

determine the specificity of virus transmission through insect or fungus vectors (5–9).

Functional or nonfunctional CP that accumulates in transgenic plants can interfere directly with one or more steps in virus infection, depending on the function(s) of CP in the particular plant–virus interaction. It is also possible that the presence of CP elicits plant defense responses that result in enhanced resistance to pathogen infection. So far, there is only little evidence for this role in CPMR.

3. Tobacco Mosaic Virus

The extensive knowledge of virion structure, genome organization, replication, and spread of TMV has facilitated studies about the mechanism of CPMR in tobacco. Transgenic tobacco plants that accumulate TMV CP either escape infection or develop symptoms slower than nontransgenic controls (2). In cultivars that carry the N hypersensitivity gene from *Nicotiana glutinosa*, few or no necrotic local lesions are formed after inoculation (10). There is a clear correlation of CP accumulation with resistance: The plant lines that accumulate the highest levels of CP are most resistant. At elevated temperature, CP, but not the transcript levels, decline in transgenic plants, and resistance breaks down (11). Furthermore, transgenic plants expressing a nontranslatable CP gene are not resistant (12). These findings suggest that the CP itself interferes with TMV infection.

Accumulation of the pathogenesis-related protein PR 1a was determined in transgenic plants that did or did not bear the N-gene, in order to investigate whether plant defense responses are involved in the resistance phenotype (13). Only transgenic plants carrying the N gene accumulated elevated levels of the pathogenesis-related protein PR 1a in the absence of infection; CP accumulation led to TMV resistance in all transgenic plants, indicating that CP probably interfered directly with virus infection, and that plant defense responses do not significantly contribute to resistance.

CPMR of transgenic plants accumulating TMV CP is restricted to TMV and related tobamoviruses. The degree of resistance correlates with the degree of homology between the CP amino acid sequences. There is little or no resistance to viruses from other groups (14). Specificity of CPMR to the virus from which the CP gene is derived, and to closely related viruses, has been generally observed in different plant–virus combinations. In contrast, systemic resistance that develops after hypersensitive response is broad and effective against pathogens that are not related to the inducing one.

There are several indications that early events in TMV infection are inhibited in transgenic tobacco plants. CPMR is largely overcome when TMV genomic RNA or partially uncoated TMV is used as inoculum, instead of TMV