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HVA22a: a candidate protein involved in *Potyvirus* replication and movement

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The potyvirus *Turnip mosaic virus* (TuMV) represents one rare example of phytoviruses that utilizes the plant endomembrane system to produce membranous vesicles mobile between cells through plasmodesmata (PD). The TuMV-6K2 protein induces rearrangements of the endoplasmic reticulum (ER) to generate those vesicles involved in viral replication and movement in the plant. In *Arabidopsis thaliana*, AtHVA22a (*Hordeum vulgare* abscisic acid responsive gene 22) belongs to a family of transmembrane proteins, homologous of interactors of reticulons (responsible for ER tubules constriction). Proteomics analysis showed that AtHVA22a is highly enriched in PD proteome. In our study, we showed that TuMV-6K2 interacts with AtHVA22a, by SuY2H in yeast and by BiFC in planta. The N-terminal half of the protein (including the transmembrane domains) of AtHVA22a is required for its interaction with 6K2. AtHVA22a is associated with cortical ER and partially to PD, and at the level of viral replication complex during TuMV infection, as well as the interaction between AtHVA22a and 6K2 observed in BiFC. Furthermore, overexpression of AtHVA22a increases TuMV propagation in *Nicotiana benthamiana* while TuMV propagation is slowed down in AtHVA22a-CRISPR/Cas9 mutants. Altogether, our results indicate that AtHVA22a plays an agonistic effect on TuMV propagation.

Keywords: 3-5 words to describe your project

TuMV-6K2, AtHVA22a, interaction, potyvirus movement