

**ABSTRACT:** “Antiviral activity of endogenous small RNAs and suppression of gene silencing by the 16K protein of the Tobacco rattle virus (TRV).”

During viral infections, the outcome of the infective process is a net balance between the compatible and defence interactions. When a virus infects the eukaryotic cell, it must deal with different host defence mechanisms among which RNA silencing is part of the initial plant innate defence response. RNA silencing in plants has the role of restraining viral proliferation in the infected cell and therefore regulates the equilibrium between viral load and plant cell integrity that is key for the plant-virus compatibility. The virus itself is inductor, target and suppressor of the RNA silencing in plants. Viral silencing suppressor proteins (VSR) counteract host antiviral silencing and modify the host gene expression programme to generate a permissive environment for compatible infections.

In this PhD thesis we have studied the interface between viral and plant RNA silencing in the context of a compatible infection. Using Tobacco rattle virus (TRV) as a model viral system and *Nicotiana benthamiana* and *Arabidopsis thaliana* as host model systems, we have dissected the role of endogenous small RNAs to promote gene silencing responses to viral sequences. Our results point to possible functional interactions between miRNAs and complementary sequences in viral genomes even though the role of those interactions as a viral proliferation controls mechanisms is not part of this thesis. We have found that TRV 16K silencing suppressor protein effects play a central role to dictate the way the TRV and plant RNA silencing interact. The 16K protein avoids, partially, the assembly of silencing effectors complexes and thus compromises the impact of antiviral vsRNAs-mediated and endogenous small RNAs-mediated RNA silencing. The suppressor effect of TRV does not have a significant impact on the miRNAs content, relative composition and activity although we cannot discard an effect on the metabolisms of some particular miRNA species.