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Histamine effect on the expression of AtoS-AtoC two component system in *Escherichia coli*

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In bacteria, the biosynthesis of polyamines is modulated at the level of transcription [1]. Upon acetoacetate-mediated induction, AtoS-AtoC two-component system acts through its direct effects on the *atoDAEB* operon transcription to regulate positively the biosynthesis of short-chain poly-(R)-3-hydroxybutyrate (cPHB) biosynthesis, a biopolymer with many physiological roles [2, 3]. AtoC is the response regulator of the AtoS-AtoC two-component system and it functions as the positive transcriptional regulator of the *atoDAEB* operon genes [4], encoding enzymes involved in short chain fatty acid metabolism. We report here that histamine contributed to cPHB biosynthesis enhancement by AtoS-AtoC in *E. coli* that overproduces both components of the AtoS-AtoC two-component system, while bacteria that overproduce either AtoS or AtoC alone did not display this phenotype. The roles of polyamines and histamine on the transcription of *atoS* and *atoC* genes as well as that of *atoDAEB(ato)* operon were studied. Polyamine-mediated induction was tested both in *atoSC* positive and negative *E. coli* backgrounds by using β -galactosidase reporter constructs carrying the appropriate promoters *patoDAEB*, *patoS*, *patoC*. Histamine was also tested for its effect on the activity of ornithine decarboxylase and on the growth of polyamine-deficient *E. coli* cells.

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[4] Filippou PS, Lioliou EE, Panagiotidis CA, Athanassopoulos CM, Garnelis T, Papaioannou D, Kyriakidis DA (2007) *BMC Biochemistry*, in press.

