LuxS/AI-2 quorum sensing system involvement in host and environmental adaptation of EPEC

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Enteropathogenic *Escherichia coli* is one of the main causes of infant diarrhea in developing countries. The hallmark of its infection is the Attaching and Effacing lesion on the intestinal epithelial cells, which results of the intimate bacterial adherence to enterocytes leading to cytoskeleton proteins rearrangement and pedestal-like structure formation beneath the bacterial cells. The primary habitat of EPEC is the lower intestine of humans and other warm-blooded animals, however this pathotype is frequently detected in soil and water. The bacterial ability to survive and persist, either in the environment or within an animal host, is related to its adaptation to the new niche, which includes the expression of colonization and virulence factors, and biofilm formation. The expression of these phenotypes involves several regulatory signaling pathways, including quorum sensing. Quorum sensing is a bacterial cell–cell communication process that allows bacteria to coordinate gene expression through the production, detection, and response to extracellular signaling molecules called autoinducers (AIs). The quorum sensing system that employs autoinducer-2, which is synthesized by LuxS, has been described in a variety of Gram-negative and Gram-positive bacteria, and appears to be involved in interspecies signaling. In this study, we aimed to verify the influence of LuxS/AI-2 quorum sensing system on interaction with epithelial cells, motility and biofilm formation by three distinctive EPEC strains. *luxS* mutants were obtained by homologous recombination and were analyzed for adherence on epithelial cells and A/E lesion formation at 37 °C, motility on semi-solid agar plates, as well as biofilm formation at 26 °C and 37 °C through crystal violet assay. Our results demonstrate that the LuxS/AI-2 system is involved in the regulation of these phenotypes, probably coordinating the expression of virulence factors and biofilm related structures with the environmental conditions and the metabolic status of the population in different environments. Moreover, AI-2 signaling appears to integrate fitness and regulation depending on different genetic backgrounds.

Key words: quorum sensing, EPEC, LuxS

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