# 2016/2017 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on **4 July 2016**

| **Supervisor Information (First named supervisor will be the contact):** | |
|---|---|
| First Supervisor's Name and Title: Dr Logan Walker | |
| Department - UOC &/or CDHB (if applicable): Pathology | |
| First Supervisors Phone: 03 3640544 | First Supervisors Email: logan.walker@otago.ac.nz |
| First Supervisors Mailing Address: Department of Pathology, PO Box 4345, University of Otago, Christchurch 8140 | |
| Co-Supervisors Name and Title(s): Professor Ann Richardson (University of Canterbury) | |

| **Research Category (Choose one category only – to be used for judging the students' presentations):** | | |
|---|---|---|
| **Clinical** | **Laboratory X** | **Community** |

**Project Title (20 words MAXIMUM):**

**Investigation of Epstein-Barr virus in breast tumour cells**

**Project Description:**

**Introduction:**
Breast cancer is the most commonly diagnosed cancer in women worldwide. Several human cancers can be caused by viruses and a mouse mammary tumour virus is known to cause breast cancer in mice. Evidence suggests that exposure to a common virus such as Epstein-Barr virus (EBV) may contribute to breast cancer risk and development in humans. Recurring mutations in some genes, including *ARID1A* and *BAP1*, have been shown to be strongly linked with EBV levels in nasopharyngeal carcinoma and gastric cancer. The same mutations occur in a proportion of breast tumours, however it is unknown whether they are associated with EBV exposure. Using quantitative PCR, we recently identified EBV in breast tumour samples. However, a meta-analysis of multiple published studies showed highly variable results of EBV in breast cancer. Key reasons for the variability, includes limitations in the sensitivity, specificity, and/or design of molecular assays used. Further investigation of molecular technologies used for epidemiological studies is essential to our understanding of viruses and breast cancer.

**Aim:**
Our proposed project will explore the use of a more sensitive and specific RNA in situ technology (RNAscope) to detect viral gene expression in human cells.

**Possible impact (in lay terms):**
*Short term* – Development of a more sensitive and specific screening tool will influence the methodological design of future epidemiological studies.

*Long term* – Development of a screening tool to help understand the biological relationship between EBV (and other viruses) and breast cancer development, which could lead to targeted therapy and/or prevention of a significant proportion of breast cancer.

**Method:** RNA *in situ* hybridization (RNAscope technology) will be carried out to detect mRNA expressed from an EBV gene in histological sections from breast and nasopharyngeal tumour tissue. Expression profiles will be recorded according to tumour cell type, including epithelial, fibroblast, lymphocyte and adipocyte. Lymphoblastoid cell lines which contain the EBV genome will be assessed as positive controls. If fresh/frozen breast tumour tissue is available and time allows, we will also explore methodologies for identifying genetic mutations in the genes *ARID1A* and *BAP1.*

**Notes:**
The experimental work for this project will be achievable within the 10 week period, and will be carried out in the Mackenzie Cancer Research Group. This is an ideal project for students considering postgraduate (Honours, PhD) opportunities.