regions. Lippincott Williams & Wilkins.
11. American Association of Neurological Surgeons. Anatomy of the Brain (https://www.aans.org/en/Patients/Neurosurgical-Conditions-and-Treatments/Anatomy-of-the-Brain). Accessed 11/12/2023.
12. Thau L, Reddy V, Singh P. Anatomy, Central Nervous System (https://www.ncbi.nlm.nih.gov/books/NBK542179/). [Updated 2022 Oct 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Accessed 11/12/2023.
13. U.S. National Cancer Institute. The Central Nervous System (https://training.seer.cancer.gov/anatomy/nervous/organization/cns.html). Accessed 11/12/2023.
14. U.S. National Institute of Mental Health. Caring For Your Mental Health (https://www.nimh.nih.gov/health/topics/caring-for-your-mental-health). Accessed 11/12/2023.