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Modulation of Swimming Ability and Biofilm Formation in *Escherichia Coli* Strains Deficient in Components of Thiol Metabolism

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ABSTRACT

Bacterial populations untiringly shift between sessile and motile states in order to adapt and survive during exposition to various stress conditions. From a practical viewpoint, elucidating factors that trigger biofilm formation in non-pathogenic bacteria has a big perspective as soon as representatives of normal colon microflora are known to positively contribute to an overall state of human health. Effects of low molecular thiols on bacterial motility and/or biofilm formation have been poorly studied. The aim of this work was to elucidate contribution of components of thiol metabolism in biofilm formation in *E. coli* using a number of knock-out mutants in the genes, encoding components of thiol metabolism, stages of biofilm formation, global regulators of responses to stationary-phase stress (RpoS), shift to sessile mode (YdeH), anaerobic shift (ArcB/ArcA), SOS-response (RecA), stringent response (RelA). Motility tests were performed on 0.2% agar plates with LB, after 6 h of incubation at 30ºC diameters of the swimming zones were measured. Under our conditions, most striking inhibiting effects on swimming ability were found in case of *cydD*, *gor trxB*, *arcB* and *recA* mutants, when zone diameter decreased by about 7 times compared to the untreated control (28.5 ± 2.6 mm). While mutations in *ggt*, *gsiA ggt*, *relA* and *rpoS* resulted in about 2 times diminishment of the swimming zones. Deficiency in synthesis of one of the matrix components (*pgaA*) resulted in just 1.5 times inhibition of the zone. Collectively, it revealed involvement of thiol metabolism as well as participation of the studied global regulators in the processes of planktonic/sessile state transitions. In some cases, the observed down-regulation of the swimming ability coincided with the ability to form biofilms in the crystal violet staining tests. Further research is being carried out.

Keywords: thiol metabolism, bacterial biofilms, motility

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