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Our favourite food: The potential for microbial degradation of paleoluminescent organic material in caves.

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Without sunlight energy, the presence of organic carbon within a cave system becomes a function of geology, hydrology and climate; significant organic input is limited to the entrance zone and areas fed by surface water, whether rapidly entering the system through faults or slowly percolating through the bedrock. Due to such geologic isolation, the majority of caves were considered a sterile environment; starved of the nutrients essential to support life. Nonetheless, in the last 20 years, there has been a revolution in our understanding of the metabolic strategies capable of supporting microbial growth and the recognition of previously undetected geomicrobial activity in cave systems. Consequently, there has been a paradigm shift in our understanding of the physical and chemical conditions that allow microbial survival in extremely starved (oligotrophic) environments, such as caves. Most organic carbon entering caves is from soil detritus, which is chemically fractionated and degraded as it percolates through the host rock. As a result, the water entering these systems brings with it little organic carbon; usually in the form of organic, humic and fulvic acids that are resistant to decomposition. Nonetheless, our research suggests that these organic acids are capable of supporting a diverse microbial community, whose synergistic metabolic activities are able to breakdown these structurally complex molecules. Such microbial activity may be responsible for a number of geochemical signatures observed within cave environments; as diverse as calcite deposition to the formation of corrosion residues. As a result, our research may be of significance for geologists

attempting to understand the degradation of luminescent organic material in such cave environments.