Stem Cells International

Special Issue on
Muscle Stem Cell Niche for Skeletal Muscle Regeneration

CALL FOR PAPERS

Adult skeletal muscle is a highly regenerative tissue. Muscle injury or exercise can generate large numbers of newly formed muscle fibers within a week because of a result of expansion and differentiation of muscle stem cells, termed muscle satellite cells. In normal muscle, satellite cells that reside beneath the basal lamina of muscle fibers are mitotically quiescent. Upon regeneration stimulation, satellite cells undergo activation and enter the cell cycle to give rise to daughter myogenic precursor cells. After a few rounds of cell proliferation, these myogenic precursor cells exit the cell cycle and fuse each other to form multinucleated new muscle fibers, thus becoming mature muscle fibers.

During myogenic precursor cell division, a subpopulation of proliferating cells returns to quiescent satellite cells as a self-renewal process that interacts with the skeletal muscle microenvironment as a stem cell niche including endothelial cells and fibroadipogenic progenitors (FAPs). Therefore, it is timely to understand the molecular and cellular mechanisms in satellite cell self-renewal for the maintenance of satellite cells as a muscle stem cell pool throughout life and differentiation to provide mature muscle fibers. The muscle stem niche plays an essential role in the regulation of satellite cell proliferation, survival, differentiation, maturation, and self-renewal.

The aim of this Special Issue is to highlight recent findings regarding satellite cell self-renewal, maintenance, proliferation, differentiation, and maturation, including heterogeneity and asymmetric division, focusing on roles in the stem cell niche for satellite cells as well as environmental factors including stem cell niche cells and exercise regulating muscle fiber maturation. We welcome both original research and review articles describing muscle stem cell self-renewal and maintenance. Submissions including differentiation and maturation, including the use of pluripotent stem cells, embryonic stem cells, and induced pluripotent stem cells (IPSCs) or IPSCs-derived cells, single cell-based technologies are also encouraged. In addition, we welcome research discussing muscle stem cell niche disruption such as endothelial cells and FAPs, potentially affecting skeletal muscle aging and disease.

Potential topics include but are not limited to the following:

- • In vitro modelling of primary or pluripotent stem cell-derived satellite cell self-renewal, maintenance, proliferation, differentiation, and maturation
- • Satellite cell self-renewal, maintenance, proliferation, differentiation, and maturation by the microenvironment, including co-culture and biomaterials in three-dimensional (3D) culture systems
- • In vitro modelling of interactions between satellite cells and muscle stem cell niche cells such as endothelial cells, FAPs
- • Efficient transplantation methods of primary satellite cells or pluripotent stem cell-derived satellite cells with modulation of self-renewal, maintenance, proliferation, differentiation, and maturation
- • Satellite cell-mediated high-throughput screening of small molecules which stimulate self-renewal, maintenance, proliferation, differentiation, and maturation
- • In vivo functional crosstalk between satellite cells and muscle stem cell niche cells
- • Imaging analysis exploring three-dimensional (3D) crosstalk between the muscle stem cell niche and satellite cells
- • Single cell-based technologies exploring the crosstalk between the muscle stem cell niche and satellite cells
- • Efficient transplantation methods of primary satellite cells or pluripotent stem cell-derived satellite cells with modulation of self-renewal, maintenance, proliferation, differentiation, and maturation
- • Cell therapy and regenerative medicine using primary or pluripotent stem cell-derived satellite cells for muscle diseases and aging
- • The effect of exercise on the muscle stem cell niche and muscle fiber maturation
- • The effect of aging on the muscle stem cell niche and muscle fiber maturation
- • The effect of diseases and their pathologies on the muscle stem cell niche and muscle fiber maturation

Authors can submit their manuscripts through the Manuscript Tracking System at https://review.hindawi.com/submit?specialIssue=799968.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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