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Editorial

Tissue Streaming in the Lungs and Airways: What are its Ontogenetic Alterations?

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Abbreviations

ISOAD: International Society on Aging and Disease; LA-DOHaD: Latin-American Chapter of International Society for Developmental Origins of Health and Disease; PhD: Philosophy Doctor

This short communication aims at attracting more attention to the topic of tissue streaming, as applied to lungs and airways. This term was used by us already several times, especially when discussing the cytoarchitectonics of pituitary and adrenal glands [1-5], but historically, Gershom Zajicek in Israel was the first to study this process in several organs and tissues including liver [6], however unfortunately, not in lungs and airways. Nevertheless, this researcher suggested the existence of streaming organism [7], thus introducing provocative generalization of tissue streaming to the whole human and animal body, obviously including repiratory system.

Just recently we outlined the necessity of broadening and expansion of endocrinology to the science of bioregulation and of gerontology to the science of ontogeny [5,8,9]. Also we stressed the existence of non-respiratory pulmonar functions, probably related to neuroendocrine cells and neuroepithelial bodies of the lungs [10]. In this regard, it is interesting that these bioregulatory structures appear to be located in close proximity to the niches of stem and progenitor cells, according to the following scheme (modified from [11]):

NEC / NEB ↔ Niche ↔ SC →PC →<DC→ >DC→ A / R,

where NEC - Neuroendocrine Cell, NEB - Neuroepithelial Body, SC - Stem Cell, PC - Progenitor Cell, <DC - Less Differentiated Cell, >DC - More Differentiated Cell, A / R - Apoptosis/Removal (By Phagocytosis).

It is important also that usually, stem cells are quite small (~5 μm), and cell size appears to increase gradually during the processes of cell differentiation [5,11]. Nevertheless, the phenomena of tissue hyperplasia and hypertrophy are not understood yet properly, principally because of high heterogeneity of real tissues composed of several cell types (See discussion in [11]).

Another essential focus should be made on ontogenetic alterations of tissue streaming. When it begins and what happens with it during several stages of development and aging? In this regard, it is important that the velocity of tissue streaming, at least in the liver, decreases drastically during the aging [12]. If this is also the the case in respiratory system, then it can partially explain the predisposition of lungs and airways to age-related disorders including chronic obstructive pulmonar disease, pneumonia and some others.

In conclusion, present-day pulmonar and respiratory medicine urgently needs focusing non only on the tools of biochemistry and molecular biology, but also on advanced biotechniques of histology and morphometrics, especially as referred to neuroendocrine cells and neuroepithelial bodies, in relation to cytodifferones in the lungs and airways.

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