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Functional Complementation of Z-Ring Regulation by Alleles of *HETP* in *Anabaena*

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FUNCTIONAL COMPLEMENTATION OF Z-RING REGULATION BY ALLELES OF *HETP* IN *ANABAENA*

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Anabaena is a filamentous cyanobacterium that is able to undergo cell-differentiation in nitrogen-limiting conditions to produce a nitrogen-fixing cell called a heterocyst. Under normal conditions, *Anabaena* will produce 10% heterocysts in its filament in about 23 hours. While the vegetative cells continue to divide by constriction of a protein ring, called the Z-ring, heterocysts do not contain z-rings and do not divide. In contrast, a *ΔhetP* mutant of *Anabaena* produces only 2-3% heterocysts at a later time of 48 hours, with z-rings present in about one-third of these heterocysts. The part of the *hetP* gene required for inhibition of z-ring formation in heterocysts is unknown. To identify this part of the gene, we attempted to complement *ΔhetP* mutant by the addition alleles of the *hetP* gene. Three alleles of *hetP* were tested in comparison to a *ΔhetP* mutant containing empty vector alone: a wild-type copy of *hetP*, hetP containing the amino acid mutations C36A and C95A, and a 68 base pair truncation of *hetP*. The presence of Z-rings in heterocysts was assessed after 48 hours in nitrogen-limiting conditions by fluorescence microscopy. Z-rings in heterocysts were only found in the Δ*hetP* strain of *Anabaena* containing an empty vector suggesting a limited region of the *hetP* gene that is required for z-ring loss in heterocysts.

References:

1. Higa, K. C., Callahan, S. M.. (2010) Ectopic expression of hetP can partially bypass the need for hetR in heterocyst differentiation by Anabaena sp. Strain PCC 7120. Molecular Microbiology 77(3): 564-574.