Gold discovery may have industry applications

Derek Lovley in his laboratory (Stan Sherer photo)

Lovley's lab has previously published evidence that iron-reducing micro-organisms are involved in the formation of uranium ores, changing uranium to a form that precipitates out of water. Massive accumulations of magnetite created by iron reducing microbes during the Precambrian period of the earth's development now are important deposits of iron ore, according to Lovley.

In the laboratory, postdoctoral research associate Kazem Kashefi, and graduate students Jason M. Tor, and Kelly P. Nevin studied dissolved gold in an oxidized form in an environment similar to that found in a hydrothermal vent, where dissolved gold can sometimes be found.

The team wanted to see what would happen if they put iron-reducing microbes into the gold solution under those conditions. As they suspected, the microbes rapidly converted the gold from the useless, oxidized, dissolved form to a more valuable, insoluble, metal form. Essentially, the microbes had eaten the solution, and left behind a precious byproduct.

"There's a significant amount of gold found in solution in some thermal springs, and hydrothermal vents on the ocean floor," Lovley said. "The problem is that the gold is extremely diluted, so only a teeny amount is dispersed in a very large volume of water."

"There are waste streams from gold processing where this same reduction process might work on a larger scale, but the goal of this study was to offer an explanation of how gold deposits are formed, more than it was to produce any profitable or useful application on a larger scale," explained Lovley. The research was presented in the July issue of the journal Applied and Environmental Microbiology. It was funded in part by a grant from the National Science Foundation, through the Life in Extreme Environments Program.