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Morphological structure cartilage joints of sternum of alloxan Diabetes

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Resume

The material of the study was 32 mature rats and their offspring. We used informative methods such as histological and histochemical, morphometric. As a result of the study, morphological changes in the bone-cartilaginous-ligamentous structure of the rib-sternal complex in the offspring obtained from pregnant rats with diabetes mellitus in the period of early ontogenesis are presented. It has been established that the negative impact of antenatal diabetes mellitus on the development of the connective tissue formation of the sterno-costal complex. This article describes the morphological changes in the anatomical structures of the rib-sternal complex in rat pups born from pregnant individuals with experimental diabetes mellitus.

Keywords: *Cartilage, rib –sternal complex, experimental alloxan diabetes, alloxan, chondrocytes, rats.*

Relevance

Diabetes mellitus is a global problem, and although it is receiving more and more attention, its importance is growing year by year. The number of patients is growing rapidly [3,18,19,20,21,22,23]. While the total number of people with diabetes in the world has increased fivefold since 1980, in 2018, 422 million people suffered from the disease, accounting for almost 10 percent of the world's population. While maintaining the current situation, the number of cases is projected to double by 2030 and account for 20 percent of the world's total population [WHO 21.10.2021], [1,3,4,5,6,7,8,9,10]. Changes in the shape and functional structure of the chest affects the functional state of the organs in the cavity of the cage [2,11,12,13,14,15,16,17]. Lack of information on the morphofunctional properties of the rib –thoracic complex leads to serious shortcomings and errors in the prevention and treatment of injuries and deformities in certain areas [3,24.25,26,27].

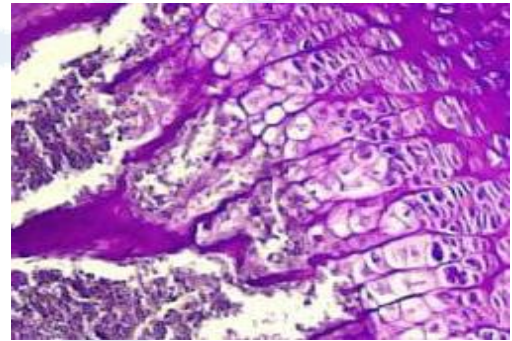
Scientific research in this field is not only scientific but also of practical importance. All of the above allows us to draw conclusions about the problems developed by us and the relevance of the rib-sternal complex due to the prevalence of its deformations and injuries and their morphofunctional substantiation.

The purpose of the work. To study the dynamics of morphological changes in the rib-sternal complex of rats with experimental alloxan diabetes.

Materials and methods: The study was performed on 32 white laboratory rats weighing 150-200 g. The animals were kept in vivariums with food and water according to a standard ration. The animals were divided into two groups for the study. The control group produced 10 rats and the male rats were in a 3: 1 ratio and were injected with 0.5 ml of 0.9% sodium chloride solution once. The study group consisted of 32 rats and the male rat had a 3: 1 ratio. On the fifth day of gestation, experimental diabetes mellitus using an alloxan model was called in rats. A mixture of alloxan 150 mg / kg and distilled water was administered to the experimental group by a single intraperitoneal injection into the abdominal cavity. An increase in blood glucose to approximately 350 mg / dl (Plus Satellite.Russia) confirms hyperglycemia. In our experimental rats, 15 minutes later, the rats were weaned. After 20 minutes, the tails began to turn blue. After 3 hours, thirst and polyuria were observed. The next day there was less

convulsions and tachycardia. In a 20- to 24-day follow-up, the study group found that the rats had low mobility, weight loss, long-term wound healing, and hair loss. Of the 22 rats taken for the experiment, 40% died. The study materials were components of the 14-21-30-45-60-day-old thorax of young rats born to mothers with experimental diabetes. The study required histological analysis the rib-sternal complex of the experimental group.

RESULTS AND DISCUSSION: The results of the study showed the presence of many SHIK-positive homogeneous structures around the epiphyses and apophyses of the bone as a result of experimental diabetes mellitus of the rib-sternal complex. These changes occur mainly in the extracellular matrix and are characterized by the presence of atrophically altered cells in a



group of chondrocytes that shrivel in many forms.

Fig 1. General view of the sternocostal joint. The gap between the joints is almost indistinguishable. Most of the interstitial spaces are filled with homogeneous structures. Around the synovial membranes, foci of mucoid edema are detected. The paint is dyed according to Masson. 10x4.

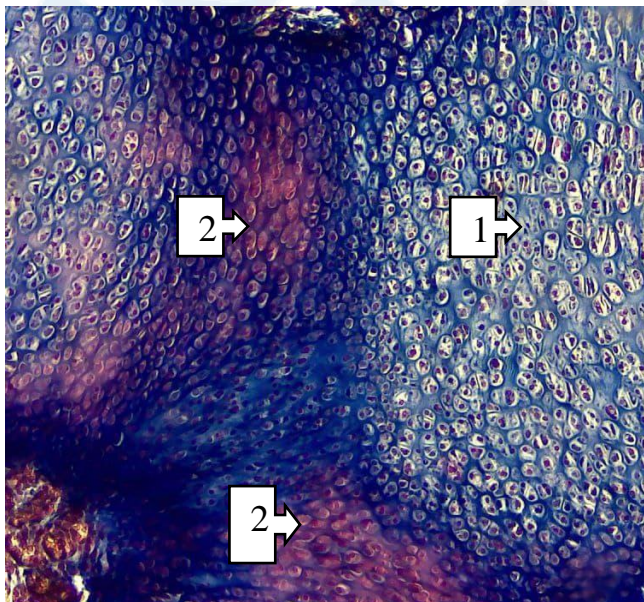


Fig.2 The proximal part of the sternum is stained with SHIK. Heterogeneous stained furnaces are detected in susceptible areas (1). In focus, the staining around the chondrocytes is of a different appearance, with the areas rich in glycosaminoglycans being stained from pinkish red to dark red (2). The phenomenon of metachromosis dye SHIK. 10x10. In conclusion, based on the above histological sections, under the influence of experimental diabetes leads to disruption of the activity of the rib-thoracic complex in the paracapsular areas and the accumulation of pathological metabolites in the extracellular matrix. This process, in turn, requires a reasonable

assumption that increased dystrophic necrotic and dysregenerative activity on the surface of large joints leads to the formation of ankylosis in the joints and osteophytes in the apophyses. So, based on the above morphological examinations, the formation of contractures in clinically small and large joints, and the development of practical recommendations that allow to predict the growth of additional osteophytes in ankylosis and apophyses will allow to develop an algorithm to solve another topical problem of evidence-based medicine.

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