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Nanominne-1: novel virus-like particle (nanoparticle) vaccines to prevent SARS-CoV-2 infections

Series of novel vaccines containing 60 copies of SARS-CoV-2 antigens displayed in ordered array on a virus-like particle scaffold (nanoparticle)

Technology No. 2020-372

IP Status: US Patent Pending

Applications

- SARS-CoV-2 vaccine

Key Benefits & Differentiators

- **Safe and low Risk:** protein-scaffold (nanoparticle) has a high safety profile
- **Induces potent immune response:** antigens are displayed in a high local density and repetitive patterns

Technology Overview

Currently, four different types of vaccines are being developed throughout the world to battle COVID19. These are either nucleic-acid, viral vector, inactivated virus, or protein based vaccines. However, each of these types has certain limitations. For example, nucleic acid based vaccines might not elicit sufficient immune responses because of inefficient DNA translation into proteins after injection. Viral vector vaccines have been associated with severe side effects and may be cleared by the host body quickly due to pre-immunity to the virus. Virus based vaccines have been associated with safety concerns, especially for immunocompromised people. Finally, protein-based vaccines might not be very efficacious because the human immune system has evolved to recognize virus particles as opposed to individual viral proteins. Thus, there is a need to develop robust and effective COVID-19 vaccines that can prevent infections without these drawbacks.

Researchers at the University of Minnesota developed Nanominne-1, a series of novel vaccines

that combine the advantages of both virus and protein based vaccines but without their associated drawbacks. Briefly, this novel vaccine contains 60 copies of SARS-CoV-2 antigens, which are displayed in an ordered array on a virus-like particle scaffold (nanoparticle). Antigens are displayed in high local density and repetitive patterns to induce a potent immune response. The proposed vaccine has shown strong neutralizing antibody responses in mice, and is expected to protect mice from future SARS-CoV-2 infections.The featured protein-scaffold has a high safety profile and is expected to be highly effective in activating an immune response in humans and preventing SARS-CoV-2 infections.

Phase of Development

TRL: 4-6
In vivo animal studies in progress. Strong neutralizing antibody responses have been detected in the serum of immunized mice

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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Researchers

- **Fang Li, PhD** Professor, Department of Veterinary and Biomedical Sciences
- **Mark K. Jenkins,PhD** Regents and Distinguished McKnight University Professor, Department of Microbiology and Immunology

References

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