

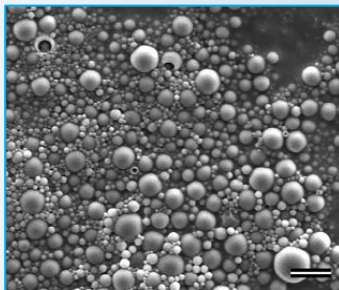
Single dose mucosal vaccines

Background

This new method of encapsulating biological molecules allows their use as effective mucosal vaccines in just a single dose. The vaccines are delivered to the mucosal surfaces in a way that stimulates the immune response required for a protective effect, and can be combined with immunostimulatory substances for an enhanced response.

Technology

By using a Generally Recognized As Safe (GRAS) polymer to enclose sub-unit vaccines, in uniformly sized spheres of about 1µm diameter, the antigens are protected. This allows them to be delivered via mucosal routes, targeting dendritic cells and stimulating protective immunity on delivery. Antigen is encapsulated in the spheres, with additional antigen either adsorbed onto the surface of the spheres or as free antigen. Free or surface antigen elicits an initial immune response, whilst the encapsulated antigen is gradually released into the body, boosting the response. This produces effective priming and boosting of the immune system from a single dose.



Scanning electron micrograph showing the surface of antigen loaded microspheres. Scale bar represents 2.5 µm.

The immune response can be further enhanced by co-encapsulating the antigen with immunostimulatory ssRNA molecules (e.g. poly-U).

Intellectual Property

Patent: WO 2001/070200

Granted: Europe and Australia

Pending: USA, Canada and Japan.

Applications

- Vaccines delivered by oral, nasal, pulmonary or transcutaneous routes or injected
- Single dose prime-boost vaccines
- Can stimulate immunity at the site of infection for pathogens which infect via the mucosa; e.g. GI and respiratory infections, TB, HIV
- Can also be used to enhance the immune response for cancer vaccines

Benefits

- Single dose immune system prime/boosting
- Increased potency of sub-unit vaccines
- Demonstrated in mouse challenge model against bacterial pathogens
- No requirement for adjuvants
- Co-encapsulation with cytokines, chitosan or ssRNA can further enhance the immune response
- Vaccine remains stable and active following storage at 30°C for 5 months
- Microencapsulation Polymer GRAS qualified
- Manufacture scaled up to a pilot GMP process

Licensing & Partnering Opportunity

Please contact: Ceri Mathews, PhD MBA

T: +44 (0)1794 301217 M: +44 (0)7798 631852

E: cerimathews@ploughshareinnovations.com