Golden microbial art

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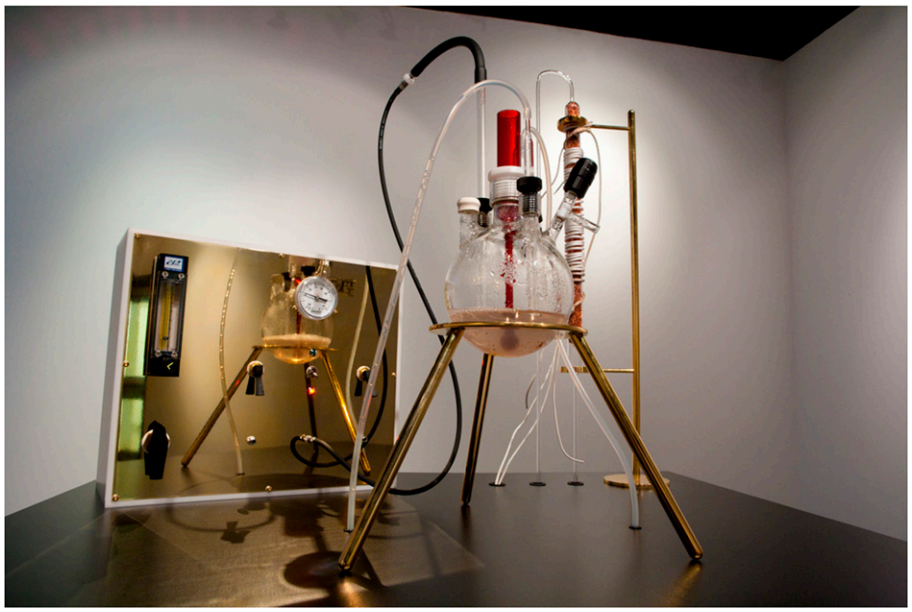
Enclosed in a glass sphere, microbes feast on a toxic meal. The liquid gold chloride they ingest is normally poisonous, binding to and destroying cellular structures. However, like microscopic neo-alchemists, this specially designed strain of *Cupriavidus metallidurans* is busy turning its poisoned dinner into gold—in view of an audience.



"The Great Work of the Metal Lover," by Adam Brown and Kazem Kashefi. Custom alchemical-inspired glass bioreactor containing biofilm produced by *Cupriavidus metallidurans* precipitating Au^0 from Au^{III}. Image courtesy of Adam Brown and Kazem Kashefi, Michigan State University.

Under the glare of a museum spotlight, the colony releases tiny, 24-karat golden balls into a reddish liquid. After one week, there is enough gold floating in the glass sphere to melt into a 100-mg nugget. Called "The Great Work of the Metal Lover," this precious metal-producing bioreactor is actually an award-winning art installation, the result of a collaboration between Kazem Kashefi and Adam Brown, both at Michigan State University.

Kashefi, a microbiologist, had been studying strains of metal-metabolizing extremophiles. Then he met Brown, a professor of electronic art and intermedia. Together, they designed the installation, with Kashefi modifying *C. metallidurans* so that it could complete the gold transmutation at room temperature, and making the microbe tolerant of extremely high concentrations of gold chloride, enough to produce visible amounts of gold.

Next, Brown adorned the space around the bioreactor with some of the microbes' handiwork: Images of golden bacterially produced spheres, captured by a scanning electron microscope and festooned with 24-karat gold leaf that he retrieved from the spotlighted soup.

With gold-plated laboratory hardware and a microscope trained on the action, the portable laboratory looks a bit like the gleaming contraptions one might find in science laboratories of yesteryear.

www.pnas.org/cgi/doi/10.1073/pnas.1304918110