

# A Fresh Perspective on Histology and Embryology - A Lens on Aesthetics

Una Nueva Perspectiva sobre Histología y Embriología: Una Mirada a la Estética

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LIAO L.; YAO, X.; HAN, M. & BAI, S. A fresh perspective on histology and embryology – a lens on aesthetics. *Int. J. Morphol.*, 40(5):1400-1403, 2022.

**SUMMARY:** Histology and embryology is a science that studies the micro structure and function of the body and embryogenesis, and has insight into the microcosmic world of human body. It is delicate and ingeniousness, which greatly satisfy our thirst for knowledge and visual appreciation. This paper expounds the beauty of Science in histology and Embryology from the perspectives of aesthetics on cell morphology, tissue mode, organogenesis and life birth. Aesthetic education in histology and embryology can possible cultivate medical students' humanistic quality and aesthetic thinking, So that they are able to have an access to the essence of life.

**KEY WORDS** Aesthetics; Histology; Embryology; Philosophy; Humanistic quality.

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## INTRODUCTION

Medicine belongs to both natural science and social science. Medicine studies human beings, and human studies medicine. Histology and embryology, as basic courses for medical majors, belong to morphological disciplines, which describe more than laws compared with functional disciplines and other natural disciplines (Macneill, 2011). Therefore, it is easy to feel complicated and bored. How should we help the learners avoid such an unpleasant situation? To study medical courses from the perspective of aesthetics will help to cultivate students' appreciation of science, explain the laws of life, and feel the pleasure brought by the beauty of science.

Histology and embryology is a science that studies the microscopic structure and function of the body and embryogenesis, and provides insight into the microscopic world of the human body itself. Its perfection, ingenuity, fineness and richness are amazing and can greatly satisfy our thirst for knowledge and visual appreciation. Combining the contents of histology and embryology, this study explores the scientific beauty contained in medicine from the perspectives of cell morphology, tissue pattern, organogenesis and origin of life. Aesthetic education in

histology and embryology can not only train medical students' humanistic quality and aesthetic thinking, but also enable them to understand the essence of life from an aesthetic perspective (Scott, 2000; Shapiro *et al.*, 2009).

**The beauty of cellular morphology.** Cell is the basic structure and function unit of human body, and the number of human cells is huge and various. The morphology and structure of each cell vary greatly. And the perfect design can be found in every cell form, such as a double concave disk of red blood cells, rather than a double convex shape. Double concave can increase the surface area of red blood cells by about 25 %, and the distance between any point in the cell and the cell surface is not more than 0.85 mm. The nearly perfect shape and structure design of red blood cells is conducive to the rapid exchange of gas inside and outside the cell. Long cylindrical skeletal muscle cells, often called muscle fibers because they are slender, looking like slender girl.

The most elegant and intelligent cells are the neurons, which consist of a cell body, dendrites, and axons. There are many dendrites, but one axon, Dense dendrites

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FUNDING. Educational Research and Teaching Reform project of Xinjiang Medical University No. YGS2021026.

suggest: "listen to both sides and you will be enlightened; heed only one side and you will be benighted" Slender protuberances form a wired network between each other, connecting the body as a whole for overall regulation. Therefore, neurons deserve to be the outstanding managers of the kingdom of human cells, so that we can feel the "beauty of wisdom" of neurons. Short cylindrical cardiomyocytes, connected by a leap disc, represent the "beauty of unity" of cells, while tadpole-shaped sperm represent the "beauty of movement".

**The beauty of organization.** The emergence of multicellular organisms has brought good news to human evolution, but it also faces the challenge of how to organize the large number of cells. Histology explains the principle of organization, and the hierarchy principle.

The cell is the most basic structure and function unit of human body, Cells and extracellular matrix form tissues. The human body consists of four major tissues: epithelial tissue, connective tissue, muscle tissue and nerve tissue. The four tissues are combined in different ways, in different numbers, and in different kinds to form different organs, each of which performs a highly specialized function. Functionally related organs constitute a system, each of which performs relatively complete and independent physiological functions. For example, the urinary system consists of kidneys, ureters, bladder and urethra, which are mainly responsible for the production and discharge of urine. The human body is composed of eight systems (nervous system, circulatory system, immune system, digestive system, respiratory system, urinary system, endocrine system and reproductive system). This organization has both division of labor and cooperation, so that multicellular organisms in an orderly and efficient way to form a whole individual.

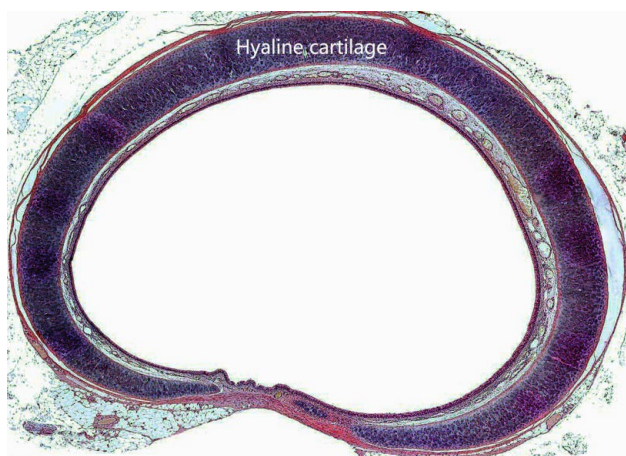


Fig. 1 c-shaped hyaline cartilage on the outer membrane of trachea.

The beauty of organization is not only in the overall structure, but also in individual organs. For example, the trachea in the respiratory system has C-shaped transparent cartilage on the outer membrane of the trachea. The C-shaped cartilage ring acts as the scaffold of the trachea to ensure that the gas is smooth and not deflated due to inspiration. Meanwhile, the smooth muscle and dense connective tissue at the interface enhance the contractile of the trachea (Fig. 1). It indicates the trachea "Be prepared for danger in times of peace", this kind of design is unique.

The small intestine in digestive system is highly space-efficient. The long, curved intestine, folds, villi, and microvilli can expand the surface area of the small intestine 600 times, making the surface of the small intestine 5-6 meters long to more than 200 square meters. In bone tissue, fibers in the same layer of bone plate are arranged parallel to each other, and fibers in adjacent bone plate are arranged perpendicular to each other (Fig. 2). This arrangement is like multiple layers of wood plywood, which increases bone strength.

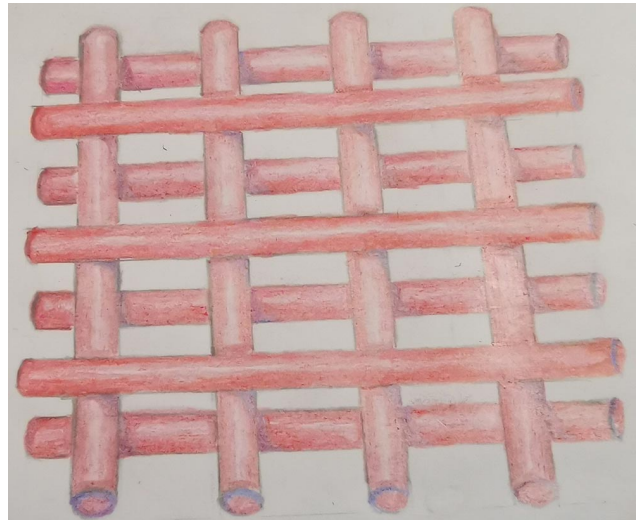


Fig. 2 Arrangement of fibers in bone plates.

**The beauty of organogenesis.** During the development of human embryo, organogenesis has experienced from nothing to existence, from naive to mature, and from primordia to complex morphological differentiation. In the process of formation, some organs of the transformation of the road contains the beauty of intelligent design.

The occurrence of face is the "ugly duckling" to "white swan" gorgeous metamorphosis: the genesis of face comes from a frontonasal process, a pair of maxillary process, and a pair of mandibular process these five projections. At 4 to 5 weeks, the face is almost invisible, and at 7 to 8 weeks, the five projections "conjure up" toward the central axis to form a perfect face.

Design of atrial septum of heart - a true masterpiece of wisdom, in the process of cardiogenesis, The division of atria underwent "two compartments and three pores", i.e. the first atrial septum appeared first, the first chamber hole appeared and closed, and then the second chamber hole appeared. The second septum appeared on the right side of the first septum and covered the second foramen, leaving a foramen ovale between the second septum and the endocardium pad, and the foramen ovale was covered by the foramen ovale valve. During the embryonic period, because the pressure of the right atrium is higher than that of the left atrium, the left and right atria can be connected through the foramen ovale. This design not only solves the problem that pulmonary circulation is not established in the embryonic period, but also leads to poor circulation access. It also cleverly avoids the mixed problem of dynamic venous blood caused by the establishment of pulmonary circulation (after birth, the foramen ovale can be closed again because the pressure of the left atrium is higher than that of the right atrium). The foramen ovale and its valve act as a two-way switch that can be opened during the embryo and closed after birth. We have to marvel at this almost perfect masterpiece of nature.

**The beauty of birth of life.** Through the ages, humans have struggled to find out where they come from, where they go, why they get sick, what's the point of living and so on. These problems are not only medical problems, but also those of philosophy, physics and many other disciplines. From the original creationism to materialism, from metaphysics to dialectical materialism, from macro to micro, our understanding of life has become more profound and accurate.

Embryology is a science that studies the process and mechanism of the development from zygote to newborn, from

fertilization to cleavage and blastocyst formation, and further to implantation of diblastoblast, triblastoblast, and finally to the formation of human embryonic. It shows the perfect process of a cell developing from a fertilized egg to a newborn (Bolton, 2003). Each life is born unique, a masterpiece of DNA weaving. As a food processor, life preserves genes and carries human civilization and wisdom. Nature has designed this work to contain endless natural wonders, wisdom, innovation, courage, which leaves you amazed at how beautifully, simply, harmoniously and exquisitely the structure and function of the body have evolved over billions of years (Fig. 3).

## DISCUSSION

Under the new medical model, the training of medical students is not only to master medical theory and technology, but also to learn and master relevant knowledge of humanities and social and natural sciences, so as to strengthen their medical literacy (Evans *et al.*, 1997). In the current tense doctor-patient relationship, we should strengthen the medical students own aesthetic accomplishment; make the internal beauty and external naturally united. In clinical practice, the behavior and attitude of medical students at work will also directly affect the psychological response of patients, thus affecting the development and change of the disease.

Histology and embryology is a medical professional course in basic medicine, belonging to the morphological discipline, focusing on the description of cells, tissues and organs, and the beauty of science contained in it is now in reality. The beauty of morphological structure and

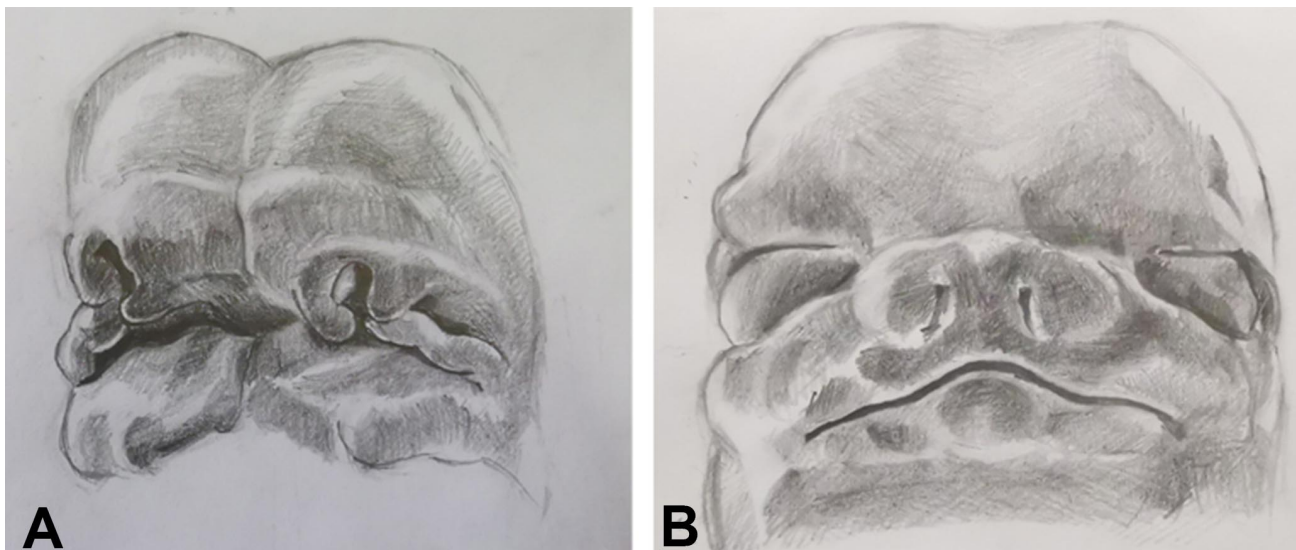


Fig. 3. Schematic diagram of facial occurrence (A 5 weeks , B 7 weeks).

development gives learners and teachers artistic conception of beauty (Moss, 2014; Francis, 2020) In the teaching process, the aesthetic education should be properly integrated into the teaching of medical specialty, to stimulate the emotion with beauty, to cultivate the creativity and imagination of students, so as to make the teaching and learning work together, which reflects the influence of the internal beauty of tissue embryology on medical students, and is beneficial to stimulate the interest of learners in medical science.

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**RESUMEN:** La histología y la embriología son ciencias que estudian la microestructura y la función del cuerpo y la embriogénesis, y tienen una visión del mundo microcósmico del cuerpo humano. Es delicadeza e ingenio, lo que satisface en gran medida nuestra deseo de conocimiento y apreciación visual. Este artículo expone la belleza de la ciencia en histología y embriología desde las perspectivas de la estética sobre la morfología celular, el modo tisular, la organogénesis y el nacimiento de la vida. La educación estética en histología y embriología puede posiblemente cultivar la calidad humanística y el pensamiento estético de los estudiantes de medicina, para que logren tener acceso a la esencia de la vida.

**PALABRAS CLAVE:** Estética; Histología; Embriología; Filosofía; Calidad humanista.

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