Poster

Characterization of HsbA, a repressor of biofilm formation in Pseudomonas putida

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ABSTRACT

Alternation between a free-swimming planktonic lifestyle and biofilm formation is a highly regulated process in bacteria. This process is mediated by the second messenger c-di-GMP: high levels of c-di-GMP are associated with biofilm formation while low levels promote biofilm dispersal and flagellar synthesis. The anti-σ factor antagonist protein HsbA has been described as an activator of both flagellar motility and biofilm formation in Pseudomonas aeruginosa. In this organism, HsbA activity is controlled by phosphorylation mediated by the histidine phosphotransferase HptB and the response regulator HsbR. [1,2]. Although Pseudomonas putida displays orthologues of the hsbA, hsbR and hptB, the role of these proteins in lifestyle regulation has not been previously studied in this model bacterium.

In this work we have characterized the role of HsbA in the regulation of the planktonic-to-biofilm lifestyle switch in P. putida by means of biofilm formation and gene expression assays. We have found that HsbA negatively regulates biofilm formation in late stationary phase by preventing the accumulation of intracellular c-di-GMP. This is achieved by inhibiting the activity of CfcR, a diguanylate cyclase expressed in stationary phase [3]. As in P. aeruginosa, HsbA activity is regulated by phosphorylation with the intervention of HptB and HsbR. In contrast, we have found no evidence of the involvement of HsbA in the regulation of the flagellar function. Our results indicate that although P. aeruginosa and P. putida share the same regulatory elements, they are functionally different, reflecting the adaptation of these bacteria to their different lifestyles.

REFERENCES

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