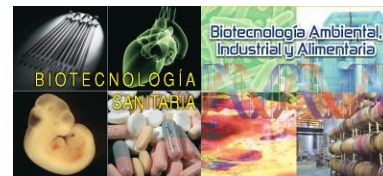


## Poster

## FleN and FlhF as new regulatory elements in the lifestyle switch in *Pseudomonas putida*



Blanca Navarrete, Laura Serrano, Antonio Leal, Aroa López-Sánchez and Fernando Govantes  
(1)Área de Microbiología, Centro Andaluz de Biología del Desarrollo (CABD).Universidad Pablo de Olavide/CSIC.

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### ABSTRACT

**Motivation:** *Pseudomonas putida* is a soil bacterium that can be found in nature as individual motile cells or as part of sessile communities called biofilms (1). Biofilm formation could be considered an adaptive strategy as it provide higher resistance against adverse agents, antimicrobial treatments, ultraviolet radiation or dehydration, increasing bacteria survival (2). The switch from a planktonic lifestyle to biofilm formation in *P.putida* is regulated by FleQ and the intracellular levels of c-di-GMP (3). Isolation of insertion mutants in *flhF* gene, defective in biofilm formation, suggests the involvement of additional elements in the regulation of this process. In this work, we have characterized the transcriptional organization of *flhA*, *flhF*, *fleN* and *fliA* genes and the role of FlhF and FleN in biofilm development in *P.putida*.

**Methods:** Planktonic growth and biofilm formation curves, adhesion and *swimming*-motility assays. Gene expression analysis:  $\beta$ -galactosidase assays and RT-PCR. Electrophoretic mobility shift assays (EMSA).

**Results and Conclusions:** To test the role of FlhF and FleN in biofilm development, we carried out a phenotypic characterization of  $\Delta flhF$  and  $\Delta fleN$  mutants. Experiments shown that  $\Delta fleN$  mutant is not able to form biofilm whereas  $\Delta flhF$  mutant exhibits a wild-type phenotype. Adhesion assays indicate that  $\Delta fleN$  mutant has a reduced adhesion, whereas  $\Delta flhF$  can properly adhere to the surface. On the other hand, both mutant show reduced *swimming* motility. These results suggests that both, FleN and FlhF, are involved in *swimming* motility, but only FleN is necessary for biofilm formation, probably by altering adhesion capacity of the bacteria.

Bioinformatic tools predict that *flhF* and *fleN* form an operon with the upstream gene *flhA* and the downstream gene *fliA*. In order to corroborate this hypothesis, we have done RT-PCR using RNA from the mutants. Results shown that these genes are structured in a single operon: *flhAFleNfliA*.

To determine a possible regulatory role of these elements in biofilm formation and motility,  $\beta$ -galactosidase assays were performed to analyse the expression of biofilm and flagellum related promoters. Results shown that FleN downregulates both types of promoters whereas FlhF is only involved in the regulation of one flagellar gene. The regulatory role of FleN has been further studied *in vitro* by EMSA with the regulator FleQ. Results suggest that FleN is required for FleQ to bind to its target promoters.

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