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GOLD STREAK

For centuries, scientists have wondered why gold is found in two forms - as a solid in deposits close to the Earth's crust, and in solution, often far removed from gold-ore deposits. A fairly simple lab experiment conducted at the University of Massachusetts may lead to an understanding of how the precious metal

came to be available in disparate forms and how some gold-ore deposits might have been formed.

In research related to pollution clean-up, a team of UMass microbiologists, led by researcher Derek Lovley, has extracted gold solids from water containing dissolved gold. The work uses technology that Lovley developed 10 years ago to clean up heavily polluted water and soil in the United States using bacteria and archaea (ancient micro-organisms) to break down heavy metals in affected environments. Like uranium, cadmium and other heavy metals, gold is precious and useful to humans. Lovley notes that dissolved gold, however, is useless because it can't be manipulated and formed into valuable or beautiful objects. He says, when either solid or liquid gold is ingested, it is toxic to most life forms. On the other hand, liquid gold and many other heavy metals are not toxic to a group of microbes called extremophiles, which are simple life forms known to thrive in environments where others cannot live.

With this in mind, the UMass researchers asked if extremophiles might have ingested the liquid gold found in hydrothermal vents, hot springs and other hot places and left it scattered as deposits of solid gold in places that now are below the surface of the Earth. This would explain how the metal came to be in two different forms in very different environments. If that is the case, the team wondered if microbes could duplicate the process in the laboratory and extract valuable solids from liquids containing dissolved gold. Bacteria and archaea digest one metal form and excrete it as another form, leaving behind deposits of solid metal in unlikely places on Earth or maybe even on Mars. _,