

A blueprint for life forms on Mars?

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Microbes taken from surface sediment near Lost Hammer Spring, Canada, about 900 km south of the North Pole, could provide a blueprint for the kind of life forms that may once have existed, or may still exist, on Mars. Credit: Elisse Magnuson.

The extremely salty, very cold, and almost oxygen-free environment under the permafrost of Lost Hammer Spring in Canada's High Arctic is the one that most closely resembles certain areas on Mars. So, if you want to learn more about the kinds of life forms that could once have existed—or may still exist—on Mars, this is a good place to look. After much searching under extremely difficult conditions, McGill University researchers have found microbes that have never been identified before. Moreover, by using state-of-the-art genomic techniques, they have gained insight into their metabolisms.

In a recent paper in *The ISME Journal*, the scientists demonstrate, for the first time, that microbial communities found living in Canada's High Arctic, in conditions analogous to those on Mars, can survive by eating and breathing simple inorganic compounds of a kind that have been detected on Mars (such as methane, sulfide, sulfate, carbon monoxide, and carbon dioxide). This discovery is so compelling that samples of the Lost Hammer [surface](#) sediments were selected by the European Space Agency to test the life detection capabilities of the instruments they plan to use on the next ExoMars Mission.

Developing a blueprint for life on Mars

Lost Hammer Spring, in Nunavut in Canada's High Arctic, is one of the coldest and saltiest terrestrial springs discovered to date. The water which travels up through 600 meters of permafrost to the surface is extremely salty (~24% salinity), perennially at sub-zero temperatures (~−5 °C) and contains almost no oxygen (

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