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Intellectual Property

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Patent Pending

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Optimization of Geminiviral Vector for Expression of Rituximab

AzTE Case # M13-014

Invention Description

Production of monoclonal antibodies (mAbs) in plants has developed tremendously over the past two decades, in great part due to low production costs, scalability and lack of animal pathogen contamination.

Rituximab is a chimeric monoclonal antibody against CD20 used in the treatment of lymphomas and leukemias. Rituximab has been FDA approved for the treatment of non-Hodgkin's lymphoma, chronic lymphocytic leukemia as well as rheumatoid arthritis. Because of Rituximab's success and the expiration of its patent protection in Europe in 2013 and the US in 2018, a low cost and scalable production system would be highly advantageous.

Researchers at the Biodesign Institute of Arizona State University have developed novel optimized geminiviral vectors for the expression of Rituximab in *N. benthamiana*. These multi-replicon single vector systems produce fully assembled Rituximab that is much more uniform in its glycan structure and at expression levels greater than 0.5 mg/g leaf.

This technology, with its high yield and superior glycan structure presents a significant improvement to current Rituximab production methods.

Potential Applications

- Plant-based production of Rituximab for research and commercial use

Benefits and Advantages

- High-yield production capacity
- Uniform glycan chains on the Rituximab antibodies
- Can produce nonfucosylated Rituximab – research indicates that fucose in the glycan impairs function
- No need for non-competing viruses or co-infection with multiple expression modules
- Minimally sized construct