

### **Microbial responses to toxic metals in the Oak Ridge Reservation environment**

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**Project Goals:** The environmentally relevant isolation of several metal-resistant microorganisms is described along with the characterization of a novel uranium-binding complex from a strain isolated from the ORR site.

**Abstract:** The metal resistance campaign is focused on investigating molecular mechanisms to microbial metal resistance. One of the defining characteristics of the Oak Ridge Reservation (ORR) environment is the presence of mixed industrial waste and the effect this waste has on the groundwater microbial community. Metals are a key component of the mixed waste with concentrations of uranium, aluminum, manganese, cadmium and cobalt in contaminated groundwater wells over 1,000 times greater than those in pristine background wells. The metal resistance campaign is exploring the effects of metal toxicity on the ORR groundwater community in several ways. Strains will be described that were isolated from ORR groundwater in media that contain metal concentrations similar to those present in the contaminated environments. The physiology of metal toxicity was studied through measurement of genome-wide gene fitness under copper, zinc, chromium and uranium toxicity using the model organism *Pseudomonas stutzeri* RCH2. In addition, the properties of a uranium-binding protein complex from the ORR isolate *Pelosinus fermentans* UFO1 will be presented.

*This material by ENIGMA- Ecosystems and Networks Integrated with Genes and Molecular Assemblies (<http://enigma.lbl.gov>), a Scientific Focus Area Program at Lawrence Berkeley National Laboratory is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Biological & Environmental Research under contract number DE-AC02-05CH11231*