

**Project title** Interactions of carbohydrate fermenting microorganisms in the gut of abalone.

**Supervisors** Dr. Gabriel Visnovsky (University of Canterbury), Dr. Jason Ryan (Callaghan Innovation Research Limited) and Prof. Andrew Jeffs (Auckland University)

### **Project description**

Abalone (*Haliotis*) are a valuable seafood species in New Zealand and in many parts of the world. Recently, New Zealand has developed large scale commercial abalone culture in land-based facilities. A major cost in culturing abalone is providing artificial feed. In the wild, adult abalone feed mostly on seaweed and appear to rely on microbial fermentation in the gut to assist in the breakdown of the algae to release nutrients, especially carbohydrates and proteins. Farmed abalone feed has a high component of carbohydrates derived from terrestrial sources, mostly grains. The ability of microbial communities in the gut of abalone to digest these different carbohydrate sources is still unclear.

A range of alginolytic microorganisms, microbes which contain alginases, have been identified previously. These microorganisms all reside within the *Vibrio* genus, which usually makes up a majority of the abalone when the animal moves from diatom-based diets (juveniles) to seaweed-based diets (adults). It has also been observed that increased carbohydrase activity is exhibited by abalone fed in a range of diets. This could be a result of either a combination of increased bacterial concentrations in the abalone's gut or facilitated contact between dietary substrates and digestive cells. An examination of the role of microbes in the digestion in some species of New Zealand seaweed-eating fish again indicated that the microbial community mainly contributed alginase activity, rather than amylase.

The main objective of this research is to isolate, identify, and characterize carbohydrate fermenting microorganisms from New Zealand abalone. By isolating and learning more about these microbes we will possibly be able to understand the complex interactions they have with its host.

### **Applicant Qualifications and specific competences**

The successful candidate must be independent, curious, rigorous, highly self motivated, be goal oriented and have good writing and communication skills. An enthusiasm for innovation and creative thinking is particularly encouraged.

The applicant should have a First Class Honours degree (or an Upper Second Class at least) in Microbiology, Industrial Microbiology, Biochemistry, Biotechnology, Biotechnology Engineering, Chemical and Process Engineering or Biology. A master degree in any of the mentioned areas and previous experience in microbial fermentation will be advantageous but is not essential.

Applications should be in the form of a detailed CV and a covering letter. The CV should contain the names and complete contact details of at least two referees, and the type, class and grade of your degree/s. Full transcripts from previous degree/s should be submitted together with the application.

Applications should be sent directly to: [cape-applications@canterbury.ac.nz](mailto:cape-applications@canterbury.ac.nz)

Only selected candidates will be contacted.

**Project initiation and application deadline**

The successful applicant is expected to start in the month of September/October 2014, although a different starting date can be arranged for the successful candidate. The application deadline is April 15, 2014.

**Funding notes**

The value of the scholarship will be NZ\$25,000 per annum (for a maximum of 3 years). The scholarship covers tuition fees for the thesis enrolment at the New Zealand domestic rate for the term of the scholarship. The student levy and administration fee are not included.