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Phenotype of deleted mutants of *D. vulgaris* hildenborough

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Sulfate-reducing bacteria have evolved to use sulfate as a terminal electron acceptor for their respiration. These bacteria are an environmentally important group belonging to Gram-negative, anaerobic delta-Proteobacteria. *Desulfovibrio vulgaris* Hildenborough is the best studied of this group. By interaction with reduced c-type cytochromes of the sulfate reducers, many metals are changed in their redox state often making the metals less soluble. We hope to harness this potential, but need a greater understanding of the physiology of *D. vulgaris*. Deletion mutants of *D. vulgaris* were created by marker exchange mutagenesis through homologous recombination. Mutants JW380, JW381, JW382 and JW383 have genes deleted that are related to Na+/H+ antiport systems located at the cytoplasmic membrane. The growth phenotypes of these mutants under various concentrations of salts (Na+, K+, NO2- and NO3-) and high pHs (pH7.0~9.0) were determined to understand the relationship between the deleted genes and the environmental stresses. Growth was followed by Optical Density of cultures at 600nm and by protein measurement with Bradford Protein assays. Additionally, *D. vulgaris* Hildenborough possesses a 3.57Mb genome and a 202.3Kb megaplasmid. The *nif*H and *pae*I genes are found on the megaplasmid. With PCR primers to amplify those genes and the chromosomal fur gene, the existence of the megaplasmid could be verified in each mutant. All the mutants in Na+ and K+ media responded as the wild-type. Increasing pH of the medium correlated with decreased growth of all mutants. The protein produced at pH 8.5 was the highest for all cultures. It was surprising that JW381, JW382 and JW383 grew at 250mM nitrate and 0.5mM nitrite, even though slowly, when the wild-type and JW380 did not grow. Mutants and wild-type died with 1.0mM or 2.0mM nitrite. The deleted genes in the mutants look minor parts of the whole Na+/H+ antiport systems. A thoroughly study will be needed to understand the response to nitrite and nitrate. The megaplasmid was present in each mutants.