2015/2016 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on **3 July 2015**

Supervisor Information (First named supervisor will be the contact):

Supervisor's Name and Title(s): Dr Logan Walker, Dr John Pearson

Department: Pathology	Institution: UOC
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Research Category (Choose one category only – to be used for judging the students' presentations):

Clinical	Laboratory X	Community

Project Title (20 words MAXIMUM):

Genetic and epidemiological assessment of BRCA mutation carriers from the NZ Familial Breast Cancer Study

Project Description:

Introduction:

A significant proportion of breast cancers are due to inherited genetic changes that increase risk of developing the disease. Genetic mutations in the breast cancer susceptibility genes *BRCA1* and *BRCA2* are known to confer a highly elevated risk of breast cancer in approximately one-third of multi-case families. However, for most breast cancer affected women, the genetic changes underlying their disease remain undetermined or poorly understood. The New Zealand Familial Breast Cancer Study (NZFBCS) was initiated in 2013 to learn what genetic factors common in New Zealand women are associated with individual breast cancer risks and to support a multidisciplinary approach to informed decision-making in health practice. The study has attracted more than 100 women who fulfil the inclusion criteria: *female, have had genetic testing through the Genetic Health Service NZ service, and carry a BRCA mutation and/or a BRCA sequence variant of unknown clinical significance*. The study exploits local resources and expertise from various sectors, including the University of Otago, Canterbury District Health Board, Genetic Health Service NZ, the Cancer Society Tissue Bank and the Christchurch Breast Cancer Registry. The NZFBCS is the first and only study site in the country that contributes data from New Zealand patients to the large international consortium, ENIGMA (Evidence-based Network for the Interpretation of Germline Mutant Alleles). ENIGMA provides a means for diagnostic and research laboratories worldwide to pool resources and refine methods, including the multifactorial likelihood model, for classifying genetic changes in *BRCA1*, *BRCA2* and other breast cancer susceptibility genes. The NZFBCS will also provide the first New Zealand contribution to the respected international consortium, CIMBA (Consortium of Investigators of Modifiers of *BRCA1/2*).

Aim:

To profile genetic, epidemiological and clinical data associated with participants in the New Zealand Familial Breast Cancer Study

Method:

Patient attributes such as medical history, reproductive history and family history will be assessed and summarised using descriptive statistics. Pedigree information collected from each study participant will be evaluated using statistical models that assess the probability that an individual carries a germline deleterious mutation of the *BRCA1* and *BRCA2* genes. Genetic data will be annotated along *BRCA1* and *BRCA2* genes and corresponding proteins in relation to known functional domains. Variants of unknown clinical significance will be evaluated using bioinformatic tools. Next generation sequencing data of germline DNA from four patients testing negative for BRCA mutations will be interrogated bioinformatically for potential risk associated rare variants proposed by other studies.

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. The student will take a lead role in the experiment described, with appropriate supervision from Dr Walker and Dr Pearson. This will allow the student to develop important scientific skills, in a supportive and active multidisciplinary research environment.

Student Prerequisites (eg. Medical Student) if applicable:

None