Science and Technology in Medicine

Research Project Proforma (School of Medicine)

Research Title: **Keywords (up to 5)**	Anti-inflammatory and immunoregulatory effects of mesenchymal stem cells conditioned media in inflammatory arthritis Mesenchymal stem cells, rheumatoid arthritis, paracrine, inflammation
Supervisor: **Job Title:** **Department:** **Email Address:** **Telephone:** **Webpage link:**	Dr Oksana Kehoe Lecturer in Biosciences Rheumatology Research, RJAH Orthopaedic Hospital, Oswestry o.kehoe@keele.ac.uk 01691404149 http://www.keele.ac.uk/istm/staff/oksanakehoe/
Type of projects offered (delete as appropriate)	Intercalation (1 year)/Studentship (4-8 weeks)/Both

(1) Outline the broad aims of your research and its medical relevance (150 words): This project will contribute to the identification and development of new therapies for improved treatment of autoimmune systemic chronic inflammatory diseases, more specifically, rheumatoid arthritis (RA). RA affects more than 600,000 people in Britain and costs the economy almost £8 billion a year. Current treatments are associated with side effects and not all patients respond to treatment. For patients with arthritis, medications can halt inflammation but are unable to achieve regeneration/repair of the damaged tissues. There is still a clear unmet clinical need for better treatments which will give patients a better quality of life.

Mesenchymal stem cells (MSC), due to their immunosuppressive and regenerative properties, hold the exciting promise of being a revolutionary therapy for arthritis sufferers. The therapeutic potential of MSC-conditioned media has not been tested in arthritis and

may lead to the development of a safe, cost effective and universal treatment for autoimmune diseases.

(2) Indicate the skills/techniques the student will learn (100 words)

The project will acquire a number of fundamental skills and techniques related to regenerative medicine. Cell culture – including isolation of bone marrow MSCs, peripheral blood T-lymphocytes, immunocytochemistry and immunohistochemistry, flow cytometry, RT-PCR, western blotting.

The immunoregulatory effects of conditioned media on activated peripheral blood T-lymphocytes will be assess by MTT assay, production of anti-inflammatory markers (IL-10 and TGF-β ELISAs) and detection of apoptosis in activated T-lymphocytes. Therapeutic potential of conditioned media will be tested in pre-clinical arthritis models. We will identify whether intra-articular injection of MSC-conditioned media leads to a reduction in inflammation, the induction of $CD4^{+}CD25^{+}Foxp3^{+}$ regulatory T-cells and shifts the M1/M2 macrophage balance.

Please submit this form electronically to Prof Divya Maitreyi Chari on d.chari@keele.ac.uk by 31 July 2015