Single-shot vaccine

To provide effective patient protection, many traditional vaccines require multiple injections, which results in a costly and inconvenient regimen. These disadvantages have resulted in the development of single-shot vaccines that can provide protection against infection with only one injection.

The single-shot vaccine is a combination product of a **prime component antigen with an appropriate adjuvant and a microsphere component** that encapsulates antigen and provides the booster immunizations by delayed release of the antigen.

Formulation of single shot vaccine

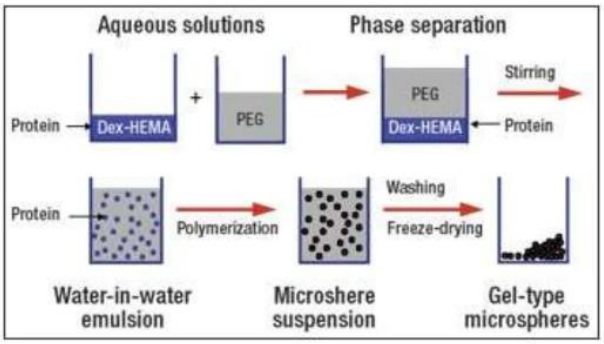

Fig: Formulation of single shot vaccine

Once the freeze-dried microsphere product is rehydrated by reconstitution in an aqueous solution, hydrolysis of the carbonate ester groups in the dextran hydroxyethyl methacrylate (dex-HEMA) will be initiated that results in delayed antigen release from dex-HEMA microspheres. This will increase the mesh size in the hydrogel network. The encapsulated protein will be released when the mesh size exceeds the hydrodynamic diameter of the protein.

Factor affecting antigen release

1. Polymer nature

2. Crystallinity

3. Method of preparation

4. Molecular weight of drug

5. Carrier size and morphology

The development of encapsulated vaccine technology with pulsatile release could offer a realistic opportunity to replace existing repeated immunization vaccine and significantly improve immunization.

Single vaccinations that mimic multiple doses through pulsed release of antigen should be as immunogenic as multiple dose regimes, providing that the polymer does not alter the immune response.

In this setting the existing vaccine in its soluble form constitutes the prime and the encapsulated forms acts as the boost.

Future consideration for single dose vaccine delivery

As most vaccines in the current immunization schedule are given as two or more discrete doses at set time intervals, combining pulsatile delivery with the currently licensed vaccines formulations in an attractive possibility. The development of encapsulated vaccine technology with pulsatile release could offer a realistic opportunity to replace existing repeated immunization vaccine and significantly improve immunization.

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Some individual may have an allergic reaction to the vaccines. The vaccine may behave as a super antigen and over stimulate the immune system. The primary risk associated with vaccines, especially vaccines that utilize live organisms, is that the vaccine itself causes illness.

Common side effects associated with single shot vaccines

- Muscle aches
- Pain around injection site
- Fever