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. Margaret Currie, Dr. Anna Pilbrow and Dr. Elisabeth Phillips	
Department: Pathology	Institution: University of Otago, Christchurch
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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):

Identification of microRNAs in breast tumour cells after co-culture with adipocytes.

Project Description:

We are looking for a bright, enthusiastic student to join a multidisciplinary team: The Mackenzie Cancer Research Group and The Christchurch Heart Institute.
The proposed summer-studentship represents an important part of our ongoing research into the role of adipocytes in the progression of cancer, but is designed for completion within a 10 week Summer-Studentship.

Background: Obesity is linked to a worse outcome in patient with breast cancer regardless of menopausal status and hormone receptor status. The Mackenzie Cancer Research Group are currently using primary cell culture of human adipocytes in a novel experimental co-culture system, where adipocytes from human breast adipose tissue are grown together with breast tumour cell lines. Culturing these cells together has remarkable impact on both the adipocytes and breast tumour cell lines. Adipocytes become de-differentiated, less lipid rich and secrete factors which promote the survival and migration of breast tumour cells *in-vitro* (cancer-associated adipocytes). Breast tumour cells become more resistant to chemotherapy, and display a more aggressive phenotype.

MicroRNAs have been identified in the development of cancer; numerous studies have identified potential important roles for microRNAs in the pathogenesis of cancer, particularly their function as oncogenes and deregulating tumour suppressors. MicroRNAs have also been associated with the differentiation of adipocytes *in-vitro*. To date, there is no literature showing the identification and function of microRNAs in tumour cells when the tumour cells are grown in an adipocyte rich environment. A mechanism for this phenotypic change in our co-cultured tumour cells has yet to be elucidated.

Aim: To identify microRNAs that may be contributing to the phenotypic change seen in the breast tumour cells that are co-cultured with adipocytes.

Method: The student will grow breast tumour cells *in-vitro* and be involved in the co-culture of these cells with human breast adipocytes using the co-culture system. Total RNA will be extracted from breast tumour cells cultured alone or in combination with breast adipocytes, and converted to cDNA using commercial kits (Exiqon). To identify microRNAs associated with co-culture in breast tumour cells, an initial screen will be performed in a small number of samples using high-throughput real-time quantitative PCR (RTqPCR) assays (Exiqon). MicroRNAs will then be selected for validation in a larger number of breast tumour samples from two cell lines using individual miRNA RTqPCR assays (Exiqon). For each cell line, microRNA levels will be compared between tumour cells cultured with and without adipocytes using ANOVA. All statistical analyses will be performed with SPSS.

The project will be carried out under the supervision of Dr. Margaret Currie, Dr Anna Pilbrow and Dr. Elisabeth Phillips. Results from the summer-studentship are intended to contribute to data for publication and provide pilot data for further investigations into this interesting field of research.

Significance: Obesity has a negative impact on breast cancer; obese women have more distant metastases at diagnosis and have higher mortality rates. This project will give greater insight into the biology of adipocytes and the interaction that occurs between tumour cells and this largely neglected stromal cell.