LETTER

Archaea in a hyper-arid polar desert

Studying the microbial diversity of a unique biome such as the McMurdo Dry Valleys, Antarctica, is important to understand the sustainability of life under cold-arid conditions where other forms of life (i.e., plants and animals) do not exist. Pointing et al. (1) examined multidomain microbial diversity in the McKelvey valley using culture-independent molecular approaches and interestingly found microbes to have adapted to these extreme conditions.

One of the most significant findings of this study (1) was the lack of recoverable archaeal phylotypes from samples collected from the valley. The authors unsuccessfully used two sets of primer pairs to amplify archaeal communities from these samples and suggested that archaea were unable to tolerate extreme xeric conditions. Archaea have previously been reported from similar environmental conditions. For example, several members of Crenarchaeota were obtained from an endolithic microbial community in dolomite rock in the central Alps (Switzerland) (2). Archaea were also obtained from Arctic ice shelf microbial mats (3), and from Lake Fryxell (4), which is near the McKelvey valley. Pointing et al. (1) did use two different sets of primers, but other available approaches were not exhausted. PCR-based methods have revolutionized microbial diversity studies but still suffer from serious drawbacks. It is possible that the number of archaea present in these samples were too low to be detected by PCR. There are two approaches to overcome such problems: (*i*) DNA extraction from larger sample size and/or (*ii*) nested PCR. It is not clear if the authors used either of these approaches. Potentially low numbers of archaea could be further investigated by an attempt to enrich/grow them under laboratory conditions. This poses the question whether the authors missed an opportunity to identify some novel extremophilic archaea from this unique biome by not using a culture-dependent approach. Other approaches may include the measurements of microbial activities such as methane emission, which is mainly produced by archaea. Pointing et al. (1) report a significant finding on the microbial diversity near the cold-arid limit for life; however, there is a scope for further analysis using suitable approaches to reach to a final conclusion regarding presence of archaea in this unique environment.

Brajesh K. Singh[1]
Macaulay Land Use Research Institute, Aberdeen AB15 8QH, United Kingdom

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[1]E-mail: b.singh@macaulay.ac.uk.