MEDIA RELEASE

NEWS FROM THE UNIVERSITY OF TASMANIA
DATE: WEDNESDAY, 4 NOVEMBER 2009
ATTENTION: Chiefs of Staff, News Directors

Slimy orange Antarctic marvel

An obscure, single-celled organism, which has some amazing survival adaptations that allows it to live in the coldest place on Earth, could play an important role in food safety and medicine.

But the bacteria, *Psychroflexus torquis*, is at risk of disappearing forever if climate change melts the rare pockets of Antarctic ice where it lives.

UTAS Associate Professor in Food Molecular Biology, Associate Professor John Bowman, is determined to discover the slimy orange bacteria's secrets before it disappears from the wild.

P. torquis is an extreme psychrophile, which means it only grows at low temperatures. It is extremely slow growing, replicating itself just once a day, compared with common warm-temperature bacteria which replicate every half hour.

The bacteria is mainly found in perennial sea ice aged up to 10 years and it feeds on the secretions of the algae.

It is its amazing array of adaptations to withstand extreme cold, high salinity and low nutrients that makes it unique in the bacterial world.

Assoc. Prof. Bowman has sequenced the *P. torquis's* genome and is now studying the species novel cold adaptation and stress protection mechanisms, which have evolved in the Antarctic cryosphere.

The bacteria produces massive amounts of slimy exopolysaccharides (complex carbohydrates that it excretes) and anti-freeze proteins, which help it survive in the extreme cold.

"We think the exopolysaccharides actually carry the anti-freeze proteins, and together they influence the way ice crystals grow and allow the microbe to grow at temperatures colder than -10 degrees Centigrade.," Assoc. Prof. Bowman said.

"The species also appears to possess the ability to store carbon and energy as glycogen and polyphosphate, which may be important when temperature conditions do not allow efficient transport of nutrients or nutrients are not available."

The bacteria has an unusual light active protein that absorbs light and generates energy, called proteorhodopsin, which has been observed in other microbes living in extremely low nutrient environments.

Finally, *P. torquis* also forms a series of different polyunsaturated fatty acids, which may have potential nutriceutical (nutrient supplement) benefits for humans.

Assoc. Prof. Bowman, who is based at the Tasmanian Institute of Agricultural Research, is currently looking at the bacteria's proteins using the state-of-the-art proteomics facility at the UTAS Central Science Laboratory.

This research on Antarctic bacteria was released at today's launch of the UTAS publication, *Research to Reality*.

Additional research projects in marine and Antarctic studies are featured in the latest edition of *Research to Reality*, which is available online at www.research.utas.edu.au from Wednesday, 4 November, 2009.

Information Released by:
Media Office, University of Tasmania
Phone: 6226 8519 Mobile: 0418 510 121
Email: Media.Office@utas.edu.au