**HONOURS PROJECT 2017**

**Project Title:** The role of the insulin receptor and IGF-1R activation in normal growth and disease

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**CNS Lab:** Proteins in Metabolism and Cancer  
**Location of Project:** FMC lab 6E109

**Brief Outline of Project:**
We aim to understand the basic mechanism by which insulin and insulin-like growth factor 1 (IGF-I) bind and activate their receptors (the insulin receptor and the IGF-1R) to promote metabolic control, cell growth and survival. Surprisingly we lack fundamental information as to how insulin and IGF-I interact with their receptors to promote the key conformational changes required to activate the receptor tyrosine kinase domains and subsequent downstream signaling pathways. We will probe this interaction by making novel mutants of the ligands and the receptors and then testing these in cell based assays for their abilities to promote downstream insulin receptor or IGF-1R signalling. This will allow us to understand in detail which interactions between the ligands and the receptors are key for promoting specific receptor activation outcomes. Ultimately this information will allow us to create novel improved insulins for the treatment of diabetes and inhibitors of IGF-I for the treatment of cancers that are dependent on IGF-I signaling for growth and survival.

During honours the following methods and techniques will be used: Molecular biology techniques such as PCR (polymerase chain reaction) and cloning; Protein expression and purification; Cell culture; Western blotting; data analysis and interpretation. You would study under the guidance of Associate Professor Forbes and the experienced research assistant and PhD students in our laboratory.

**Key References:**