Faculty of Engineering  
Summer Research Program 2021-2022

Project Title: Topologically-defined polymer scaffolds for peripheral nerve regrowth

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Objective

- Prepare a library of surface-patterned porous polymer scaffolds
- Characterize materials prepared through scanning electron microscopy, profilometry, and atomic force microscopy
- Evaluate the efficacy of the prepared materials using dorsal root ganglion cells

Project Details

Soft lithography is a method commonly used to fabricate microscale structures from photocurable monomers using elastomeric stamps. Several cell types respond to specific oriented topographies and microenvironments, showing favourable responses to various designs of cell attachment, proliferation, and alignment, both in vivo and in vitro. Porous polymeric materials can be generated by a technique known as emulsion templating, whereby the droplets in a concentrated emulsion are used to generate pores in the final material. The combination of these two fabrication methods allows bulk porous polymers with surface patterns to be produced in one step. The work will initially involve preparing polymers from commercially available thiol and acrylate monomers. These will be used to build a library (grooves, pillars, bumps, etc.) of patterned porous polymers which will be characterized by a range of techniques to investigate the efficiency and versatility of pattern transfer of emulsion templated polymers. The patterned scaffolds will be investigated to assess the effect of the generated patterns on attachment and spreading of cells of a neuronal lineage.

Prerequisites

None

Additional Information

Informal enquiries can be made to neil.cameron@monash.edu
Submit as a word document - no more than one page long.