

PhD Studentship: The Effect Of Osteoporosis On Bone Cell Response To Strontium.

Osteoporosis mainly affects older people and causes an increased risk of vertebral, hip and wrist fractures with every decade over 50 years of age leading to an incidence of nine million fragility fractures per year worldwide. Fixation of such fractures is essential and current devices are not fit for purpose. This project will contribute to development of biomaterials for new fracture fixation device, designed specifically for the older, osteoporotic population. A bioresorbable polymer will be used for the new device, in place of more traditional metals. The polymer will be uniquely modified to ensure controlled release of a strontium-based bioactive component, which is proposed to increase bone formation and osteogenic gene expression.

The project team have **funding from The Dunhill Medical Trust** to investigate the ability of controlled strontium release from resorbable devices to improve osteoporotic fracture fixation. This PhD project will contribute to part of these investigations with the **specific aims** to

1. understand the dose response of relevant primary cells to strontium;
2. Investigate differences in response of cells from osteoporotic patients to strontium.

Using human bone marrow derived mesenchymal stem cells from “normal” donors undergoing elective spinal surgery, outcome measures will be cytotoxicity, cell morphology, cell proliferation and cell differentiation. An experimental design approach will then be used to identify the target therapeutic range, establish longer-term outcomes and examine response of cells from “normal” donors compared to osteoporotic donors.

Given that Sr is reported to have a dual effect on both osteoblasts and osteoclasts the second phase of *in vitro* studies will be completed via a three month placement at our research partner in Technische Universitat Dresden (TUD) and will examine the *in vitro* response to osteoblast/osteoclast co-culture assay, using both ‘normal’ and OP cells. **This will give the PhD student a valuable opportunity to undertake an international placement in Dresden, Germany.**

The successful candidate will have access to state-of-the-art facilities at QUB and part of the MATCH Pioneer Research programme (www.qub.ac.uk/MATCH/)

The PhD is for 3 years starting October 2019 with an enhanced annual stipend of £15,500. The successful candidate should hold a bioscience degree (e.g. biomedical sciences, biomedical engineering or similar) with at least 2:1 Honours and be willing to spend 3 months on placement in Germany. Fee/studentship funding is available for UK nationals or EU nationals.

Supervisors:

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