Transformation of Plants by Agropine-Type
Agrobacterium Rhizogenes: Organization of
the Transferred DNA (T-DNA) and Its
Use to Introduce New Genes into Plants

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Abstract

Structure and organization of the T-DNA originated from an agropine-type
Agrobacterium rhizogenes strain was determined in transformed tobacco.
The overall strategy for introducing new genes into plants using an inter­
mediate vector and the wild-type Ri plasmid is presented.

Transformed plants can be regenerated from roots induced on sensitive
plants by Agrobacterium rhizogenes. Structure and organization of the T-
DNA (Fig. 1) was determined by Southern analysis of genomic DNA in trans­
formed tobacco. Nicotiana plumbaginifolia, Convolvulus arvensis and rape­
seed (Brassica napus) plants regenerated from roots induced by an agropine-
type strain (A4) (Jouanin et al. (submitted)).

The T-DNA is derived from two non-contiguous regions (TL and TR) of
the root-inducing plasmid (pRiA4) (Jouanin, 1984). The length of the TL-
DNA is about 20 kb (Slightom et al., 1985; Slightam et al., 1986) except
in tobacco where it is always shorter; the TR-DNA can either be absent
in transformed plants, or range in size from 5 up to 30 kb (Jouanin et al.
(submitted)). In some plants, the TR-DNA is linked to the TL-DNA, but in
inverted orientation relative to its position on the plasmid.

The overall strategy for introducing new genes into plants using the
wild-type Ri plasmid consists in the use of an intermediate vector pos­
sessing: a ColEl origin allowing autonomous replication in E. coli but not
Agrobacterium; an antibiotic resistance marker for selection in bacteria; a
fragment from the pRi T-region providing homology for recombination with
the wild type Ri plasmid; a chimaeric gene or other gene to be introduced
into plant cells. Chimaeric genes have been constructed whose expression
in plants is expected to modulate sensitivity to antibiotics, heavy metals, or
viruses.
Figure 1. Under the restriction map of the T-region of pRiA4 are indicated the size and copy number of the T-DNA in transformed plants.

REFERENCES


