

2017/2018 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on 3 July 2017

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

First **Supervisor's** Name and Title: Professor Stephen Chambers

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

First Supervisors Phone: 3640590

steve.chambers@otago.ac.nz

First Supervisors Email:

First Supervisors Mailing Address: Department of Pathology, University of Otago, Christchurch

Co-Supervisors Name and Title(s): Trevor Anderson, Dr John Clemens, Professor David Murdoch, Dr Amy Scott-Thomas, Dr

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

Clinical

Laboratory yes

Community

Project Title (20 words MAXIMUM): Finding the reservoir of *Legionella longbeachae*

Project Description: A survey of tree species in Christchurch Botanic gardens and surrounds for *L. longbeachae*

Introduction: *Legionella longbeachae* is the predominant cause of Legionnaires disease in New Zealand. Its importance was first recognized in Christchurch but a nationwide study has shown that it occurs throughout the country. Cases typically occur between November and March and over this time, it is the commonest cause of admission to hospital with community acquired pneumonia. About 25% of cases require admission to the Intensive Care Unit and 5% die from this infection. *L. longbeachae* is known to occur in soils and can replicate in amoeba to high levels. Infection is strongly associated with gardening and the use of commercial potting mix or compost. A study conducted with a commercial supplier in New Zealand has shown that *L. longbeachae* is common in pine bark (about 50% of samples positive), which is a major ingredient of potting mix in New Zealand, but not in peat. It is not yet known whether these environmental strains cause human infection in New Zealand. Studies in Australia and Scotland have confirmed the association with pine bark but studies in Japan have suggested that oak products may also harbour *L. longbeachae*. Genetic studies of *L. longbeachae* demonstrate it has enzymes that can degrade plant material supporting such a niche in the environment but the major reservoir has not been determined.

Aim: To determine the range of tree species that harbor *L. longbeachae* in the Christchurch environment.

Possible impact (in lay terms): *L. longbeachae* is the major cause of admission to hospital for pneumonia during the summer months. We think the main reservoir is in pine bark that can subsequently multiply sufficiently in the soil or compost under the right conditions to cause human infections. If the reservoir can be identified, infection control measures for gardeners and commercial producers may be identified. This project will contribute to an ongoing programme of research aimed at preventing Legionnaires Disease occurring.

Method:

- 1) A survey of the bark and litter around a range of tree species growing in and around the central Christchurch area will be performed together with composting sites in the Christchurch Botanic Gardens. Dr John Clemens, a **plant biologist, curator of Christchurch's Botanic Gardens and adjunct Associate Professor of the Department of Biological Sciences at the University of Canterbury**, will supervise collection of bark and litter around a range of tree species including pines, oaks and other trees in the Hagley Park and Botanic Gardens. Each sample will be comprised of about 50 grams of bark and bark litter. About 30 samples will be collected from each tree species and a range of 10 tree species will be sampled in the first round of testing. Depending on our findings, further samples may be subsequently needed. Positive controls from previous testing will be included.
- 2) Testing for *L. longbeachae* will be done by qPCR and culture. PCR testing will be done under the supervision of Trevor Anderson, senior scientist at Canterbury Health Laboratories and Ali Mohammadi (PhD student) who have developed these methods. Cultures will be done in laboratories in the Department Pathology of University of Otago, Christchurch under the supervision of Dr Amy Scott-Thomas.
- 3) Extracts from bark of all species studied will be extracted and checked for inhibitors of *L. longbeachae*.
- 4) All DNA and cultured isolates will be stored for future sequencing.

Student Prerequisites (eg. Medical Student) if applicable:

Student with some molecular biology experience

Administration Details

1. Is ethical approval required? 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 #)
- 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) 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.

_____ Canterbury Medical Research Foundation

3. Medical Records or Decision Support accessed No

4. Health Connect South or other DHB records No

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 29 January 2018.
- I agree that the project lay report may be available to local media for publicity purposes.

Signature of Project Supervisor(s):

Date:

- 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)

Date:

Signature of Clinical Director: (if applicable)
(Print Name)

Date: