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Signal Crosstalk between Two Different *Agrobacterium* Two-Component Systems

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Extended Abstract

Bacteria often use the so-called two-component system to transduce signal. A typical bacterial two-component system is comparatively simple and comprises two components, a sensor with histidine kinase activity and its cognate phosphorylatable response regulator [1, 2]. Most bacteria encode dozens of two-component signaling pathway [2]. Although both the histidine kinase sensor and response regulator in each two-component system are part of large, paralogous protein families that are highly similar at both sequence and structural levels, relatively little interaction between histidine kinase sensor and non-cognate response regulator was found, indicating that individual two-component signal transduction systems are highly specific, well insulated and rare cross-talk [3]. The high specificity of interaction between sensor and its cognate response regulator is accordant with the requirement for maintaining the faithful flow of signal through two-component system. *Agrobacterium* uses chemotaxis system to sense a large number of chemicals released by wounded host and VirA/VirG two-component system to induce the virulence gene expression [4, 5]. Chemotaxis signal transduction system is a special case of two-component system. Its histidine kinase CheA lacks transmembrane sensor domain and has three cognate response regulators, CheY1, CheY2 and CheB. Although the atypical two-component system, chemotaxis system is very different from the typical VirA/VirG two-component system, both of them are showed to be involved in *Agrobacterium* tumorigenesis [6]. Our previous study suggested that chemotaxis signaling and virulence induction signaling may have cross-talk in *Agrobacterium* [3]. Here, three lines of experimental evidences demonstrate the signaling cross-talk between these two two-component systems. 1) Chemotaxis signal-driving run pattern of *Agrobacterium* cheA-deletion mutant could be adjusted by the complementation of VirA. 2) Bacterial two hybrid assay showed that VirA interacts with CheY2 and CheA interacts with VirG. 3) *In vitro* pull-down experiment showed that VirA can pull-down CheY2.

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