2014/2015 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on **4 July** 2014

Supervisor Information (First named supervisor will be the contact):	
Supervisor's Name(s): Dr Logan Walker	
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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):

Human amylase gene copy number variation and breast cancer development

Project Description:

BACKGROUND:

A very recent study demonstrated a clear inverse association between germline DNA copy number of the salivary amylase (*AMY1*) gene and risk of obesity (Falchi *et al*. 2014). Obesity, as defined by a body mass index (BMI = weight in kilograms divided by the square of height in metres) over 30, is significant health concern both nationally and internationally. A number of studies have shown a link between obesity and the development of diseases, such as cancer, cardiovascular disease, and diabetes. Breast cancer is the most frequently registered cancer in New Zealand women, and obesity is a risk factor for the development of new cases in post-menopausal women. Furthermore, weight gain after surgery for breast cancer is also associated with an increased risk of relapse. These findings suggest a potential link between *AMY1* copy number and breast cancer risk.

AIM:

To measure *AMY1* gene copy number for breast cancer patients and compare with BMI.

METHOD:

DNA and BMI data will be sourced from a cohort of breast cancer cases from our local NZ Familial Breast Cancer Study, the Cancer Society Tissue Bank and from the international research initiative kConFab (Peter MacCallum Cancer Centre, Melbourne). Several molecular methods, such as qPCR and Nanostring technology, will be compared for accuracy, reproducibility and cost in measuring the copy number of *AMY1*. The association between *AMY1* gene copy number and BMI of breast cancer patients will be determined using regression techniques.

SIGNIFICANCE:

Obesity has become a major national and global health challenge. Through ongoing patient recruitment by the NZ Familial Breast Cancer Study, Cancer Society Tissue Bank, and established links with kConFab, we are well placed to assess DNA copy number changes of *AMY1* and breast cancer risk. Identification of women who are genetically predisposed to increased BMI could lead to future studies exploring interventions, such as oral administration of amylase containing capsules, which may in turn reduce risk of breast cancer and other obesity-related diseases.

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. This will allow the student to develop important scientific skills, in a supportive and active multidisciplinary research environment. It is likely that the findings will contribute to a research manuscript, in which case the student would be a contributing author.

REFERENCE:

Falchi et al., Low copy number of the salivary amylase gene predisposes to obesity. Nature Genetics 46, 492–497 (2014)