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Anent the structure of the articular surface

Introduction. For a long time the structure of the articular surface attracted attention of many researchers and remains not fully understood. W. Hunter (1742–43), B. Brodie (1813), J. Toynbee (1849) believed the cartilage surface is covered by synovial membrane. Subsequently, a lot of scientists, such as В.Н. Павлова (1980, 1988), J.M. Clark (1990), R. Teshima (2004), В.Ш. Вагапова (2004), Ш.М. Ахмедов (2006), A.J. Sofia Fox (2009), J. Rautiainen (2015) and others researchers disproved this statement, used terms «lamina splendens» and «chondral membrane», claiming the cartilage surface is acellular.

The aim of the study. To determine the structure of the articular surface during the postnatal period in order to solve above-mentioned contradictions.

Materials and methods. Hip and knee joints of white laboratory rats from the 1st to 90th days of their postnatal life were chosen as materials of the present study. Joint fragments were fixed in the Buen liquid, decalcinated in a 20 % formic acid solution, dehydrated in an ascending battery of alcohols and chloroforms, immersed in paraffin. For the overview microscopy by means of χ10, χ40, χ100 lens magnifications hematoxylin and eosin stain, stain after Laidlaw, stain according to Mallory's method, Hart's staining, PAS staining, alcianblau staining, lectinhistochemical staining with peanut (PNA-HRP), vicia sativa (VSA-HRP), soybean (SBA-HRP), wheat germ (WGA-HRP), perca fluviatilis (PFA-HRP) agglutinins. The method of M.A. Voloshyn (1981) was used as a model of antenatal antigen influence when studying joint reactivity. Use of experimental animals was guided by the «European Convention for the protection of Vertebrate Animals used for Experimental and Other Scientific Purposes» (Strasbourg, 18.03.1986).

Results. It has been established that all intraarticular formation of joints, including articular surface, in new-born rats are covered by morphologically different from cartilaginous tissue structure which is nothing else, but synovial lining cells which continue directly from joint capsule to articular cartilage. Synovial lining cells are clearly delimited from articular cartilage by fibrous argentophil lamina (proposed term — basal lamina). Basal lamina mainly comprises collagen and to a lesser extent elastic fibers, which distinctly separate synovial lining cells from adjacent articular cartilage. Moreover, basal lamina has a significant content of glycoproteins and glycosaminoglycans, and shows pronounced expression of all studied lectin receptors. Shape of synovial lining cells varies from cubical to prismatic. Intercellular amorphous substance is detected among synovial lining cells. Throughout the apical (luminal) surface of synovial lining cells during the whole observation period, there is a strong expression of polysaccharides and intensive deposition of lectin-binding sites without significant changes. Poor detection of basal lamina and intercellular substance, absence of polysaccharides and glycoconjugates expression on the luminal surface of synovial lining cells were observed in synovial layer which covers intraarticular ligaments and fibrous layer of joint capsule. It indicates the different morphological and functional state of the synovial layer in all its length. The distribution of glycoproteins, glycosaminoglycans and glycoconjugates after antenatal antigenic injection does not change significantly, and anatomical integrity of synovial layer on articular cartilage remained steady. Obtained data indicate the leading role of the synovial layer in the protection of articular cartilage from aggressive influences of synovial fluid. Single and indivisible lining the articular cavity synovial layer is believed to be innate, protective, nonspecific, immunobiological, anatomical and physiological barrier between articular cartilage and fibrous skeleton of joint capsule on the one hand, and synovia on the other hand. Glycoconjugates expression on the basal lamina and on the luminal surface of synovial lining cells plays the role of nonspecific lectin mediated mechanism in articular cartilage protection.

Conclusions. The surface of the articular cartilage in new-borns is covered by synovial layer. Any changes in the structure of covering synovial layer, its age-related involution and transformation into «lamina splendens» may play a key role in articular cartilage degeneration and dystrophic processes in it with consequential predisposition to osteoarthritis development. ■

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Vitamin D status in patients with cardiovascular disease according to age, gender and diagnosis

Aim of the research — to assess the difference of 25-hydroxy-cholecalciferol (25(OH)D) level in blood plasma in patients with arterial hypertension (AH) and coronary heart disease (CHD) according to age, sex and diagnosis.

Materials and methods. We examined 539 individuals (152 men and 387 women) aged 30 to 79 years. Among them 71 participants did not have any cardiovascular disease, 221 had II degree of AH, 247 suffered from CHD. Vitamin D status was assessed by the serum level of vitamin D total (25(OH)D total = $25(OH)D_3$ + $25(OH)D_2$) using immunoenzymatic assay with the help of original DRG reagents. Level of parathyroid hormone (PTH) in blood plasma was estimated by means of the same method. Statistical analysis was carried out by «STATISTICA 10.0» software.

Results. We found an negative correlation between age and level of 25(OH)D in blood plasma in a whole group ($R = -0.21$; $p = 0.000001$) and in joint group with AH and CHD ($R = 0.198$; $p = 0.000015$, $n = 468$), but after dividing patients into three groups by diagnosis this correla-