

Science and Technology in Medicine



Research Project Proforma (School of Medicine)

Research Title:	Neurological injury models for regenerative medicine: biomaterials and cell transplantation
Keywords (up to 5)	Tissue engineering; Neuroscience; Nanoparticles; Traumatic brain injury; Parkinson's disease
Supervisor:	Dr Stuart Jenkins
Job Title:	Lecturer in Neurobiology
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Type of projects offered (delete as appropriate)	Intercalation (1 year) Studentship (8 weeks)

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

Regenerative medicines, especially those based on tissue engineering, offer the possibility of treating currently incurable and devastating conditions. However, many prospective therapies fail at clinical trial because the models they were tested in failed to mimic key features of the central nervous system. Superior neuromimetic models are needed in order to understand disease-specific pathology, and test new therapies. Developing these novel therapies involves identifying safe and effective tools for neural tissue engineering, including nanoparticles for drug delivery, genetic engineering, or tracking transplanted cells.

I develop models of the central nervous system to mimic disease, and assess the safety and efficacy of potential therapeutic tools. I have a particular interest in immunomodulatory therapies, that could harness the repair-promoting functions of the brain's specialised immune cells, microglia.

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

- **Neural tissue engineering**
- **Culturing neural cells/tissue as models of neurological injury or disease**
- **Simulating ischaemic stroke, traumatic brain injury**
- **Guiding development of embryonic stem cells (ESCs) into dopaminergic neurons, as transplant populations**
- **Developing improved culture systems, including 3D culture, organotypic brain slices, serum-free culture media, controlled oxygen levels**
- **Testing biomaterials (hydrogels, nanoparticles)**
- **Fluorescence and electron microscopy**
- **Molecular biology, including qPCR**

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