Towards engineering *Agrobacterium* for protein transfer

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Bacteria has different types of secretion system to secrete substrates into the surrounding environment or to another organism. Gram negative bacteria has at least six (type I-VI) secretion systems that are well studied. Many Gram-negative bacterial pathogens have type III secretion system (T3SS) to deliver effector proteins and other substrates into their host. *Agrobacterium tumefaciens*, a soil borne plant pathogen has type IV and type VI secretion systems but no T3SS. In an attempt or deliver proteins from *Agrobacterium* to plant cells, we transferred the T3SS from *Pseudomonas syringae* pv. *syringae* 61, cloned in plasmid pLN18, into *Agrobacterium.* We then introduced into the resulting strain the plasmid pBBR1MCS4::*AvrPto*, encoding the *Pseudomonas* effector protein AvrPto. Tsuda et al. (1) showed that when *AvrPto* is expressed in plants, it suppresses the plant immune response and increases susceptibility to *Agrobacterium*-mediated plant transformation. Our results suggest that delivery of AvrPto from a T3SS engineered *Agrobacterium* strain can enhance both transient and stable transformation of *Arabidopsis* and *N. benthamiana*. T3SS engineered *Agrobacterium* strain will be potentially useful to transfer other bacterial or plant proteins that may enhance *Agrobacterium*-mediated plant transformation.

(1) Tsuda, K, Nguyen-Ie, V, Bethke, G., Tsuda, Y, Glazebrook, J, and Katagiti, F (2012) An efficient *Agrobacterium*-mediated transient transformation of *Arabidopsis*. Plant J. 69:713-719.