Unraveling *patA* gene function in *Anabaena* heterocyst formation

Javier Muñoz-García* and Saúl Ares
Departamento de Matemáticas and Grupo Interdisciplinar de Sistemas Complejos (GISC),
Universidad Carlos III de Madrid, 28911 Leganés, Spain

Differentiated type of cells can form patterns in filamentous cyanobacteria. Specifically the genus *Anabaena* has received special interest because under nitrogen-limiting conditions some of their vegetative cells differentiate into a particular type of cells called heterocysts. In spite of losing the possibility to divide, these heterocysts are useful for the colony because they are able to fix and share environmental nitrogen. In order to efficiently distribute the fixed nitrogen, heterocysts are arranged forming quasiregular patterns in the filament. Recent works have allowed to advance in the understanding of the interactions and genetic mechanisms underlying this puzzling phenomenon, however the role of many of the genes involved is still unknown. One of them is the gene *patA*, which has an enigmatic mutant phenotype in which heterocysts are only formed at the end of the filament. In this work we investigate its function and provide a model, based on previous results [1], that explains how *patA* interacts with other genes and affects heterocyst pattern formation and maintenance. This theory reproduces the phenotypes in which *patA* and other genes have been knocked out or overexpressed and allows to obtain a more complete knowledge of this paradigmatic example of biological pattern formation.

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[1] J. Muñoz-García and S. Ares, Proc. Natl. Acad. Sci. USA **113**, 6218 (2016).

[*] javiermunozgarcia@gmail.com