**Queen’s University Belfast**

*School of Nursing and Midwifery*

**Project Title: Unravelling patient predictors of mesenchymal stem cell expansion in an orthopaedic setting.**

**Proposed Supervisors**: Dr Susan Clarke (School of Nursing and Midwifery), Mr Eugene Verzin (Consultant, RVH), Dr Alex Lennon (School of Mechanical and Aerospace Engineering).

Stem cell therapies are now used for indications ranging from cardiology to dementia to bone repair. These therapies rely on the ex vivo expansion of mesenchymal stem cells (MSCs) derived from a variety of tissue sites such as adipose tissue and bone marrow, but there are anecdotal reports of failure of the cells to expand sufficiently in culture to allow reimplantation in a significant number of patients (discussions with those involved suggest as many as 20% of patients are affected). In a recent study, we found that, in the adult population, age had limited effect on the number of stem cells in bone marrow, or on their proliferative capacity, however there were significant differences in gender and with body mass index (BMI). BMI showed a positive correlation with osteoprogenitor number in males- accounting for up to 75% of the variation. The aim of the proposed project is to investigate further patient factors that may affect the MSC compartment in order to build a computational model that could predict the potential for ex vivo expansion. The project involves isolation and characterisation of primary mesenchymal stem cells, collection of patient data and advanced statistical analysis. This project will provide further understanding of the patient characteristics that affect stem cell expansion ex vivo and could aid decision making for clinicians. It complements the current trend towards personalised medicine by avoiding the use of inappropriate therapies, potentially across all fields of medicine in which stem cell therapies are applied.

**If you wish to be considered for a studentship, please complete the following two steps:**

1. **Email an up to date CV and a covering letter explaining why you want to undertake a PhD in the School of Nursing and Midwifery to Sean Morrison at sean.morrison@qub.ac.uk.**
2. **Complete the online application by clicking here for the QUB Postgraduate Applications Portal.**

**The closing date for applications is Friday 19 May 2017. Interviews for shortlisted candidates are expected to take place the week commencing 29 May.**