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Terrestrial microbes in martian and chondritic meteorites

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Good extraterrestrial analogs for microbiology are SNC meteorites as Mars analogs, and chondrites as early planet analogs. Chondrites and SNCs are used to trace processes in the early solar system and on Mars. Yet, questions about terrestrial contamination and its effects on the isotopic, chemical and mineral characteristics often arise. A wide biodiversity was found in 21 chondrites of groups CR, CV, CK, CO from ANSMET, CI and CM Falls, and 8 SNCs. Studies documented the alteration of meteorites by weathering and biology [1]-[6], and during aqueous extraction for oxygen isotopic analysis [7], visible biofilms grew in the meteorite solutions in days.

To assess biological isotopic and chemical impacts, cultures were incubated 11 months and analyzed by PCR. The sequences for 2 isolates from EET 87770 and Leoville were of a good quality with long sequence reads. In EET 87770, the closest matches were in the genus *Microbacterium*. Soil and plant isolates were close relatives by sequence comparison. *Bacillus*, a common soil bacterial genus, grew in a Leoville culture. All SNCs exhibited biological activity measured independently by LAL but only 1 colony was successfully cultured from grains of the SNC Los Angeles. Isotopic analyses of samples with various amounts of microbial contamination could help quantified isotopic impact of microbes on protoplanetary chemistry in these rocks.

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