A Look into the Tiny Earth: Finding Antibiotic Producing Bacteria in Yellowstone Soil

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In 1928, Alexander Fleming observed the ability of penicillin to kill Staphylococcus epidermidis, revolutionarily classifying penicillin as the first true antibiotic drug. Antibiotics are produced naturally by bacteria to eliminate other competitive microorganisms, often in diverse soil ecosystems. Since Fleming, over 100 antibiotics have been discovered to treat bacterial infections. However, the World Health Organization predicts that worldwide death rates from drug-resistant infections will rise from 700,000 per year to 10 million by 2050, becoming the leading cause of death for humans. It's become critical to locate new antibiotic producers in areas with abundant microbial competition. One of these places is Yellowstone National Park, where hot springs support one of the planet's greatest concentrations of biodiversity. This study was focused on finding antibiotic producers in Yellowstone soil, as well as investigating the effects of each sample's proximity to hot springs. Bacteria were isolated from each soil sample and grown in colonies to see if they inhibited the growth of different ESKAPE pathogens. Of the 46 antibiotic-producing colonies that were found, 8 were selected based on unique characteristics and then tested in order to identify them, resulting in 5 distinct species. Many of the antibiotic-producing colonies came from samples taken close to freshwater rivers into which hot springs flowed. Thus, Yellowstone's biodiverse soil harbors incredible amounts of distinct antibiotic producers that could be used to treat a myriad of infections.

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