

SUMY STATE UNIVERSITY
MEDICAL INSTITUTE



«**BIOMEDICAL
PERSPECTIVES**»

ABSTRACT BOOK

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POST-GRADUATE STUDENTS AND YOUNG SCIENTISTS SESSION

PECULIARITIES OF MORPHOMETRIC CHANGES IN RAT'S LUNGS WITHIN AGE DIMENSIONS

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Introduction. Respiration process provides the permanent supply of oxygen to all tissues and organs. Conducting of the air flow is proceeding through the respiratory tract (conductive section) to the respiratory section (lungs' alveoli), where the gas exchange occurs between air and blood. Each stage of maturation is characterized by specific changes in lungs.

Aim. To distinguish the peculiarities of morphometric changes in rat's lungs within age dimensions.

Materials and methods. The study was carried out on 18 white lab rats of both sexes. The animals were divided into 3 groups according to the age: young (3 months, the weight was 151.5 ± 0.3 g), mature (9 months, the weight was 193.2 ± 0.13 g) and old (21 months, the weight was 220.2 ± 0.19 g). The histological method was applied along with morphometry in dynamic regime and with the usage of universal certified programs "SEO Scan Lab 2.0" and "SEO Image Lab 2.0". The depth of the alveoli and the width of the entrance to the alveoli were measured.

Results. The significant difference in the structure of the lungs of rats of different age groups could not be visually distinguished. Although while conducting the morphometry of the pulmonary structures of rats of different age groups, certain patterns were revealed, which, of course, were referred to the processes of growth and aging.

The microscopic dimensions of the main indicators of the respiratory part of the young animals' lungs were as follows: depth of alveolus (DA) – 52.4 ± 0.07 μm , width of the entrance to the alveolus (WEA) – 31.05 ± 0.1 μm .

The DA rate of young rats was 53.9 ± 0.73 μm , indicating that it increased by 2.9% ($p < 0.05$), compared to young animals, WEA reached 22.9% ($p < 0.05$), which in absolute numbers was 38.7 ± 0.14 μm .

Changes in morphometric parameters of mature animals occurred as such: DA increased to 55.2 ± 1.36 μm , which is 2.4% ($p < 0.05$) more than the DA index of mature animals, SWA – to 51.2 ± 0.06 μm (32.3% increase ($p < 0.05$)).

Conclusion. The analysis of GA and WEA changes within the processes of maturation and aging attests the development of emphysematous changes which began with mature rats and progressively developed with the old ones.

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