A Physiological and Genetic Approach to Studying Lead Resistance in Arthrobacter sp. VN23-1. (S03-jerke102435-Oral)

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Abstract:

The physiological mechanisms and genetic basis for lead resistance are poorly understood in bacteria. Arthrobacter sp. VN23-1 isolated from soils contaminated with lead and chromium, grew at lead concentrations up to 150 uM in minimal media. The growth rate was unimpaired at 75 and 150 uM lead. Growth yield was not affected by the presence of lead, suggesting that the energetic costs associated with lead resistance were modest. Lead resistance appears to be located on a mobile genetic element. Lead resistance was mobilized from VN23-1 to a lead sensitive Arthrobacter sp. SI-1 by conjugation and a 70 Kb plasmid has been isolated from VN23-1. Southern hybridization indicates that the sensitive strain does not have a plasmid present while the transconjugant does. The DNA sequence of a 6.5 Kb fragment from the isolated plasmid shares homology with P-type ATPase resistance genes (zntA, cadA). These results suggest that resistance is mediated by an efflux mechanism. In addition the 6.5 Kb fragment contains a sequence that shares homology to transcriptional regulators of heavy metal resistance genes suggesting that genes on the isolated fragment are involved in lead resistance.

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