

UQ Summer Research Project Description

Project title:	Role of Toll Like Receptor (TLR)-4 on iron homeostasis
Hours of engagement & delivery mode	On-site at the Translational Research Institute, Woolloongabba Hours of engagement must be between 20 – 36 hrs per week and must fall within the official program dates (13 Jan – 21 Feb 2025).
Description:	<p>Inflammatory bowel diseases (IBD), which include ulcerative colitis (UC) and Crohn’s disease (CD), are chronic inflammation of the gastrointestinal tract. Anaemia represents the most common complication in IBD, prevailing in 27% of patients with CD and 21% of patients UC. Anaemia is associated with poor quality of life, increased rate of hospitalization and deaths in IBD. Anaemia in patients with IBD arise due to iron deficiency anaemia (IDA) and anaemia of inflammation (AI). Most anaemic IBD patients are treated with iron supplementation, but half do not respond to iron supplementation therapies. We have discovered that leaky gut (endotoxemia) plays a key role in IBD induced anaemia (Bisht et al, unpublished data). We showed previously (Bisht et al, Fron in Immu, 2020) that endotoxin receptor, TLR4, is expressed by erythroblastic island macrophages, a crucial immune cell supporting red blood cell formation. However, role of TLR-4 on IBD induced anaemia is poorly understood. In this project, we aim to explore the role of TLR-4 on iron homeostasis in mouse model of colitis. We will specifically delete TLR-4 in erythroblastic island macrophages and tissue iron, iron homeostasis genes and proteins will be analysed.</p> <p>The project will utilise mouse model of experiment colitis and mouse model of endotoxemia. Iron in liver, spleen and bone marrow will be analysed by Prussian blue and bathophenanthroline. Serum iron will be analysed using ELISA kit. Iron homeostasis genes in bone marrow, liver and duodenum will be analysed by quantitative real-time polymerase chain reaction.</p>
Expected learning outcomes and deliverables:	Students will get exposure to world class facilities at TRI and Mater. As part of this project, students will have the opportunity to observe mouse harvest, tissue collection (bone marrow, blood, liver, duodenum and spleen) and learnt mouse tissue sample collection and preparation. They will also learn techniques such as real time polymerase chain reaction and ELISA. At the end of the project student will gain experience working in a PC2 laboratory and Immunology techniques.
Suitable for:	This project is open to applications from student with a background in Molecular Biology or Master Research students.
Primary Supervisor:	Dr Kavita Bisht
Further info:	For further information, please email Dr Kavita Bisht at Kavita.Bisht@mater.uq.edu.au