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**Petryshen O.I.**

## MORPHOLOGICAL STRUCTURE OF THE KIDNEY UNDER THE INFLUENCE OF SALTS

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As a result of industrial human activity accumulation of various xenobiotics in the environment is increasing rapidly and it has reached the level of an ecological disaster for mankind. Among the pollutants of a technogenic origin, chemical combinations of different metals occupy the first place, aluminium and led salts take the leading role.

The aim of our research was to determine the influence of aluminium and lead salts on the renal morphology.

The complex of morphological methods studied the renal structure of 50 mature albino male rats weighing 0,2-0,25 kg which were kept in the vivarium. Animals were divided into 2 groups. The 1st group – control (n-25), and the 2nd group – experimental (n-25) that during 14 days received 200 mg/kg aluminium chloride and 50 mg/kg lead chloride on 1% starch suspension intragastrically.

The analysis of morphometric indices of the kidney has found enlargement of the cortical substance thickness and medullar substance. Experimental animals revealed the increased size of the nephron bodies at the expense of volume enlargement both vascular glomerulus and filtrating sphitting. The nephron canaliculi also undergo some changes: the diameter of a proximal portion and Henle's loops enlarge 2,5 times, a distal portion enlarges moderately. Besides, experimental animals showed morphologic changes in the cells that are the components of the renal canaliculi. Thy cytoplasm contains small and single large vacuoles, and a number of epithelicytes contain paranuclear vacuoles which make the cell bigger. The nuclei of the cells are hyperchromic, nuclear-cytoplasmatic Hertwig index is shifted into the cytoplasm site. Some epitheliocytes of the proximal and distal canaliculi demonstrate local morphological changes accompanied by dystrophic cellular lesions.

The combined influence of aluminium and lead salts results in morphofunctional and dystrophic changes of the renal tissue with the occurrence of hydropic and ballooning dystrophy in the epithelicytes of the nephron canaliculi which is accompanied by stasis and sludge with a sharp hyperemia and lymphectasy, stromal and perivasal edema, small foci of diapedesic hemorrhages.

**Popova I.S.**

## THREE-DIMENSIONAL RECONSTRUCTION AS A TOOL FOR EARLY HUMAN NECK DEVELOPMENT STUDIES

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Three-dimensional computer reconstruction is a morphological method that gives an opportunity to receive a computer model of morphological structures, obtained from a series of histological sections or computer tomograms. The main structures of the neck, which can be visualized by the means three-dimensional imaging, provide data on anatomic relations at all morphological levels of neck and define compartments through which disease processes can be spread, as well as define the differential diagnosis of mass lesions arising within an individual compartment.

The aim of this work is to reveal some peculiarities on the usage of a three-dimensional reconstruction method while remodeling components of infrahyoid triangles in the anterior neck region, applied to human embryos and prefetuses.

We have used serial sections of 7 specimens of human embryos and prefetuses measured from 13,5 to 80,5 mm of parietal-coccygeal length (PCL). The material was obtained and studied at Chernivtsy Regional Pathologists Office. The study was performed in accordance with the

provisions of the Declaration of Helsinki on ethical issues of studies conducted with humans (1964-2008), Ukrainian Ministry of Health Orders № 690 (23.09.2009), № 944 (14.12.2009), № 616 (03.08.2012). All specimens were obtained from ectopic pregnancies or spontaneous abortions, and no part of the material gave indications of possible malformation. Approval for the study was granted by the Ethics Committee of the HSEE of Ukraine "Bukovinian State Medical University".

To prepare material for computer reconstruction, it has undergone a few steps: dehydration, enlightenment and pouring into a paraffin block; microtomy and digital photographing with labeling congruous one in a specialized computer program (3D-Doctor Virtual Anatomist, Kharkiv); calibration and creation a three-dimensional model (rendering). As a result, the obtained virtual model of microscopic structures further can be measured (morphometry method), which was not possible previously with the help of classical morphological methods. The advantage of this method is that the series of photos are received while conducting microtomy, so there is no need to compare histological slides in an appropriate order. Digital photos are saved in a specific order with serial number.

While conducting the reconstruction of human fetuses and prefetuses' neck, it is important to start labeling from massive structures like neckvertebrae. In human embryos (middle of 2nd month of the PND) infrahyoid group of muscles is represented by a fused mass that only starts its way of differentiation on smaller, defined structures. By the end of 2nd month of the PND (21,0–30,0mm of PCL) platysma, sternocleidomastoid and omohyoid can be easily labeled and measured. Starting from the beginning of 3rd month of PND (31,0 mm PCL human prefetuses) sternohyoid, thyrohyoid, sternothyroid can be labeled and measured throughout their length, between the points of their typical topographical placesof attachment. Subinfrahyoid structures should be recognized in triangles that are bordered by the rudiment of hyoid bone, sternum, scapula, and vertebras. Crucial blood vessels as the common carotid artery, internal jugular vein, and internal carotid artery can be visualized behind the sternocleidomastoid region. Problematic regions for computer remodeling are intrafascial spaces: fascial coverings can be distinguished, but it is hard to outline spaces between neighborhood sheets of neck fasciae.

To conclude, three-dimensional reconstruction is a method that gives profound information on morphological peculiarities during human intrauterine development, whichwas not possible while using classical microscopic investigation methods. Digital models of human embryos and prefetuses give a unique possibility to conduct precise measurements of microscopic structures and describe their topographical interconnections in different periods of intrauterine development.

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## INTERSTITIAL CELLS OF CAJAL

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The interstitial cells of Cajal (ICC) are specialized network-forming cells distributed within and around the smooth muscle wall of the gastrointestinal wall (digestive tract), capable of generating and propagating the electric slow waves potential that leads to contraction of smooth muscle tissue. In addition to their pacemaker role, ICC is implicated in enteric neurotransmission and acting as stretch receptors in the gastrointestinal tract (smooth muscle tissue). It has been shown that there are several ICC subtypes depending on their anatomical locations, morphologic and functional criteria as follows: ICC lying between the circular and longitudinal muscle layer, ICC located in muscle bundles, ICC situated along the submucosal margin of the circular muscle layer, between myocytes, ICC lying within the connective tissue septa which surround bundles of the muscle and ICC located in the small intestine wall at the level of the deep muscular plexus. Throughout the digestive tube, the ICC lying around the myenteric plexus ganglia play the pacemaker role. Other ICC subtypes are functionally intercalated between the enteric nervous system and smooth muscle cells or they function as mechanoreceptors.