Morphometric analysis of the bronchiolar arterioles through the normal aging process

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Structure and function of the vascular system are altered in the aging process [1]. Aging is associated with structural changes in the lung that leads to a decreased lung function [2]. The aim of this study was the morphometric assessment of the bronchiolar arterioles in the lung of mouse through the normal aging process. Lung specimens from CD1 mice at the age of 2, 6, 12, 18 or 24 months were fixed in 10% neutral-buffered formalin and paraffin-embedded. After staining of 5-μm sections with Masson trichrome technique [3], optical microscope images were taking using a Primo Star light microscope (Carl Zeiss Microscopy GmbH, Oberkochen, Germany) equipped with a Axio-Cam ICc1 camera (Carl Zeiss Microscopy GmbH, Oberkochen, Germany). Images were edited and labeled using the software Zen lite 2011 (Carl Zeiss Microscopy GmbH, Oberkochen, Germany). The following parameters were analyzed in the bronchiolar arterioles: total perimeter, total area, adventitia layer area, muscular layer area, and lumen area. All the information was captured in SPSS software (IBM v.22). The data were statistically analyzed using a one-way ANOVA. A \( p \) value less than 0.05 was considered significant. The results of the ANOVA analysis indicated that there was no a significant difference in total perimeter \( (F = 1.33, p = 0.265) \), total area \( (F = 0.66, p = 0.621) \), adventitia layer area \( (F = 0.25, p = 0.907) \), muscular layer area \( (F = 0.27, p = 0.893) \), and lumen area \( (F = 1.04, p = 0.393) \) among the analyzed ages. Changes in dimensions of bronchiolar arterioles have been proposed as a mechanism in pulmonary diseases of the elderly, like chronic obstructive pulmonary disease (COPD) [4]. Our findings indicate that there are no significant changes in dimensions of bronchiolar arterioles in the normal aging process. More research is necessary to assess the possible role of small blood vessels in chronic pulmonary diseases.

**Keywords:** morphometry; lung; aging; bronchiolar arterioles; mouse

**References**