МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ’Я УКРАЇНИ
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ

М А Т Е Р І А Л И

106-ї підсумкової науково-практичної конференції
з міжнародною участю
професорсько-викладацького колективу
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Матеріали підсумкової 106-ї науково-практичної конференції з міжнародною участю професорсько-викладацького колективу Буковинського державного медичного університету (м. Чернівці, 03, 05, 10 лютого 2025 р.) – Чернівці: Медуніверситет, 2025. – 450 с. іл.

У збірнику представлені матеріали 106-ї науково-практичної конференції з міжнародною участю професорсько-викладацького колективу Буковинського державного медичного університету (м. Чернівці, 03, 05, 10 лютого 2025 р.) зі стилістикою та орфографією у авторській редакції. Публікації присвячені актуальним проблемам фундаментальної, теоретичної та клінічної медицини.

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The aim of the study. To investigate peculiarities of an early embryo-topography in the human neck region to determine possible periods of the developmental critical periods. These critical periods are believed to be vulnerable for possible congenital malformations establishment if the normal course of the developmental processes are impaired.

Material and methods. Six specimens of human embryos were subjected to microscopy, morphometry, and three-dimensional reconstruction. The material was classified by parietal length and obtained in accordance with the Declaration of Helsinki based on a bilateral agreement between the Department of Histology, Cytology, and Embryology of Bukovinian State Medical University and the Regional Pathologists Bureau.

Results. The research has traced step by step the processes of neck embryo-topography as a discrete part of the human body during the embryological stage of prenatal human development. Our findings indicate that the sixth week of prenatal development marks the first critical period in the formation of the infrahyoid triangles. During this stage, a common muscle layer for the infrahyoid muscles, as well as a shared precursor for the sternocleidomastoid and trapezius muscles, begins to develop. These early structures signal the initial separation of the anterior cervical region in humans. By the start of the sixth week, the muscle layer for the infrahyoid muscles in fetuses presents as a distinct band of muscle tissue extending dorsally and laterally on both sides of the tongue base. Additionally, this critical period is characterized by the formation of the subcutaneous neck muscles and the hyoid bone, driven by the differentiation of the hyoid pharyngeal arch and the emergence of the cervical sinus. We identify the 7th to 8th weeks of prenatal development as the second critical period, during which the complete separation of the omohyoid, sternohyoid, and thyrohyoid muscles occurs alongside the establishment of their innervation. This phase is also marked by the transition of the hyoid rudiment to the pre-cartilaginous stage and the loss of its connection to the cranial segment of Reichert’s cartilage. During this period, anatomical variations and malformations may arise not only within the infrahyoid muscles - such as absence of muscle bellies, duplication, or atypical attachment - but also within the structure of the hyoid bone.

Conclusions. These critical periods underscore the complexity and precision of early cervical development, highlighting stages where structural differentiation and potential anatomical variations are established. Understanding these phases provides valuable insight into the mechanisms underlying congenital neck malformations and informs approaches for early diagnosis and intervention in developmental anomalies of the cervical region.

Semeniuk T.O.

TYPES OF INTERSTITIAL CELLS WITHIN THE HUMAN HEART VALVES

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Introduction. Millions of people worldwide suffer from different cardiovascular diseases. Diseases that affect the atrioventricular valve apparatus of a heart show an increasing trend every year. This, in turn, increases an interest of morphologists in the structural and functional changes of tissue and cellular components that occur in human heart valves with age. Despite numerous fundamental works about morphology of the valvular apparatus of the human heart, this issue still attracts the attention of scientists today. The modern view on the heart valves includes not only view that considers the valves like the passive mechanical structures that direct a blood. Valves are morphological components of the heart that have a complex structure, perform important functions and undergo changes with age. Cardiac surgeons are interested in creating an “active” substitute for heart valves for to prolong human life. In addition it is necessary to create substitutes that are as close as possible to the natural valve in terms of the structure and function. It would be possible thanks to the development of tissue engineering.

The aim of the study. To identify and study valvular interstitial cells in the leaflets of the atrioventricular valves of the human heart.

Material and methods. The study was performed on 19 atrioventricular valves of adult human hearts. Immunohistochemical methods and the method of electron microscopy were used for the research.

Results. Cells were found in between bundles of collagen and elastic fibers within the leaflets of the atrioventricular valves of the heart using an electron microscopy. Each cell contained one brightly stained nucleus with a predominance of euchromatin, a well-developed granular endoplasmic reticulum, and a Golgi complex. Numerous secretory granules were located in the cell cytoplasm around the nucleus. These cells are regarded as valvular interstitial cells that have the properties of secretory cells and are capable of participating in the synthesis of intercellular substance of connective tissue directly. A constant mechanical movement of the leaflets and a deformation of the connective tissue lead to a damage of the leaflets. The secretory interstitial cells respond in order to preserve the integrity of the leaflets of the heart valves.

Elongated cells with a large number of long and thin processes were detected in the leaflets of the heart valves using the immunohistochemical method using monoclonal antibodies to actin of smooth muscle cells (clone 1A4, DAKO Company). These cells were located in the connective tissue of the leaflet and they were more concentrated closer to the free edge of the leaflet. They were in close contact with the collagen fibers of the intercellular substance of the connective tissue. Cells contacted each other by some adhesive contacts. The location of α-sma antigenic determinants in the cytoplasm of these cells indicated that they contain contractile microfilaments. The obtained picture can be regarded as a prominent positive reaction (+++). These cells resembled both smooth muscle cells and fibroblasts, so they were identified as contractile valvular interstitial cells. The similarity of these cells to both smooth muscle cells and fibroblasts makes it possible to call them also myofibroblasts. Perhaps, due to the contraction of contractile interstitial cells, it is possible to resist hemodynamic pressure.

Conclusions. Thus, based on the obtained results from this morphological study using the immunohistochemical method and the method of the electron microscopy, two types of valvular interstitial cells were detected in the leaflets of the atrioventricular valves of the human heart: secretory and contractile.

Stoliar D.B.

CHARACTERISTICS OF THE HUMAN TEMPOROMANDIBULAR JOINT IN 4-6 MONTHS OF INTRAUTERINE DEVELOPMENT

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Introduction. While dental technology has advanced considerably, many structural aspects of dental components remain ambiguous, especially the temporomandibular joint (TMJ), this information is vital not only for its immediate contributions to fetal development knowledge but also for its long-term applications in medicine, dentistry, and developmental biology.

The aim of the study. This study aimed to explore the structural characteristics of the TMJ during the second trimester of human fetal development.

Material and methods. The analysis included 8 fetal specimens between 4 and 6 months old, with crown-rump lengths (CRL) ranging from 161.0 to 259.0 mm. The investigation employed various methods such as morphometry, craniometry, macro- and microdissection, and computed tomography.

Results. In fetuses aged 4 to 6 months, the glenoid fossa exhibited a flat shape, with thin bone density in this region. Projections on the malar eminence of the temporal bones base were absent, indicating that the articular tubercle had not formed yet. Development of the synovial membrane components within the articular capsule was observed, with folds and connective tissue ligaments identified in both the upper and lower parts of the articular cavity. Capillaries were beginning to grow into the synovial membrane. Some areas displayed connective tissue layers between the temporal bone and the articular disk, as well as between the disk and the head of the mandible.