Geobacter metallireducens

A. Introduction

B. A rod shaped, Gram-negative,

C. Anaerobic bacteria

I. Metabolism

A. Role in carbon and nutrient cycling and bioremediation

B. Metabolism of soluble harmful (sometimes radioactive) contaminants into insoluble harmless forms

C. Take part in bioremediation of organic and metal contaminants in groundwater and participates in the carbon and nutrient cycles of aquatic sediments

II. Ecology

A. Aside from using Fe(III) oxides, the G. metallireducens uses metals such as plutonium and uranium to metabolize food [5]. G. metallireducens consumes these radioactive elements and breaks down the contaminants

B. When G. metallireducens metabolizes uranium, it changes the metal from a soluble to an insoluble form. The insoluble uranium drops out of the groundwater--decontaminating streams and drinking water. The insoluble uranium remains in the soil and could then be extracted

C. The use of an insoluble electron acceptor may explain why Geobacter species predominate over other dissimilatory iron-reducing bacterial species in a wide variety of sedimentary environments

III. Ecology

A. It uses a sensor to 'sniff out' metals. If metal is not nearby, it can spontaneously grow flagella—whip-like cellular propellers—to find new energy sources

B. researchers realized that in past motility experiments the organism had only been grown on soluble metals, which are easy to work with in the laboratory. After performing experiments with insoluble metals, such as iron oxide, the team found that G. metallireducens indeed grows flagella and swims

C. The microbe's metal diet has made it intriguing to researchers. In addition to using iron, the organism will use metals such as plutonium and uranium to metabolize food. Geobacter metallireducens consumes these radioactive elements and essentially eats away at the contaminants
IV. Media

A. ATCC medium: 1768 Geobacter metallireducens Medium

B. Ferric citrate (Sigma F-6129).......................13.7 g

C. Growth Conditions Temperature: 30°C
   Atmosphere: Anaerobic gas mixture, 80% N2-20% CO2