Science and Technology in Medicine

Research Project Proforma (School of Medicine)

Research Title: **Keywords (up to 5)**	**Use of statins prior to percutaneous coronary intervention (PCI)**
Supervisor: **Job Title:** **Department:** **Email Address:** **Telephone:** **Webpage link:**	Robert Butler, Alan Harper and Ying Yang Consultant Cardiologist and Senior Lecturer Department of Cardiology, Royal Stoke Hospital 01782 675971 r.butler@keele.ac.uk
Type of projects offered (delete as appropriate)	Intercalation

(1) Outline the broad aims of your research and its medical relevance (150 words):

Studies have demonstrated that statin use prior to percutaneous coronary intervention (PCI) reduces the risk of myocardial infarction (MI). One mechanism is that statins increase the number of circulating endothelial progenitor cells (cEPCs), which are derived from bone marrow, although rare in blood, which play a role in vascular injury repair.

Platelets also play an acute role in repairing damaged vessel wall. Previous work has demonstrated cross-talk between these two cell types *in vitro,* but limited data exist regarding their interaction at the site of vessel injury. Our lab has developed a tissue-engineered human arterial constructs to recreate an arterial injury model under physiological flow conditions.

In this project, we will use our arterial construct to develop a balloon injury model, so we can replicate endothelial injury from a PCI. We will use this new methodology

to assess how the interaction of platelet and cEPCs are affected when these two cell types are perfused under physiological conditions, either alone or separately, and also examine whether EPC perfusion alone or in combination with platelets affects the re-endothelialisation of the damaged arterial construct.

By doing this we hope to better understand the mechanisms of re-endothelialisation of the arterial wall. The physiological cell interaction between EPCs and platelets is further complicated by the many drugs given at the time of an acute coronary syndrome, the net impact of which can be tested using our model. Platelet-EPC interactions can be assessed with background therapeutic levels of aspirin/clopidogrel/bisoprolol/heparin/rampiril alone or in combination.

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

This one year intercalation project will generate data that can be presented and hopefully published, and will generate meaningful data towards greater understanding of the complex processes that are in play at the time of a myocardial infarction

Please submit this form electronically to Faye Palmer at medicine.intercalation@keele.ac.uk