Making a Living While Starving in the Dark: Metagenomic Insights into the Energy Dynamics of a Carbonate Cave

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Abstract

Kartchner Caverns in Benson, Arizona is one of the top ten caves in the world in terms of the mineralogical diversity of its formations. Kartchner's management and development has left parts of this wet "living" carbonate cave remarkably untouched despite 200,000 visitors per year and its location in the arid US Southwest. We have been working in Kartchner since 2001 to develop an understanding of (i) spatial and geochemical impacts on the variability in microbial structure and diversity found on cave formations (speleothems), (ii) the metabolic potential of speleothem microbial communities and their relationship to possible nutrient sources, (iii) the potential for a biogenic contribution to speleothem formation, and (iv) whether tourism may ultimately impact important functional aspects of speleothem communities that could alter the formation and growth of these unique cave features. The results of this research will be presented in the larger context of a discussion of the Earth's microbiome and how physical, chemical, and biological characteristics influence the microbial types and functions in any given ecosystem.

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