Retrovirology

Poster presentation

P02-10. Plant expression of chimeric Gag/gp41 virus-like particles as a mucosally-targeted subunit vaccine against HIV-1

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from AIDS Vaccine 2009
Paris, France. 19–22 October 2009

Published: 22 October 2009

Retrovirology 2009, **6**(Suppl 3):P15 doi:10.1186/1742-4690-6-S3-P15

This abstract is available from: http://www.retrovirology.com/content/6/S3/P15

Background

The HIV-1 envelope protein gp41 has been shown to play critical roles in the viral mucosal transmission and infection of CD4+ cells. Gag is a structural protein configuring the viral capsid, and has been suggested to constitute a target of cellular immunity potentially controlling viral load.

Methods

The goal of this project is to express in plants enveloped virus-like particles (eVLPs) consisting of Gag and a "deconstructed" version of gp41 (dgp41) as a broad-acting mucosal immunogen.

Results

Using a PCR-based *de novo* gene synthesis method, a plant optimized HIV-1 *gag* gene was constructed. The gene was expressed in *Nicotiana benthamiana* using a modified tobacco mosaic virus-based transient expression system and leaf accumulation of the 55 kDa Gag protein was confirmed. Sucrose gradient sedimentation showed that the full-length Gag protein migrated at a density corresponding to that reported for Gag VLPs. Furthermore, examination of leaf material and the extract in transmission electron microscopy showed budding of 100-nm VLPs. Stable lines harboring the *gag* gene were created and were shown to accumulate the Gag protein. The *dgp41* gene was then transiently expressed in these stable lines, and expression was confirmed with western blotting using anti-2F5 Abs. Preliminary evidence based on sucrose gradient sedimentation suggests that the two proteins may assemble into eVLPs.

Conclusion

These results suggest that plant cells can support the formation of HIV-1 dgp41/Gag eVLPs.