420

ACTINOBACTERIA IN ANTARCTIC ICE

J Twin, J Bowman

University of Tasmania, Hobart, Tasmania, Australia

Actinobacteria is a class of extremely diverse gram-positive bacteria that possess a high guanine/cytosine content in their genomes. In nature they are important organic decomposers and are important biotechnologically for their roles in many industrial and pharmaceutical processes. As well as this, Actinobacteria are also extremely robust, generally being able to withstand desiccated and nutrient limited environments for extended periods of time. Microbial diversity studies of environments from around the world including solid ice have continually detected members of Actinobacteria. The study of solid ice is a unique opportunity to examine a snap-shot of the past whether years or millennia ago.

Research has been carried out on the diversity of Actinobacteria in Antarctic ice. Glacial ice from Law Dome and marine ice beneath the Amery Ice Shelf were obtained through collaboration with the Antarctic and Climate Ecosystem CRC (ACE CRC). The Law Dome core samples consisted of extremely pure ice aged between 3-100Kyr. The marine ice beneath the Amery Ice Shelf consisted of several samples taken along a 20 metre core.

DNA was extracted from the samples and was subjected to clone library analysis as well as denaturing gradient gel electrophoresis (DGGE) to examine diversity trends, and show the relative abundance of bacteria in the ice samples. To complement the molecular analysis carried out, traditional culturing experiments were also carried out in which Actinobacteria were readily cultured from the solid marine ice.

The findings of this research reaffirm the importance of Antarctic Actinobacteria both as an important part of the microbial biota in the present and past, and also identifies bacteria that could be used in further research, such as studies into evolution and global climate change.