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Abstract

Control of Stem Cell Fate and Function: A 3D Approach

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Abstract:
The exciting and potent outcome of stem cell culture in 3D system on par with its performance in conventional 2D system has great impact on tissue engineering and regenerative medicine. In the recent milieu, 3D techniques are being explored in stem cell research as the cells cultured in 3D mimic native cellular morphology and physiological function, thus biomimetic tissue growth and organization is shaped in in vitro culture system. In a conventional cell culture, cells are cultured in plastic surfaces (for example, polypropylene tissue culture plate), which is a planar 2D system. As a result, structure and morphology of cells are altered in comparison to native cells and thus drastically loses its native physiological growth and functions, which hinders several biological features and long-term translational success of stem cell-based therapy. 3D culture provides an inimitable microenvironment for nutrient and oxygen supplies for the cell to grow, proliferate, migrate, differentiate and for other cellular functions analogous to native cellular growth. This talk focuses on controlling stem cell fate and functions using 3D culture system made of polymer nanofibers and hydrogels.

Biography:
Dr. Murugan Ramalingam is Professor at the Vellore Institute of Technology. He has also an Adjunct Professor at Tohoku University, Japan, Professeur des Universite at the Université de Strasbourg, France and ASEM-DUO Professor at the University of Twente, The Netherlands. He has worked at the WPI Advanced Institute for Materials Research, Japan, as an Assistant Professor and at the Université de Strasbourg, France, as an Associate Professor. He has also worked at the National Institute of Standards and Technology (NIST) and the National Institutes of Health (NIH), under the U.S. National Academies Associateship program. He is the author of 300+ publications, including 15 textbooks and 70 book chapters. His current h-index is 40 with 10000+ citations. He is a recipient of several prestigious fellowships and awards, including CSIR Fellowship (India), Singapore Millennium Fellowship (SMF) (Singapore),

NRC National Academies Fellowship (USA), Nationale Professeur des Universités (France), ASEM-DUO Fellowship (South Korea), Fellow of Royal Society of Biology (UK), Fellow of Institute of Nanotechnology (UK), and Fellow of Royal Society of Chemistry (UK).

Publication of speakers:

- Murugan Ramalingam et al ; Biomaterial Surface patterning of self assembled monolayers for controlling neuronal cell behavior, 2009 Jan 1
- Murugan Ramalingam et al ; Ethyl 4′-ethenyl-2′-oxo-4-phenyl-2-(3,4,5-trimethoxy-phen¬yl)spiro¬[pyrrolidine-3,3′-indoline]-5-carboxyl¬ate monohydrate , 2008 Oct 4
- Murugan Ramalingam et al ; (Z)-3-(4-Fluoro¬phen¬yl)-1-[4-(methyl¬sulfon¬yl)phen¬yl]-2-tosyl¬prop-2-en-1-one, 2008 Nov 1
- Murugan Ramalingam et al ; Hybrid hydrogels containing vertically aligned carbon nanotubes with anisotropic electrical conductivity for muscle myofiber fabrication, 2014 Mar 19
- Murugan Ramalingam et al ; Skeletal Muscle Tissue Engineering: Methods to Form Skeletal Myotubes and Their Applications, 2014 Feb 20.

6th International Conference on Stem Cell Research, Cell and Gene Therapy; July 20-21, 2020; Paris, France.

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