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IN THE SOIL BACTERIUM *BACILLUS SUBTILIS*, FNR (FUMARATE NITRATE REDUCTION) IS REGULATED BY MTA?

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In the soil bacterium *Bacillus subtilis*, the Mta protein (Multidrug transporter activator) is a transcriptional activator of the MerR family of regulatory proteins. Mta regulates positively at least four genes: *mta, ydfK*, *bmr* and *blt*. The two latter genes are coding for transporters of drugs and are controlled by a specific transcriptional activator. It was known that the N-terminal domain or DNA binding domain of Mta and MtaN interacts directly with the promoters of the *bmr* and *blt* genes, and activates their transcription. With the aim to find genes that are regulated positively or negatively by Mta and to determine its regulon, we constructed a constitutive mutant called MtaN, with a deletion of the C terminal region of the Mta protein, which is involved in signal recognition. Transcriptome analysis of the *mtaN* strain showed that Mta affects positively and negatively the expressions of several genes. Among the genes repressed, our attention focused particularly on those related to anaerobic respiration, the *fnr* gene and *narG*, *narH*, *narK*, *narJ* genes, etc. controlled positively by the global transcriptional regulator Fnr. This repression was confirmed by RT-qPCR. Mutant alleles *mtaN* and Δ*mta* were introduced into a merodiploid strain *fnr+fnr::lacZ* and the level of β-galactosidase activity of cells was determined. It was also observed that the level of transcription of *fnr* and the expression of the transcriptional fusion *fnr::lacZ* were higher in the *Δmta* strain than that in the wild type strain of *Bacillus subtilis* or the *mtaN* strain. These results suggest that in our experimental conditions, wild type Mta protein represses the expression of *fnr* moderately. However, this difference in expression is transient and only observed when cells are in the slow growing phase before entering stationary phase. In order to understand whether Mta really controls Fnr, and if this control is direct or indirect, further studies on this topic are necessary.