

북극 스발바르 제도의 암석 종류에 따른 미생물 군집 분석 Endolithic microbial communities of different types of rocks in Svalbard

Yong-Hoe Choe, Mincheol Kim, Jusun Woo, Mi Jung Lee and Yoo Kyung Lee *

Arctic Research Center, Korea Polar Research Institute, KIOST

*교신저자 Tel: 32-760-5530, E-mail: yklee@kopri.re.kr

Extreme environmental conditions such as those found in the polar regions on Earth are thought to explore the limits of life and the strategies evolved by microorganisms to adapt to extreme environments. The high Arctic has been long considered a suitable terrestrial analogue to Mars in many geological and astrobiological aspects. We used a combination of pyro-sequencing and microscopy methods to examine endolithic microbial communities on five different rock types (sandstone, limestone, basalt, granite, and travertine). Bacterial communities showed slight variation between different rock types. Bacterial communities were dominated by *Actinobacteria*, *Proteobacteria*, *Chloroflexi*, *Bacteroidetes*, and *Acidobacteria*. Blast result revealed that dominant endolithic OTUs in this environment are highly affiliated with those found in soils or rocks of Arctic and Antarctica, suggesting 'niche conservatism' occurs at a global scale. Mantel test was performed to further explore the correlations between endolithic microbial community and chemical composition of rocks, and showed significant positive correlations between bacterial communities and most of the major elements including Si, Al, Fe, Mg, P, K, and Ti. This study shows that endolithic communities are associated with the type of rock and its localities.

Key words: Astrobiology, Endolith, Microbial community

Acknowledgments

This study was supported by a grant from Korea polar research institute (PE15030)

References

- [1] Starke V. et al. (2013) Environmental Microbiology Reports, 5, 648–659.
- [2] Smith H. D. et al. (2014) International Journal of Astrobiology, 13 (3), 271–277.
- [3] Horath T. et al. (2005) Microb Ecol. 51(3), 353-64.
- [4] Cary S. et al. (2010) Nature Reviews. Volume 8.
- [5] Ziolkowski L. A. et al. (2013) Biogeosciences, 10, 7661–7675