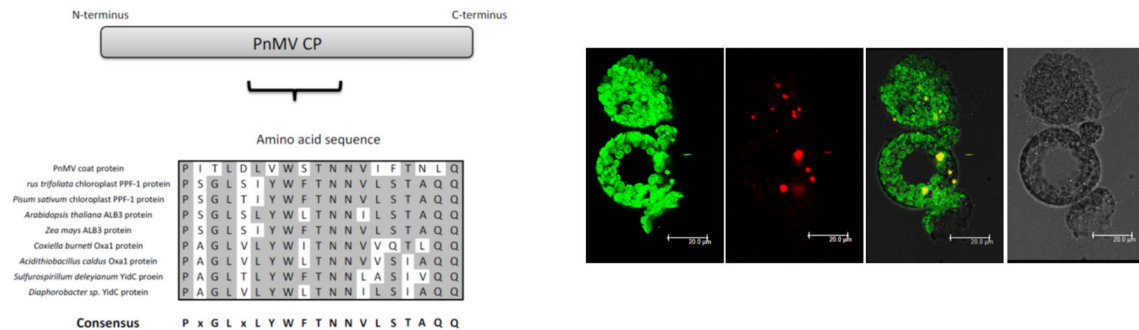


7 Virus	Dissekere virale replikasjonsmekanismer
	<i>Dissecting viral replication mechanisms</i>



Summary

Replication of all positive-sense single-stranded RNA viruses occurs in specific structures in close association with cellular membranes. Targeting of the viral replication complex (RC) to the site of replication is mediated by the interaction of viral-encoded proteins and host factors. Electron microscope studies have shown that *Poinsettia mosaic virus* (PnMV, family *Tymoviridae*) infection is associated with the presence of vesicular structures in the chloroplasts, which indicates that the replication of PnMV might occur in association with chloroplast-derived membranes. Using computer assisted homology search, we have identified that the coat protein (CP) of PnMV shows similarity to membrane bound proteins and contains a conserved amino acid sequence motif found in members the Alb3/Oxa1/YidC protein family. This protein family is involved in the insertion of proteins into intracellular membranes. We hypothesize that the targeting of the PnMV RC to the chloroplast is mediated by viral-encoded CP. We plan to test this hypothesis carrying out co-localization studies using transient and stable expression of GFP-tagged viral proteins and confocal laser scanning microscopy. This type of study involves good amount of gene cloning and molecular techniques, the use of delivery vectors, plant cell transfections and cellular localization studies. The student will gain competence in the following areas and techniques: Molecular biology, virology, gene technology, recombinant DNA techniques, plant genetics and plant pathology.

Subject area

Molecular Biology, Virology, Cell Biology, Plant physiology, Plant-pathogen interactions

Language thesis

Norwegian and/or English

Bachelor or Master thesis

Credits

60 Credits

Project/company

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Our publications on Poinsettia mosaic virus

- Spetz C & Blystad D-R (2015) A Membrane-Binding Conserved Motif in the Coat Protein of PnMV Seems to Mediate Chloroplast Targeting. *Acta Horticulturae* 1072, 97-104.
- Spetz C, Clarke JL, Dees MW, Haugslien S, Moe R, & Blystad D-R. (2012) RNA silencing-based resistance in *Nicotiana benthamiana* Is transiently broken by graft inoculation of Poinsettia mosaic virus January 2012. *Acta horticulturae* 941(941):91-108
- Clarke, J.L., Spetz, C.J., Haugslien, S., Dees, M.W., Moe, R. & Blystad, D.-R. (2011). Production of transgenic Poinsettia with Resistance against Poinsettia mosaic virus (PNMV) using Agrobacterium-Mediated Transformation. *Acta Horticulturae* 901:87-93.
- Dees, M.W., Spetz, C.J.J. & Blystad, D.-R. (2011). First report of Tulip virus X (TVX) in Norway. *Acta Horticulturae* 901:215-222.
- Fløistad, E., Spetz, C. J.J. & Blystad, D.-R. (2011). Virus elimination and retention of free - branching in Poinsettia. *Acta Horticulturae* 901:207-213.
- Spetz, C., Moe, R. and Blystad, D-R. (2008). Symptomless infectious cDNA clone of Norwegian isolate of *Poinsettia mosaic virus*. *Archives of Virology* 153, 1347-1351
- Clarke, J.L., Spetz, C., Haugslien, S., Xing, S., Dees, M.D., Moe, R. and Blystad, D- R. (2008). Agrobacterium tumefaciens-mediated transformation of poinsettia, *Euphorbia pulcherrima*, with virus-derived hairpin RNA constructs confers resistance to Poinsettia mosaic virus. *Plant Cell Reports* 27, 1027-1038