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Abs # 1075: Gene transfer to plants by diverse species of bacteria

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Agrobacterium has become the most effective vector for gene transfer in plant biotechnology. When suitably modified, it is widely considered to be the only bacterial genus capable of transferring genes to plants. Not any more! Recently three plant-symbionts (*Rhizobium* sp. NGR234, *Sinorhizobium meliloti*, and *Mesorhizobium loti*) were made competent for gene transfer by acquisition of a disarmed Ti plasmid and binary vector. Transgenic plants from three plant species, tobacco, *Arabidopsis* and rice, were regenerated. These plants contained 1-3 copies of the T-DNA and progeny analysis showed stable inheritance of the transgenic GUS and hygromycin resistant phenotype. To ensure that gene transfer did not result from contamination with *Agrobacterium* cells, controls including species-specific PCR, selective plating, and of a tagged binary vector were implemented. Thus, diverse plant-associated bacteria, when harbouring a disarmed Ti plasmid and binary vector, are readily able to transfer T-DNA to plants. These observations may indicate the existence of a ubiquitous mechanism effecting natural horizontal gene transfer from bacteria to plants. We may benefit from this broader range of interactions to facilitate gene transfer to previously recalcitrant plant cell types, explants or species. In contrast to the complex licensing for *Agrobacterium* methodology, our alternative technology is available to the international community by way of an open source BIOS licence. This type of licence is characterized by having no commercial restrictions other than covenants for sharing of improvements, relevant safety information and regulatory data, and for preserving the opportunity for others to freely improve and use the technology.

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