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Inventors

Tsafrir S Leket-Mor

Aigerim Kamzina

Hugh Mason

S. Indu Rupassara

Contact

Jovan Heusser
jovan.heusser@skysonginnovations.com

Platform for Generating Chimeric Virus-Like Particle Vaccines

Despite advances in vaccine development, many viruses including RSV, SARS and more don't have successful vaccines. Even a long-term vaccine has yet to be developed for influenza. Much of the difficulty involves identifying a conserved antigen that is sufficiently immunologic that also triggers a desired immune response for vaccination.

Plant-based production of biologics, such as virus-like particles (VLP), began to compete with yeast, insect, bacterial and mammalian production systems nearly two decades ago. However, transient viral-based vectors have brought many advantages including safety, speed, versatility and cost to this expression system making it even more flexible and attractive.

Researchers at the Biodesign Institute of Arizona State University have developed a novel platform for generating chimeric VLP-based vaccine compositions in plants. This platform works with any virus that has an enveloped trimeric surface protein, such as Influenza, RSV, Ebola, SARS-CoV, and more. Co-expression of two proteins, one of which, a trimeric envelope protein, is fused at its N-terminus to a foreign antigen, causes the assembly of chimeric VLPs that display the foreign antigen on the surface in the form of trimers. These chimeric VLPs can then be used as vaccine compositions, or reagents to detect antigen-specific immune responses.

This modular platform can be readily adapted to many different viral antigens for the formation of chimeric VLPs that could serve as strong vaccine candidates or research reagents.

Potential Applications

- Platform for generating vaccines to enveloped viruses with trimeric surface proteins (Influenza, SARS-CoV, RSV, Ebola, etc.)
- Platform to generate reagents to detect antigen-specific immune responses

Benefits and Advantages

- Plant based expression systems have many advantages including safety, rapid expression, versatility/flexibility and cost-effectiveness
- Plant based expression systems eliminate contamination by mammalian pathogens
- Key target for protective T cell immunity so it should produce a robust immune response and production of foreign antigen-specific neutralizing antibodies
- Enhanced protein production
- Platform can be readily adapted to many different trimeric antigens
- Enables native-like conformation of foreign trimeric antigens

For more information about the inventor(s) and their research, please see

[Dr. Mor's Biodesign webpage](#)

[Dr. Mason's Biodesign webpage](#)