

2017/2018 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on 3 July 2016

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

First **Supervisor's** Name and Title: Dr Abel Damien Ang

Department - UOC &/or CDHB (if applicable): Pathology, UOC

First Supervisors Phone: 033640557

First Supervisors Email: abel.ang@otago.ac.nz

First Supervisors Mailing Address: University of Otago Christchurch, 2 Riccarton Ave, PO Box 4345, Christchurch 8140

Co-Supervisors Name and Title(s): Associate Professor Gabi Dachs

Research Category (Choose one category only – **to be used for judging the students'** presentations):

~~Clinical~~

Laboratory x

~~Community~~

Project Title (20 words MAXIMUM):

Does vitamin C interact with chemotherapy in cancer treatment in vivo?

Project Description:

We are looking for a bright, enthusiastic student to join our multidisciplinary cancer research group. The Mackenzie Cancer Research Group is interested in the cellular and molecular basis of cancer and response to therapy. We have close links with the clinic and the proposed study represents an important part of our ongoing research.

Introduction:

In NZ and worldwide many cancer patients seek high dose vitamin C (HDVC) treatment from complementary medicine providers. This treatment option continues to be controversial, largely due to the lack of an agreed mechanism of action or evidence for clinical efficacy. We have generated significant *in vitro*, *in vivo* and pre-clinical evidence that suggests a link between tumour vitamin C content, activity of the transcription factor HIF-1 and tumour growth and aggression (Vissers 2007, Kuiper 2010, 2014, Campbell 2015, 2016). To investigate whether a change in vitamin C supply may alter tumour growth, we use a knockout mouse model; *Gulo*^{-/-} **mice can't synthesize** vitamin C and are therefore similar to humans in this regard. In this mouse model, we have data for lung, melanoma, and breast cancer tumours treated with vitamin C alone. However there has not yet been any systematic studies looking at the effect of vitamin C on chemotherapy in a relevant *in vivo* model.

Aim: To investigate whether high dose vitamin C treatment may affect the efficacy of chemotherapy, and if different scheduling of vitamin C-chemotherapy treatment would yield different outcomes.

Possible impact (in lay terms):

The use of vitamin C in cancer remains controversial, yet many cancer patients choose high dose vitamin C treatment. This study will provide valuable scientific data for the ongoing debate, particularly with respect to combination therapy of vitamin C and chemotherapy. This data is vital for the design of clinical trials in cancer patients.

Methods:

To determine the effect of scheduling on the combination of vitamin C and chemotherapy, the treatment groups were as follows: 1) saline control, vitamin C alone, 3) chemotherapy alone, 4) chemotherapy followed by vitamin C, 5) vitamin C followed by chemotherapy, and 6) vitamin C together with chemotherapy.

All tumour samples have already been collected and are ready for laboratory analyses.

In this student project, samples will be analysed using techniques such as immunohistochemistry and Western blotting. These methods will be used to measure apoptosis, DNA damage, degree of hypoxia, levels of HIF-1 and its target proteins, and blood flow in the tumour samples.

Student Prerequisites (eg. Medical Student) if applicable:

We are looking for a student with a strong science background, and, ideally, some laboratory experience.

Administration Details

1. Is ethical approval required? Yes/~~No~~

If Yes: please circle or tick one of the following:

a) ~~Applied for (provide application #)~~

b) Approved (attach a copy of the letter of approval from the ethics committee or application #) AEC approval C11/16

c) ~~To be done~~

2. Are you able to provide the funding for this project (ie. \$5,000 for the student, incidental expenses should be met from departmental or research funds) Yes/~~No~~

If Yes: Please provide name of the funder _____

If No: Please provide ideas of possible funding sources, including past funding agents and topics often associated with this research area, for the Research Office to contact.

University of Otago Research Grant

If Yes: You will be sent a request for more information.

3. Medical Records or Decision Support accessed Yes/~~No~~ N/A

4. Health Connect South or other DHB records Yes/~~No~~ N/A

5. Signatures:

- I have read the 2017/2018 Summer Studentship programme handbook.
- I am prepared to supervise the project and will be available to the student during the studentship (including Christmas/New Year break if the student is working during this time).
- I agree to assume responsibility for the submission **of the student's reports to the Research Office** by the due date 30 January 2017.
- I agree that the project lay report may be available to local media for publicity purposes.

Signature of Project Supervisor(s):

Date: 28/6/2017

- I understand that I am responsible for hosting the Summer Student chosen for this project and will meet any costs incurred. I agree that incidental expenses will be met from departmental or research funds.

Signature of Head of Department:
(Print Name) Prof Martin Kennedy

Date:

Signature of Clinical Director: (if applicable)
(Print Name) N/A

Date: