Jumping Genes and Human Reproduction

Project Description

Project duration:	Honours (from January 2025)
Description:	Our genomes contain thousands of mobile DNA "jumping genes", some of which can cause genetic mutations by copy-and-pasting themselves to new locations in our DNA sequence. Jumping gene mutations have long been known to cause genetic disease. More recently, jumping gene DNA and RNA molecules have been linked to autoimmunity and inflammation because they are recognised by the immune system as "non-self" nucleic acids, by pathways that normally combat viral infection. Jumping genes are highly active in placenta during pregnancy, but their impact in this tissue is not fully understood. This project will investigate whether too much jumping gene activity in placental cells can cause an inappropriate immune response, and how placental cells regulate jumping gene activity. This work will potentially reveal jumping genes as contributors to placental dysfunction and adverse pregnancy outcomes.
Expected outcomes and deliverables:	The Honours student undertaking this project will gain experience in molecular biology techniques, genetics, genomics, cell culture, CRISPR-Cas9 genome editing, flow cytometry, and fluorescence microscopy, among other techniques. They will gain expertise in molecular genetics, genomics, and cell biology, with a focus on mobile DNA and mammalian development. The Honours student will receive excellent scientific training in a research environment that is supportive and inclusive. They will be expected to generate publication-quality data, with guidance by the team leader and team members. In addition to laboratory skills, the student will be expected to develop their written and verbal scientific communication skills over the course of the Honours project.
Suitable for:	The ideal applicant is highly motivated and curious, with a background in genetics, genomics, cell biology or developmental biology. However, students with other educational backgrounds in the biological sciences are encouraged to get in touch and discuss their interests with the team leader.
Primary Supervisor:	Dr Sandra Richardson
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