

Mining microbial treasures from toxic sites

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Filled with a noxious brew of copper, cadmium and arsenic, with a pH rivaling that of sulfuric acid, Montana's Berkeley Pit seems inhospitable to life. Nonetheless, scientists have discovered microorganisms in this abandoned copper mine and other human-made noxious sites. These extreme environments induce microbes to synthesize potent, never-before-seen molecules that could find uses in human medicine, according to an article in *Chemical & Engineering News*, the weekly newsmagazine of the American Chemical Society.

Recently, [scientists](#) have begun exploring places like old copper mines and smoldering coal seams for signs of life. They suspect that some of the unusual molecules that microbes make to stay alive under such hostile conditions could help humans survive maladies such as cancer or antibiotic-resistant bacterial infections. However, researchers face substantial challenges in growing these [microorganisms](#) in the lab and isolating potentially useful compounds, which are just the first of many steps to move drugs into the clinic, freelance contributor Carrie Arnold writes.

Replicating in the lab the [extreme environments](#) in which these microbes thrive can be challenging or impossible. However, researchers Andrea and Don Stierle at the University of Montana cultured fungi from the Berkeley Pit in a nutrient broth spiked with pit water. The Stierles have since extracted and purified several new molecules from the fungi that show anti-cancer and antibiotic activities in vitro. Because many such extremophiles can't be grown in the lab, some researchers have turned to a technique called metagenomics, which involves sequencing microbial

DNA directly from environmental samples and then predicting classes of molecules the microbes might be making. Although no compounds identified from noxious environments have yet made it into the clinic, experts predict that it's only a matter of time before these manmade disasters yield lifesaving medicines.

More information: "Scientists mine for potential drugs in the Berkeley Pit and other industrial sites," cen.acs.org/biological-chemist...rugs-Berkeley/97/i18

Provided by American Chemical Society

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