Increasing hematopoietic stem cell niches post transplantation through enhancing bone marrow macrophage resilience and regeneration mechanisms.

HDR Project Description

Project duration:	PhD 3 Years
Description:	This Earmarked Scholarship project is aligned with a recently awarded Category 1 research grant. It offers you the opportunity to work with leading researchers and contribute to large projects of national significance. Hematopoietic stem cell (HSC) transplantation (HSCT) is a potentially curative treatment for blood cancers and other diseases and can supplement high-dose chemotherapy in treatment resistant solid tumours. HSCT associated risk factors and complications remain a significant barrier to decision to treat and are a major driver of associated health costs. Despite decades of HSCT protocol refinement, treatment related morbidity and mortality remain barriers to decision to treat using this strategy. We and others have demonstrated that bone marrow resident macrophages provide multifaceted support of haematopoiesis including instructing the specialized HSC niches. Our novel findings that bone marrow resident macrophages are resilient to a myeloablative radiation dose and, after HSCT, provide critical support to HSC engraftment and bone marrow reconstitution. This PhD project will work toward testing the hypothesis that resident macrophage resilience is a critical regenerative mechanism against bone marrow damaged caused by many types of myelosuppressive cancer therapies. Using preclinical approaches to generate novel knowledge, this PhD project will contribute to examining macrophage resilience to a broad range of cancer therapies and determine if a minimum threshold of macrophage resilience determine the difference between a tolerated versus lethal dose of cytotoxic therapies.
Expected outcomes and deliverables:	Ultimately this research project is designed to inform development of novel treatment strategies to improve the safety of HSCT and reduce the side effects of a broad range of cancer treatments.
Suitable for:	A working knowledge of immunology, haematology and cell biology would be of benefit to someone working on this project. The applicant will demonstrate academic achievement in the field(s) of immunology, cell biology, molecular biology and physiology and the potential for scholastic success. A background or knowledge of immunology, cell biology and physiology is highly desirable.

	The project will involve significant work with preclinical animal models and so prospective student should be willing to undertake this type of research.
Primary Supervisor:	Professor Allison Pettit
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