



THE UNIVERSITY OF
MELBOURNE

Faculty of Medicine,
Dentistry and Health
Sciences

Colorectal Oncogenomics Group

Identifying and investigating subtypes of colorectal cancer.

The Colorectal Oncogenomics Group's research program is focused on the identification of clinically and biologically relevant subtypes of colorectal cancer including hereditary colorectal cancer and polyposis syndromes. The Colorectal Oncogenomics Group uses genomic, epigenomic and transcriptomic profiling integrated with immune cell profiling, histopathological characterisation, environmental/lifestyle risk factors and clinical data to determine the underlying aetiology of colorectal tumourigenesis so that greater steps can be made towards personalised risk stratification for early detection and prevention of this disease.

Opportunity for PhD, Honours or Masters:

Testing the effect of aspirin on colonic organoids from people with Lynch syndrome

Lynch Syndrome (LS) is a relatively common genetic condition with a prevalence of ~1 in 300. LS is caused by germline mutations in the DNA mismatch repair genes and affected individuals are predisposed to various cancers, most frequently colorectal cancer (CRC). Aspirin and other non-steroid anti-inflammatory drugs (NSAIDs), which are inhibitors of COX enzymes, have shown a protective effect against CRC, including in Lynch syndrome related CRC. Regular users of aspirin are shown to have reduced CRC incidences by up to 50% hence often prescribed in individuals with LS. Human intestinal epithelial organoid (IEO) has become a powerful translational research tool for understanding the colorectal biology and treatment development. The effect of aspirin and other NSAIDs has never been studied in the IEO model. This project

hypothesises that there are stable changes in DNA methylation that are induced by aspirin and this can be detected in the IEO model. DNA methylation can “switch” genes on and off without changing DNA sequences and is one of the epigenetic mechanisms most sensitive to environments. This project will involve developing IEOs from colonic mucosa biopsies from colonoscopy of individuals affected with LS. The IEOs will be treated with aspirin and other drugs and the methylomes and the transcriptomes will be assessed by the Infinium HumanMethylationEPIC and RNA-Seq at multiple time points to measure aspirin-inducible DNA methylation and gene expression changes. A stipend for this project is available to the selected student.



Contact us

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