What's new in polerovirus transmission?

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Poleroviruses are strictly transmitted by aphids in a circulative and non propagative manner. Virions are acquired by aphids when ingesting sap from infected plants. Virus particles cross the gut epithelium to be transported into the hemolymph and then to the accessory salivary glands cells, before being released, together with saliva, into the plant during a subsequent feed. Although viral determinants involved in the transmission process have been identified, data are lacking on (i) the role of post-translational modifications of the structural proteins in virus transmission, (ii) on the involvement of plant proteins in the transmission process, (iii) on the deregulation of aphid genes during virus acquisition and inoculation and (iv) on the nature of polerovirus receptors in aphids. We have developed different approaches to decipher some of these transmission steps. We have observed that acquisition of virions in aphid intestinal cells did not induce a strong gene deregulation, suggesting that the virus hijacks a well-conserved endocytosis mechanism. We have identified several phloem proteins able to bind purified virions *in vitro* and have shown that these proteins can stimulate virus transmission by aphids when added to the aphid diet together with purified virus. Identification of virus partners in phloem cells are pursued by screening Arabidopsis cDNA libraries using the yeast double hybrid system. We have also demonstrated that poleroviruses particles are not phosphorylated, nor glycosylated and that glycosylation does not play a role in the transmission process as suggested before. Finally, experiments are in progress to identify virus partners in aphid vector by developing yeast screening of aphid cDNA libraries.