Identification of plant partners of polerovirus structural proteins

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Symposium II: Factors required for virus multiplication and spread

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Polerovirus are icosaedric plant viruses with a positive RNA genome, localized in phloem cells and obligatory transmitted by aphids in a circulative and non propagative mode. In order to look for plant proteins potentially involved in virus transmission, we developed two different screens (*in vitro* and *in vivo*) to identify partners of virus particles or structural viral proteins.

Using Far-Western blot on protein extracts from non-infected cucurbit sap, we identified 9 proteins able to bind *in vitro* purified particles of polerovirus. Most of the proteins were defence proteins but we also found among the candidates the major phloem protein 2 of cucurbits, a mobile phloem lectin able to bind viroids *in vitro* and *in vivo*. This protein could potentially be involved in virus transport in the plant or in virus acquisition by aphids.

The second method is based on yeast two hybrid system to screen *Arabidopsis thaliana* cDNA libraries using structural viral baits. Several candidates were identified among them cytoskeleton related proteins, a kinase, and a protease. The cytoskeleton proteins could be involved in intracellular virus transport or in cell to cell movement of the virus. The identified protease could be responsible for the cleavage of the minor capsid protein (the readthrough protein) observed in purified virions and in sieve tubes of infected plants. As this viral protein is absolutely required for aphid transmission and involved in virus movement in the plant, we can hypothesize that the protease might either control virus dispersion by aphid or virus transport in the plant. This protease has been previously reported to be a plant defence protein which may also suggest that its function in the virus cycle could be related to the perception of the pathogen by the plant.

Work is in progress to confirm some of the interactions observed between viral proteins and plant proteins. *A. thaliana* knock-out mutants of the candidate gene are being tested for viral accumulation to assess the importance of these genes in the viral cycle. If infected, these mutants will be used as virus source in aphid transmission experiments to evaluate the role of the candidates in virus acquisition by aphids. The results will be presented and discussed.