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Increasing the Antigenic Insertion Sites on the Recombinant Immune Complex Platform

Recombinant protein subunit vaccines offer an improved safety profile compared to live attenuated or inactivated vaccines, making them a promising vaccine strategy. These vaccines can further enhance immunogenicity through fusion with IgG-based protein scaffolds, such as immune complex (RIC) platforms. RIC consists of an antibody and antigen complex that is highly immunogenic and is capable of increasing subunit vaccine antigens. However, past applications of RIC platforms have only utilized a single antigen fusion site on either the antibody N-terminus or C-terminus. This limits the versatility of RIC platforms by limiting their function to only targeting one antigen or one pathogenic serotype. The potential of multiple antigenic fusion sites has yet to be explored for RIC platforms.

Researchers at the Biodesign Institute of Arizona State University have developed a novel system for designing variants of the RIC platform that can display more than one antigen. The Dengue virus (DENV) envelope domain III antigen was selected as a model antigen for fusion to IgG-based scaffolds, as four DENV serotypes exist, thus making it crucial for a vaccine candidate to have a balanced immune response to all four serotypes. Three RIC variants were created, and produced in the *N. benthamiana* plant expression system, with four antigens displayed in various fusion arrangements. In vivo binding data has shown that the human RICs were able to bind to the corresponding receptors and are likely to produce vaccine enhancement candidates.

This system could prove to be highly useful in developing additional RIC platform candidates containing more antigen fusion sites targeting multiple antigens on the same pathogen or multiple pathogenic serotypes.

Potential Applications

- Dengue Virus IgG fusion platform candidate
- Malaria IgG fusion platform candidate
- Influenza IgG fusion platform candidate

- Viruses with multiple potential antigen/serotype IgG fusion platform candidate
- Benefits and Advantages

- Additional vaccine targets were also identified
- Increasing the number of antigenic fusion sites provides greater versatility of the RIC platform to generate vaccine candidates to target multiple antigens or multiple pathogenic serotypes
- The DENV RIC with various fusion strategies were able to bind to receptors
- Modified epitope tag to limit the formation of large immune complexes that make the constructs insoluble

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

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