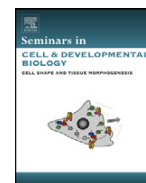




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Editorial

Telocytes in focus



Telocytes represent a new cell type recently discovered and characterized by Professor Laurentiu M. Popescu and his team in Bucharest, Romania. The current issue is dedicated to the memory of my mentor, Professor Popescu, who coined the term 'telocytes' in 2010, and moreover provided leadership and inspiration for other scientists around the world. Telocytes form a labyrinthine network in the interstitial space of many organs from different species. Shortly, telocytes were defined as cells with telopodes able to establish local and distant connections by homo- and heterocellular junctions and by releasing extracellular vesicles. Given that the telopodes role is to link telocytes with one another and with different other types of cells/structures I thought that reading about these complex build up three-dimensional spatial networks might provide some useful information about their remarkable properties and functions in processing static and/or dynamic information. Over time telocytes were explored with the help of different means, starting with the classical methods, such electron microscopy technique which remains the essential technique for their identification, and ending with FIB-SEM tomography and current proteomic technologies. However, their functions are still subject to debate. In this direction, a lot of information was gathered in the last couple of years enabling Professor Popescu to name telocytes as "connecting cells".

Many of the excellent researchers participating in this issue strove to ensure an overview of telocytes research trying to capture the most detailed aspects of the cellular and molecular story of telocytes.

By fusion of different point of view, it is our belief that readers will have an integrative opinion about telocytes and will be eager to find out more about these peculiar cells and their involvement in physiopathological processes.

In their review '*Telocyte's contacts*' Maria Simonetta Fausone-Pellegrini and Mihaela Gherghiceanu summarize the main type of homo- and heterocellular contacts participating in the formation of the telocytes networks. While the homocellular contacts appear to have a mechanical function and assure the integrity of the network, the heterocellular contacts between telocytes and a great variety of cell types and extracellular matrix elements seem to promote the idea that telocytes represent an integrated system to maintain tissue/organ function by integrating the overall information from vascular, nervous and immune system, interstitium and stem cells.

In '*Telocytes and Intercellular Communication*' John Smythies et al. are trying to fit telocytes network within different complex forms of intercellular communication that includes microvesicles of various types, bioelectrical mechanisms and volume transmission. In

their opinion telocytes might be the missing link explaining the interrelationships between these seemingly disparate systems.

Special attention was given to the telocytes in the heart. Bei et al. in their review entitled '*Telocytes in cardiac repair and regeneration*' focused on the role of telocytes in cardiac regeneration and discuss the current knowledge about telocytes role in cardiac repair after myocardial injury, as well as their potential roles in cardiac development and aging. They also underline the future possibility of a telocyte-based therapy or of a telocyte-derived extracellular vesicles delivery as novel therapeutic strategies to promote cardiac regeneration and repair. Then, Sawa Kostin in '*Cardiac telocytes in health and disease*' discusses the significance of the imbalance between telocytes proliferation and telocytes death resulting in telocytes depletion which might be a cause leading to heart failure. He also underlines the importance of an altered intercellular signalling of the myocardium by the alteration of the telocytes network and impairing of cardiac regeneration.

Shi et al. in '*Potential Roles of Telocytes in Lung Development and Diseases*' focus on the recent progress about lung telocytes specific gene and protein profiles and discuss the importance of clinical bioinformatics in the validation of telocytes biomarkers. They summarize the current knowledge of telocytes' potential role in lung development and the pathogenesis of lung diseases.

The review entitled '*Telocytes in the reproductive tract: current understanding and future challenges*' describes in detail the particularities of telocytes at the level of the uterus, fallopian tube, placenta and mammary glands. Authors discuss the future challenges raised by the theory that telocytes are a multifunctional cell type since they are able to suffer phenotypic changes according to the functional demand existing in one particular tissue.

The review '*Behaviour of telocytes during physiopathological activation*' by Díaz-Flores et al. talks about the role of telocytes during repair through granulation tissue, when they interact with pericytes, endothelial and inflammatory cells and suffer morphological and phenotypical changes. They also discuss the possibility that telocytes might be the cells in which carcinoma-associated fibroblasts and myofibroblasts originate.

Ibba-Manneschi et al. describe in '*Telocyte implications in pathology: An overview*' the fact that telocytes may cooperate with tissue-resident stem cells to foster organ repair and regeneration. They focus on the most recent findings concerning the implication of telocytes in a variety of pathologic conditions in humans. Several experimental data regarding telocytes needs to be understood in greater depth until we might be able to promote organ regeneration and/or prevent irreversible end-stage organ damage

in different pathologies using telocytes alone or the telocytes-stem cells tandem.

In '*The potential role of telocytes for tissue engineering and regenerative medicine*', Boos et al. have focused on telocytes as particularly promising for tissue engineering in the future, after further molecular and cellular studies of telocytes functions will be performed. In their opinion telocytes could develop as new tools for regenerative reprogramming of lost organ functions.

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