

# Transcriptome analysis revealed that a quorum sensing system regulates the transfer of the At megaplasmid in *Agrobacterium tumefaciens*

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*Agrobacterium tumefaciens* strain P4 is atypical, as it produces a quorum-sensing signal unusual for this species, identified as *N*-(3-hydroxy-octanoyl)-homoserine lactone (3OH,C8-HSL), without being pathogenic.

By sequence analysis and cloning, a functional *luxI*-like gene has been identified on the At plasmid of *A. tumefaciens* strain P4. Insertion mutagenesis in the *luxI* gene and transcriptome analyses permitted the identification of 32 *luxI*-regulated genes in this strain, most of them encoding proteins responsible for the conjugative transfer of pAtP4. Among these genes were the *avhB* genes that encoded a type 4 secretion system involved in the formation of the conjugation apparatus, the *tra* genes that encoded the DNA transfer and replication (Dtr) machinery and *luxI* and *luxR* orthologs. These last two genes exhibited an unusual organization, with the *luxI*-like gene surrounded by the two *luxR* orthologs.

Conjugation experiments confirmed that the conjugative transfer of pAtP4 is regulated by 3OH,C8-HSL. Root colonization experiments indicated that the quorum-sensing regulation of the conjugation of the pAt P4 did not confer a gain or a loss of fitness to the bacterial host in the tomato plant rhizosphere.

This work is the first identification of the occurrence of a quorum-sensing regulation of the pAt conjugation phenomenon in *Agrobacterium*.