



Microscopic Examination of the Microbial Life of an Alpine Subsurface Thermal Spring

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The slightly radioactive thermal springs at Bad Gastein (Austria) were examined for the occurrence of microorganisms several times. Scanning electron microscopy performed by Dr. Wolfgang Heinen revealed an interesting morphological diversity in biofilms found in this environment (1, 2). The surfaces of the submerged rocks in this spring were overgrown by microbial mats. Similar mats were also formed on glass slides which were exposed to the water stream of the spring. Molecular analysis of the community structure of the radioactive subsurface thermal spring was performed by Weidler et al. (3). 16S rRNA gene sequence analyses and restriction fragment length polymorphism (RFLP) revealed a high diversity of microorganisms. In addition, the search for crenarchaeal ammonia oxidation-related genes was done, because early results revealed the presence of a large number of crenarchaeal clones.

This work presents some of Dr. Heinen's electron micrographs and additionally new microscopic studies of the biofilms formed on the glass slides. Staining, using fluorescent dyes such as 4',6-Diamidino-2-phenylindol (DAPI), gave an overview of the microbial diversity of these biofilms. Based on the previously gained new nucleotide sequence information, a specific fluorescent in situ hybridization (FISH) probe was designed for the identification of the crenarchaeal organisms in this habitat. The morphology and small-scale distribution in the microbial mat was analyzed by several FISH experiments using standard and high specific probes.

1. Lauwers A. M. & Heinen W. (1985) *Mikroskopie* (Wien) 42, 94-101.
2. Heinen W. & Lauwers A. M. (1985) *Mikroskopie* (Wien) 42, 124-134.

3. Weidler G. W., Dormmayr-Pfaffenuemer M., Gerbl F. W., Heinen W., Stan-Lotter H. (2007) AEM 73, 259-270.