

There's gold in that there salt water?

A UMass scientist finds a method he devised to remove pollutants from water can also distill gold, but at great cost.

By STAN FREEMAN

Staff writer

AMHERST- It's been a feverish quest through much of history to transform various metals into gold.

Now University of Massachusetts researchers say a much more common commodity - sea water - can yield the same treasure.

A team of microbiologists led by Derek R. Lovley used bacteria and other microorganisms to extract solid gold from water containing dissolved gold.

"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."

However, he doubts the discovery will launch a modern-day gold rush to the ocean depths. "I think if you were to calculate the cost of pumping seawater through a reactor with these organisms, the energy requirement for that would probably exceed the value of gold."

The effort used technology Lovley first developed 10 years ago to clean up polluted water and soil using bacteria and archaea, or ancient microorganisms, to break down heavy metals in the pollution.



Union-News file photo

Derek R. Lovley, a microbiologist at the University of Massachusetts, works in his laboratory.

Gold is found on land, in deposits close to the Earth's crust, but it is also found deep under water in solid deposits near "vents," places where hot gases and materials are shot up into the water from deeper inside the earth. Scientists have never had an explanation for why solid gold appears there.

From his work with pollution, Lovley knew of microbes that digest one form of metal and excrete

it in another form. And he and his team, which included postdoctoral research associate Kazem Kashefi and graduate students Jason M. Tor and Kelly P. Nevin, theorized that microbes that live in deep water environments may have digested dissolved gold in water coming from the vents, transformed it and excreted it as solid gold.

If this were the case, the team

wondered if microbes could duplicate the process in the laboratory. The test worked.

Lovley said the process may have some commercial applications.

"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," he said.

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 Extreme Environments Program