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Dependence of the appearance of his+ reversions on the density of salmonella typhimurium cell population

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Abstract

The dependence of the appearance of mutants on the number of viable cells plated on a selective medium was analyzed with the spontaneous His+ reversion system in the histidine auxotroph of Salmonella typhimurium strain BA13. The frequency of spontaneous His+ revertants was shown to be inversely proportional to the number of plated cells. Evaluation of residual culture growth on a histidine-deficient medium suggests that this factor cannot be the reason behind the inverse dependence. The results of experiments involving previously added His"1" revertants showed that the inverse relationship between mutant frequency and population density is not connected with the inhibition of preadaptive revertant growth by nonmutant cells. Moreover, an inhibitory effect of the culture medium on the frequency of spontaneous His+ revertants upon histidine starvation was detected. On the basis of these results, it was assumed that the His+ reversion generated by histidine starvation is suppressed by metabolites of starved cells.