Novel Nanoparticle Immunogens for Influenza Vaccines

This technology offers a new approach to influenza vaccines using computationally designed nanoparticle immunogens that elicit potent, neutralizing antibodies against influenza viruses.

What is the Problem?

Influenza viruses cause significant illnesses and deaths each year, despite the availability of licensed vaccines. Current vaccines offer limited protection against continuously emerging antigenic variants and are not protective against viruses from animal reservoirs. This highlights the need for new vaccines with broader protective coverage, as circulating viruses continue to mutate.

What is the Solution?

The solution is the development of novel nanoparticle immunogens for use in influenza vaccines. Designed using computational protein design, these immunogens consist of the receptor binding domains or “heads” of hemagglutinin trimers, which are the key antigen of current influenza vaccines. The “heads” have been designed to maintain a native-like trimeric configuration. The trimeric antigens are further fused to the trimeric components of self-assembling protein nanoparticles, enabling multivalent presentation which greatly enhances immunogenicity. This approach elicits potently neutralizing, receptor-blocking antibodies against influenza viruses, offering new potential routes to the design of universal influenza vaccines.

What is the Competitive Advantage?

The competitive advantage of this technology lies in its ability to create nanoparticle immunogens that elicit potent, neutralizing antibodies against a broad range of influenza viruses. This approach provides a potential route to the design of universal influenza vaccines, offering broader protective coverage than current vaccines. It addresses the challenge of antigenic variants and viruses spilled over from animal reservoirs, which current vaccines struggle to protect against. This technology has the potential to prevent flu more effectively than current seasonal vaccines by using novel nanoparticle immunogens to further increase the potency and breadth of vaccine-elicited antibodies.

Patent Information:

Technology ID

BDP 8555

Category

Therapeutics/Infection
Selection of Available Technologies
Therapeutics/Other

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