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Stabilized Virus-like Particles Having Enhanced Mucosal Immunogenicity

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Invention Description

Noroviruses (also known as Norwalk viruses) are believed to cause approximately 90% of epidemic nonbacterial outbreaks of gastroenteritis worldwide and may be responsible for 50% of all foodborne outbreaks of gastroenteritis in the US. The CDC estimates that up to 200,000 children under the age of 5 die of norovirus infection in developing countries each year. There is no vaccine against norovirus and no specific antiviral drugs to treat infections.

Researchers at the Biodesign Institute of Arizona State University have developed a subunit antigen consisting of norovirus virus-like particles stabilized by a polysaccharide-containing plant extract. The virus-like particles have enhanced mucosal immunogenicity, and when delivered intranasally, the preparation causes a robust mucosal immune response without the need for adjuvants to trigger innate immune responses.

This nasal vaccine induces both mucosal and systemic immune responses while providing protection from two dominant norovirus genotypes; it also overcomes the storage and administration shortcomings of the current norovirus oral vaccines.

Potential Applications

- Therapeutic and prophylactic for infections caused by two dominant norovirus genotypes
- Method may also be used to prepare enhanced intranasal vaccines against other viruses, including papillomavirus, hepatitis B and C, and influenza

Benefits and Advantages

- Causes robust mucosal immune response without the need for adjuvants that trigger innate immune responses
- Vaccine preparation is heat-tolerant and does not require special handling
- Vaccine preparation method may be amenable to other applications:
 - Enhanced intranasal vaccines against other viruses, including papillomavirus, hepatitis B and C, and influenza
 - Norovirus oral vaccine, utilizing a gastric protection to reach the small intestine