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Progenitor cells and telocytes: A tandem in regenerative medicine

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We have recently described a novel type of interstitial cells – Telocytes (TCs) - in several cavitory and non-cavitory organs of humans and mammals (see www.telocytes.com). TCs have a small cell body with specific (unique) prolongations that we named telopodes (Tps). Therefore, the simplest definition of Telocytes (TCs) is: cells with Tps. A TC has 1-5 extremely long Tps, (tens up to hundreds of μm), with moniliform aspect - alternating podoms (dilated segments) and podomers, thin segments below the resolving power of light microscopy. Podoms accommodate mitochondria, ER and caveolae, which are involved in calcium movements. Tps have a dichotomous branching pattern, making a 3D network due to homo- and heterocellular junctions. TCs release shed vesicle and/or exosomes, thus sending macromolecular signals to neighbor cells and thereby modifying their transcriptional activity, eventually. We identified by transmission electron microscopy *cardiac stem-cell niches* in subepicardium, *pulmonary subepithelial niches* in the bronchiolar tree, as well as *non-satellite (resident) progenitor cell niches*, among skeletal muscle fibers. In all the three types, we identified progenitor cells in close contacts with TCs and Tps. Moreover, electron microscope tomography revealed complex nanoscopic junctions between TCs and resident progenitor cells. Apparently, Tps provide tracks for the “evolution” (sliding) of precursor cells towards mature specific cell types, and their integration into organ microscopic architecture. TCs via their paracrine secretion (including microRNAs) produce an adequate microenvironment for precursor cells. Last but not least, TCs are directly and indirectly involved in neo-angiogenesis after (experimental) myocardial infarction.

Biography

L.M. Popescu, MD, PhD, Dr. h.c.mult., is currently Professor of Cellular and Molecular Medicine, University of Medicine, Bucharest, and Head of the National Institute of Pathology Romania. He is President Elect of the Federation of European Academies of Medicine, and of the International Society for Adaptive Medicine. With over 100 scientific articles in peer-review journals, he is cited more than 1500 times. He has a Hirsch Index of about 30. He is Editor-in-Chief (and founder) of the Journal of Cellular and Molecular Medicine (Wiley/Blackwell), with a 5-year IF of 5. He is credited with the discovery of Telocytes.