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The role of bacterial growth autoregulators (alkyl hydroxybenzenes) in the response of staphylococci to stresses

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Abstract

The investigation of the response of a batch culture of Staphylococcus aureus to exogenous alkyl-substituted hydroxybenzenes (AHBs), chemical analogues of anabiosis autoinducers, showed that C 1-AHB at concentrations from 5 μM to 1.5 mM did not influence the culture growth, whereas the more hydrophobic C 6-AHB inhibited it at concentrations of 0.5 mM and higher. Either of the AHBs drastically enhanced the phenotypic dissociation of staphylococcal cultures, which manifested itself in an increase in the fraction of cells producing small nonhemolyzing colonies of G type when plated on solid media with erythrocytes. In a submerged staphylococcal culture, the relative number of cells producing G-type colonies varied from 10 to 90%, depending on the concentration of the AHB added. The growth of S. aureus in the presence of AHBs also enhanced cell tolerance to heat shock (heating at 45 or 60°C for 10 min). The role of AHBs, which are structural modifiers of membranes and possess chaperone activity, in the mechanisms responsible for cell tolerance and phenotypic dissociation of microbial populations is discussed.

Keywords

Alkyl hydroxybenzenes, Anabiosis autoinducers, G-type colonies, Phenotypic dissociation, Staphylococci, Stress, Stress tolerance