Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
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TRINITY CENTRE FOR BIOENGINEERING SEMINAR SERIES 2019

Mesenchymal Stromal Cells for Modulation of Disease Progression in Osteoarthritis: Mechanistic and Translational insights

Speaker: **Mary Murphy, Senior Lecturer in Regenerative Medicine, NUI, Galway and Principal Investigator, REMEDI Orthobiology Group, NUI, Galway**
When: **4pm on Friday 3rd of May 2019**
Where: **Tercentenary Hall, Trinity Biomedical Sciences Institute**

Inflammation has been associated with early degradative changes of articular cartilage in osteoarthritis (OA) and immune responses are key factors influencing normal tissue regeneration and repair in the joint. Although mesenchymal stem/stromal cells (MSCs) have shown potential for the repair and/or protection of damaged articular cartilage, tissue engineering strategies to date using these cells have not been entirely successful, often producing terminal rather than stable chondrocytes. Intra-articular delivery of MSCs (whether bone marrow-derived or adipose tissue-derived MSCs (ASCs)) has been shown to prevent cartilage degradation in a variety of pre-clinical models of OA as well as in early clinical trials. A large body of data is accumulating to suggest that the ability of MSCs to modulate development of OA and other diseases may be associated with immune modulation. Early cell death through apoptosis may be the primary therapeutic mechanism in systemically introduced cells but mechanisms associated with local delivery have not been defined. We have investigated the role of MSC apoptosis on immune modulation *in vitro* and characterised *in vitro* effects of surviving, engrafted MSCs retrieved from the joint. The molecular profile of these *in vivo* licensed therapeutic cells was also established.

Mary Murphy, PhD, DSc. is a principle investigator at the Regenerative Medicine Institute (REMEDI) at the National University of Ireland Galway. Ireland. Research interests focus primarily on the development of innovative medicines using mesenchymal stem/stromal cells (MSCs), MSCs derived from induced pluripotent stem cells and gene therapy to provide new modalities in patient care for osteoarthritis, bone repair and vascular calcification.
Basic research is focused on the concept that stem cell depletion, or loss/alteration of function, contributes to the development of chronic degenerative diseases such as osteoarthritis and atherosclerosis, the use of the chondrogenic differentiation pathway of bone marrow-derived MSC as a model to study early changes in osteoarthritis development and the role of inflammation and epigenetics in disease progression. Current clinical research focuses on the therapeutic potential of MSCs and she has involved with the ADIPOA2 Phase 2 clinical trial to assess adipose-derived stromal cells in osteoarthritis. Tissue engineering concepts are targeted to cover various elements including assessment of novel materials for cartilage repair and the development of targeting strategies for non-invasive delivery of therapeutic cells and anti-inflammatory or pro-chondrogenic agents to osteoarthritic joints using nanoparticles. Applied research has a focus on the manufacturing of MSCs for therapeutic use and address development of novel fully defined serum-free medium for cell growth and scale-up using robot-enabled, economic manufacturing systems.