ECRONICON OPEN ACCESS

EC CLINICAL AND EXPERIMENTAL ANATOMY

Review Article

Expansive Anthropotomia- The Anatomical League

Siniša Franjić*

Faculty of Law, International University of Brcko District, Brcko, Bosnia and Herzegovina

***Corresponding Author**: Siniša Franjić, Faculty of Law, International University of Brcko District, Brcko, Bosnia and Herzegovina.

Received: April 22, 2019; **Published:** May 29, 2019

Abstract

Anatomy is a biological discipline that deals with the structure and organization of organisms. In the narrow sense, the term refers to science of the human body (anthropotomia), but in the broader sense it also includes the sciences of the system of animal bodies (zootomes) and plants (pythotomy). From the medical point of view, the anatomy consists of precise knowledge of the form, position, size, and relationship of different structures in the healthy human body.

Keywords: *Anatomy; Histology; Physiology; Human Body*

Introduction

Just as the universe is a gigantic dance of stars and planets, spinning and turning in mysterious space, so the human body is an incredibly beautiful and complex creation, with millions upon millions of cells, functioning in their dierent ways to make an integrated whole [1].

Groups of similar cells are found joined together to form tissues. Different tissues together form structures with specic functions, called organs. Organs are associated with various tubes and supporting structures in things called systems. These carry out types of work in the body, like the different departments in a company or the various goings on in a community: communication, control, energy input, waste disposal, transport, production, and so on.

Anatomy has undergone radical changes over its history, and even now its appearance varies between audiences [2]. Within academia, it has frequently been seen as the bastion of medical teaching, even as a handmaid of surgery. To the general public over recent years, it is represented by the enormously popular public exhibitions of plastinated cadavers and body parts. Increasingly within medical teaching, it has acquired a far more humanistic face, epitomized by ceremonies at the start and end of dissection to connect the dead body with the once living individual and his/her families. Modern anatomy has also developed a strong research ethos. These movements can be traced in the many editions of Gray's Anatomy, from 1858 to the present day. However, the humanistic side of anatomy reminds us that anatomy is not merely a science, since its ethical dimensions are legion as it has transformed from a dubiously moral and barely legal activity to one that now aims to manifest the highest of ethical standards. Nevertheless, it continues to have challenging dimensions, such as its ongoing dependence upon the use of unclaimed bodies in many societies. These challenges are reminders that anatomy does not remain stationary.

There has always been a scientific basis to learning human anatomy, even if this existed in the minds of only some teachers and investigators, and quite rarely indeed in the minds of students [3]. The main way of teaching and learning human anatomy was not really science, but a gigantic task of memory, of lists of structures, of tables of relationships,of maps of the body, of origins and insertions of muscles, of artificial gateways to regions, even of mnemonics, and so on. These were, and still are, very useful aids that have passed many students through their examinations. In recent years, however, there have been major changes in the sciences underlying human anatomy. These changes have been extensive enough that they can now become the primary components for understanding human structure. They have transformed the original older disciplines of embryology, comparative anatomy, functional morphology, neuroanatomy and evolution.

Structure of the human body

Anatomy and physiology is the study of the human body [4]. Anatomy is concerned with the structure of a part. For example, the stomach is a J-shaped, pouchlike organ. The stomach wall has thick folds, which disappear as the stomach expands to increase its capacity. Physiology is concerned with the function of a part. For example, the stomach temporarily stores food, secretes digestive juices, and passes on partially digested food to the small intestine.

Anatomy and physiology are closely connected in that the structure of an organ suits its function. For example, the stomach's pouchlike shape and ability to expand are suitable to its function of storing food. In addition, the microscopic structure of the stomach wall is suitable to its secretion of digestive juices.

The structure of the body can be studied at different levels of organization. First, all substances, including body parts, are composed of chemicals made up of submicroscopic particles called atoms. Atoms join to form molecules, which can in turn join to form macromolecules. For example, molecules called amino acids join to form a macromolecule called protein, which makes up the bulk of our muscles.

Macromolecules are found in all cells, the basic units of all living things. Within cells are organelles, tiny structures that perform cellular functions. For example, the organelle called the nucleus is especially concerned with cell reproduction; another organelle, called the mitochondrion, supplies the cell with energy.

Tissues are the next level of organization. A tissue is composed of similar types of cells and performs a specific function. An organis composed of several types of tissues and performs a particular function within an organ system. For example, the stomach is an organ that is a part of the digestive system. It has a specific role in this system, whose overall function is to supply the body with the nutrients needed for growth and repair. The other systems of the body also have specific functions.

Histology

Histology is a term that refers to microscopic anatomy, or the structure (morphology) of something as it appears via a microscope [5]. Specifically, the term "microscope" here refers to the typical "light" microscope, as opposed to an electron microscope, which is used to visualize "ultrastructural anatomy," meaning that which is smaller than what we can see with a normal light microscope. Under the light microscope, we are able to visualize the cells of the body and, in most instances, we are able to see individual cells, including the cell borders (cell membranes). Most cells in the body contain a single "nucleus" (plural: "nuclei") which contains DNA and is surrounded by a nuclear membrane (border), while the remainder of the cell substance surrounding the nucleus is referred to as the cytoplasm. Under the microscope, we are able to see cells, including the nuclei and the cytoplasm. There are many different types of cells within our bodies. Anatomists and doctors categorize cell types based on their microscopic appearance and their function. A pathologist is able to determine the type of cell that is seen under the microscope based on the cell's shape, size, character, location, arrangement with other cells, and various staining characteristics. Pathologists use many different types of stains in order to visualize the cells; some can be very helpful in identifying cell types; the "usual" stain is called hematoxylin and eosin ("H&E").

Physiology

Physiology is a term used to describe how a living organism functions, not only from a structural or anatomic standpoint, but also from a biochemical, nutritional, enzymatic, hormonal, electrical and molecular standpoint [5]. It describes how our cells, tissues, and organs "communicate" with one another, how they interact with each other and their environment, and how they work.

While anatomy and histology describe what a particular organ, tissue, or cell looks like (its "morphology"), physiology describes what that organ, tissue, or cell actually does (its function). While the anatomical appearance of a tissue or organ can sometimes give us an idea of how the particular structure is functioning, this is not always the case. Many diseases have specific anatomic (gross and microscopic) features, as well as physiologic derangements; however, there are some diseases that are essentially purely physiologic. The cells are not functioning normally, but there is no anatomic abnormality that can be identified grossly or microscopically. For this reason, not every cause of death (natural or non-natural) can be identified by gross or microscopic findings at autopsy.

Classification of tissues is based on embryonic development, structural organization, and functional properties [6]. Epithelial tissue, or epithelium, embryonically derives from ectoderm, mesoderm, and endoderm; it covers body and organ surfaces, lines body cavities and lumina (the hollow portions of body organs or vessels), and forms various glands. Epithelial tissue is involved in protection, absorption, excretion, and secretion. Connective tissue derives from mesoderm; it binds, supports, and protects body parts. Muscle tissue derives from mesoderm; it contracts to enable locomotion and movement within the body. Nervous tissue derives from ectoderm; it initiates and conducts nerve impulses that coordinate body activities.

Diseases

Some diseases are classied as being organic-these are the ones where it is possible to see a definite change in the tissues and cells, for example, ulceration or inflammation [1]. Some diseases are not possible (yet) to see in this way-these are called inorganic disease. There was a time when most were lumped into a strange category called "all in the mind," which at the same time seemed to mean they didn't really exist. As physical imaging and other diagnostic techniques have become more sophisticated, and more understanding of the physiology of stress has emerged, things have been changing. There is a developing movement toward holism in orthodox medicine (at any rate, they certainly try and use the word a lot!); any good anatomy, physiology, and pathology textbook, for example, now takes a look at how the systems interrelate rather than simply looking at them as separate operations.

Having said that, the most common way of classifying diseases is in terms of the body system that they primarily involve. This means there is a tendency to compartmentalize pathology. The health services are also compartmentalized-you will see one doctor for your leg, another for your gut, and still another for your shoulder. Joined-up medicine has not arrived quite yet. Of course, GPs (general practitioners) are by definition generalists. And while, say, kidney disease is classed under nephrology, specialists in this area will be aware of the effect of, and effects on, the rest of the body. As a whole, still, orthodox doctors operate as if they are unaware of subtle interactions-especially of diet, stress, and lifestyle-and only consider gross, measurable imbalances as having importance.

The problem with Western medicine is not with pathology; it is more with the fact that it tends to see the first-line changes in tissues as being the disease. A list of "causes" reveals only shallow probing into whys-rather, it shows a series of hows. For example, one cause of disease is inammation, but inammation as a cause of disease (and there are very many inammatory diseases) really just describes what is going on in the tissues.

Medical education

Medicine is the science and practice of the diagnosis, treatment, and prevention of disease, and most medical information is about our human body [7]. Medical information is employed in different scenarios, such as education, training, diagnosis, surgery, etc. As the computing technologies develop, more information is digitized from the physical world, and then researchers work on how to process and show them back to the user, enabling the user to perceive and interact with the information naturally and effectively. Perception and interaction with different media and objects are the fundamental human activities, and they are user specific.

Anatomical education is an important content of every curriculum and starts already very early in school, to form a good understanding of the body and improve the general population's health awareness. With the advent of the plethora of exciting technological advancements there should be no reason not to include these for the creation of new education paradigms for medical learning. As such, this chapter presents an overview of the fascinating novel research, which is being undertaken in this area.

Traditional medical education learning is classified into three categories: cadaver, model, and textbook. Although technology has advanced significantly in the last decades, school education still mostly uses the same methods to convey anatomical knowledge. Typically, the information is collected in printed books like anatomy atlases, displayed in the form of charts and diagrams. Those diagrams provide a simple and wellknown method to illustrate form and appearance of organs, having the advantage that the user is accustomed to such methods of display. However, there exist several downsides to this method. First of all, the view is limited to a selected few different cross-sections the author chose to present. This may not be sufficient in some cases to fully convey how an organ is located relative to its surroundings since occlusions limit the possibilities to visualize these spatial relations. Another problem is that often the organs are only depicted schematically by leaving out details or distorting tissue colors; thus, giving only a coarse impression on how the organ actually looks like in reality. For example, it is difficult to interpret the spatial and physical characteristics of anatomy by observing two-dimensional images, diagrams, or photographs.

Human anatomy and physiology are incredibly complex [8]. Much is unknown-no one really understands the rest. And important advances in human biology are as likely to come from careful studies of yeast, bacteria, worms, fruit flies, corn, squid, toads or mice as from any direct examination of human function and malfunction. Indeed, such investigations regularly reconfirm how inextricably humans are entangled with the natural world from which they derive-which suggests that we really cannot know what we are without knowing how we got that way. But only in the past 150 years has the serious consideration of human origins finally moved from philosophical discussions on the Nature of Man and unforgiving religious disputes about Creation myths to a meticulous investigation of the copious evidence that surrounds us all. Tremendous advances in scientific instrumentation and understanding now uncover life's secrets at an ever-accelerating pace. Some of these findings have obvious immediate impacts, others more stealthily upset the way that we view ourselves. But old ideas rarely give way without protest. While much of this new and revolutionary information has yet to enter public awareness, already there is much dispute. So why are things moving so fast? And why all the dispute? Ought we not slow things down a bit until we can figure out what really is going on and what it all means? Well, fortunately or unfortunately, there is no stopping or going back. Returning to the good old days of continuous conflict over limited resources is impossible-furthermore it is pointless, since modern problems only respond to the most up-to-date and productive solutions.

Science is a cumulative adventure with each advance providing grounds for future research. No matter how inconvenient any new bit of information may be or how poorly it happens to fit the prevalent world view, such evidence can neither be ignored nor forgotten. Thus science brings a directionality to world history that is independent of all but the most catastrophic external changes. Nonetheless, the unexpected arrival of scientific discoveries without instructions for their use has always posed problems-for the public's understanding of science inevitably lags far behind the reality and even competent science teachers may lose their grip as copious new information displaces some of the old and alters the rest beyond recognition. Under such circumstances, the perplexed often seek reassurance and guidance from more traditional non-scientific authorities. These include many fundamentalist Christian leaders who are now trying to stem the rising tide of knowledge that threatens to wash away their own doctrine/following/life-style. Individuals most heavily invested in the status quo undoubtedly preached similar versions of hell-fire and damnation when our ancestors first learned to make fire, build a boat or plant a crop. But the ongoing information explosion can no longer be contained by any power on Earth. Nor can our human population explosion long continue without endangering all life on Earth.

Conclusion

Anatomy is science which study structure of the human body. It is divided into several branches: systematic anatomy examines the set of organs that make up one functional entity (organic system, e.g. digestive, nervous, etc.); topographic anatomy examines the forms and relationships between individual anatomical structures in a given area, regardless of which system they belong (e.g. in the armpit, the lateral side of the neck etc.) and has particular significance in clinical and operative medicine (surgical anatomy). The X-ray anatomy study the shape and position of individual anatomical structures in a living human by radiographic radiation. Functional anatomy study the alignment of the shape and function of individual organs.

Bibliography

1. Waller P. "Holistic Anatomy - An Integrative Guide to the Human Body". North Atlantic Books, Berkeley, USA 19 (2010): 463-465.
2. Jones DG. "Human Anatomy: A Review of the Science, Ethics and Culture of a Discipline in Transition". In Sisu AM (ed): "Human Anatomy - Reviews and Medical Advances". IntechOpen, London, UK (2017): 3.
3. Oxnard Ch. "The Scientific Bases of Human Anatomy". Wiley-Blackwell, John Wiley & Sons, Inc., Hoboken, USA (2015): 13-14.
4. Mader SS. "Understanding Human Anatomy and Physiology, Fifth Edition". McGraw-Hill, New York, USA (2004): 2.
5. Prahlow J. "Forensic Pathology For Police, Death Investigators, Attorneys and Forensic Scientists". Humana Press, Springer Science+Business Media, New York, USA (2010): 90-91.

6. Van De Graaff KM., *et al*. "Schaum's Outline of Human Anatomy and Physiology, Third Edition". The McGraw-Hill Companies, Inc, New York, USA (2010): 47.

7. Fallavollita P. "Innovative Technologies for Medical Education". In Sisu, A. M. (ed): "Human Anatomy - Reviews and Medical Advances". IntechOpen, London, UK (2017): 21-23.

8. von Hippel A. "Human Evolutionary Biology - Human Anatomy and Physiology from an Evolutionary Perspective". Stone Age Press, Anchorage, USA (1994): xvii-xviii.

Volume 2 Issue 4 June 2019