Faculty of Engineering  
Summer Research Program 2019-2020

Project Title: Nanoparticle-protein complexes for real-time biosensing of cardiac troponins

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Objective

Only ~15% of the 80,000 Victorians rushed to hospital each year with chest pains are suffering an acute coronary event requiring urgent intervention. Troponin testing at the “point of care” (e.g. in the home, in an ambulance, etc) is an urgent medical need, however currently available technologies for detecting troponin rely on complex laboratory infrastructure and highly trained technicians. The objective of this project is to develop novel, 1-step, protein biosensors for cardiac troponins which could be used by ambulance staff, or even implanted under the skin of high-risk patients.

Project Details

My group has recently engineered antibody fragments that change their fluorescence spectra when they bind to cardiac troponin. We now wish to immobilize these antibody fragments onto silica nanoparticles to enable development of a rapid biosensor which could be used either in vitro or implanted in vivo into mouse models of acute coronary syndrome. Students working on this project will gain experience in protein and nanoparticle characterisation, biosensor development, and potentially pre-clinical animal studies.

Prerequisites

Students with an interest in biomedical science or biochemistry would be well-suited to this project, especially those in dual degree programs or who have some relevant lab experience either in research projects or through exposure to labs in their undergraduate units.

Additional Information

Interested students are encouraged to visit the Nanosensor Engineering Lab website (www.nanosensor-eng.net) and contact Dr Corrie for more information.