Title:	A single gene all3940 (Dps) overexpression in Anabaena sp. PCC 7120 confers multiple abiotic stress tolerance via proteomic alterations
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Abstract:	DNA-binding proteins (Dps) induced during starvation play an important role in gene regulation and maintaining homeostasis in bacteria. The nitrogen-fixing cyanobacterium, Anabaena PCC7120, has four genes annotated as coding for Dps; however, the information on their physiological roles is limiting. One of the genes coding for Dps, ‘all3940’ was found to be induced under different abiotic stresses in Anabaena and upon overexpression enhanced the tolerance of Anabaena to a multitude of stresses, which included salinity, heat, heavy metals, pesticide, and nutrient starvation. On the other hand, mutation in the gene resulted in decreased growth of Anabaena. The modulation in the levels of All3940 in Anabaena, achieved either by overexpression of the protein or mutation of the gene, resulted in changes in the proteome, which correlated well with the physiological changes observed. Proteins required for varied physiological activities, such as photosynthesis, carbon-metabolism, oxidative stress alleviation, exhibited change in protein profile upon modulation of All3940 levels in Anabaena. This suggested a direct or an indirect effect of All3940 on the expression of the above stress-responsive proteins, thereby enhancing tolerance in Anabaena PCC7120. Thus, All3940, though categorized as a Dps, is possibly a general stress protein having a global role in regulating tolerance to multitude of stresses in Anabaena.
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