

Correlation between Vitreoscilla Hemoglobin Gene (Vgb) and Cadmium Uptake in the Heterologous Host Enterobacter Aerogenes in Response to Metabolic Inhibitors

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Abstract : The effect of metabolic inhibitor/uncoupler(s) (CCCP and NaN₃) and sulfhydryl reagents (dithiothreitol, 2 mercaptoethanol glutathione) on cadmium uptake was investigated in Enterobacter aerogenes strains. They include a transformed strain bearing the Vitreoscillahemoglobin gene, vgb as well as control strains that lack this transformed gene. The vgb-harboring strains showed better uptake of cadmium than vgb-lacking strains. Under low aeration, there was 2 fold enhancement of Cd²⁺ uptake in vgb-harboring strains compared with 1.6-fold enhancement under high aeration. The CCCP caused 36, 40 and 58% inhibition in cadmium uptake of parental, pUC9 harboring and VHb expressing cells, respectively. Similarly, the sodium azide exerted 44, 38 and 55% inhibition in Cd²⁺ uptake of parental, pUC9 harboring and VHb expressing cells, respectively. Less extensive inhibition of Cd²⁺ uptake in the range of 11 to 39% was observed with sulfhydryl reagents.

Keywords : bacterial hemoglobin, VHb, Cd uptake, biosorption

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