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AGROBACTERIUM VITIS GENOM

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Taxonomy: *Bacteria; Proteobacteria; Alphaproteobacteria; Rhizobiales; Rhizobiaceae; Rhizobium/Agrobacterium group; Agrobacterium vitis*
Agrobacterium are Gram-negative, motile, soil-dwelling plant pathogens with the species name given based on the disease phenotype associated with the bacteria. They invade the crown, roots and stems of a great variety of plants via wounds causing tumors. The diseases are crown gall, hairy root, and cane gall. Some strains possess a wide host range, whereas other possess a very limited host range. The tumor is correlated with the presence of a large tumor-inducing plasmid (Ti plasmid) in the bacteria. Thus *A.tumefaciens* causes crown gall on many dicotyledonous plants; *A.rubi* causes crown gall on raspberries; *A.vitis* gall formation on grapes; *A.rhizogenes* causes hairy roots; *A.radiobacter* is avirulent. However the ability to cause disease is associated with transmissible plasmids, and this grouping is easily disrupted when plasmids move from one strain to another. More recently *Agrobacterium* have been classified into 3 biovars based on physiological and biochemical phenotypes without consideration of disease; the 2 classification systems are not compatible. There is now a fully sequenced representative of each biovar publicly available.

Crown galls are formed when *Agrobacterium* with a a tumor-inducing Ti plasmid infects a wounded plant. A portion of the Ti-plasmid DNA. (T-DNA) is transferred from the bacterial plasmid into the host plant cell where the T-DNA is integrated into host plant chromosomal DNA by an illegitimate recombination process. Some of the transferred genes encode enzymes responsible for the synthesis of plant hormones that cannot be controlled by the plant, causing abnormal cell divisions that produce a plant gall. Other transferred genes encode biosynthetic enzymes capable of transforming plant metabolites into a class of compounds called opines that are not catabolizable by the host plant, but are catabolizable by the tumor-inducing bacterial strain. *A.vitis* strain S4 is a virulent biovar III strain isolated from the *Vitis vinifera* (grape) cv. Izsaki Sarfeher crown gall in Kecskemet/Orgavony, Hungary in 1981. It produces the opine vitopine. *A.vitis* strains not only cause galls on grapevines but also necrosis on grapevine roots and a hypersensitive response on nonhost plants.

Genome structure:

- Chromosome 1 (circular; 3,726,375 bp)
- Chromosome 2 (circular; 1,283,187 bp)
- Plasmid pAtS4b (circular; 130,435 bp)

- Plasmid pAtS4c (circular; 211,620 bp)
- Plasmid pTiS4 (circular; 258,824 bp)
- Plasmid pAtS4e (circular; 631,775 bp)
- Plasmid pAtS4a (circular; 78,730 bp)