Role of chemotaxis cluster II in pathogenic bacteria of woody and herbaceous plants.

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Chemoreceptors are essential proteins able to detect environmental changes for bacterial adaptation to the environment. The genes encoding these proteins are found individually in the genome or forming clusters with other genes related to chemotaxis. In plant-pathogenic bacteria, about 82 thousand chemosensory sequences have been described (1). In the *Pseudomonas* syringae complex, one of the most important groups of plant-pathogenic bacteria, four chemotaxis-related clusters have been described. However, one of these clusters, named cluster II, is absent in some bacteria of this complex infecting woody hosts of the *Apocinaceae* family. Examples of the absence of this cluster are strains of *Pseudomonas savastanoi* pv. mandevillae (Psm) and some strains of *P. savastanoi pv. nerii* (Psn), isolated from dipladenia (*Mandevilla* spp.) and oleander (*Nerium oleander*), respectively. Therefore, the aim of this work focuses on the functional characterization of cluster II, not only in bacteria isolated from woody hosts, but also in strains infecting herbaceous plants.

First, we constructed knockout mutants of most genes encoded in cluster II, *i.e. cheA*, *cheB*, *cheD*, *cheY* and two genes coding for chemoreceptors in a woody plant pathogenic strain, both in Psn23 strain and in *P. syringae* pv. tomato (Pto) DC3000. Motility and virulence assays performed in oleander, dipladenia and tomato plants revealed that cluster II is involved in both phenotypes. In addition, bioinformatic analysis of the ligand-binding domain (LBD) (1) of the two chemoreceptors encoded in cluster II showed that only one of them has an LBD domain. To characterise this chemoreceptor in strain Psn23, capillarity chemotaxis assays are being performed, and its LBD domain has been purified. The purified domain will be used in protein-ligand interaction assays against a collection of plant-derived compounds.

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1. Sanchis-López C., et al. (2021) mSystems 6:e00951-21