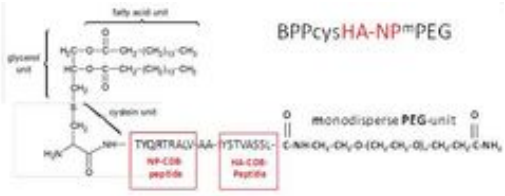
Technology Offer

Innovative lipopeptide-conjugates as mucosal adjuvants - BPPcysPep-MPEG

Reference Number 02-00280

Challenge

Mucosal delivery of vaccines allows concerted combat of diseases caused by pathogens that either invade through, or cause disease at mucosal surfaces. A novel vaccination approach is to combine systemic response and local mucosal immune response in order to induce specific protection in distant mucosal sites. Easy application of vaccines as e.g. a nasal spray or nebulizer for inhalation increases patient´s acceptance and convenience of administration. Especially in developing countries, ease of use and low costs of vaccines are important prerequisites for mass vaccinations. Moreover, injections are risk factors for infection and disease transmission e.g. HIV. In addition, many new mucosal vaccine candidates do not elicit sufficiently strong immune responses.
The vaccination through mucosal membranes requires potent adjuvants in order to enhance the immunogenicity of the vaccine antigen, to decrease its rate of degradation, and to target the vaccine to the site of immune function. There are only very few adjuvants such as Alum that are approved for use in humans. Thus the demand for new adjuvants is high and still unmet.



Example of a lipopeptide-conjugate with PEG-moiety for an influenza antigen: NP have sequence identities of 94%, with the H1N1 PR/8/34 NP and include the immunodominant Class I epitope spanning amino acids 147-155 (TYQRTRALV).

Technology

The innovative technology provides new lipopeptide- and lipoprotein-conjugates comprising a lipid-containing moiety representing the adjuvant, a peptide or protein moiety representing at least one antigenic structure and, optionally, a conjugate moiety, preferably a monodisperse polyethyleneglycol (PEG) unit. Direct coupling of the adjuvant to the antigen facilitates the efficient targeting of antigen-presenting cells via the specific binding of the adjuvants to toll-like receptors on the cellular surface of e.g. dendritic cells. A PEG moiety is the optional third component that is particularly suitable for protecting against proteolytic decrease, increasing solubility and delaying renal excretion, thereby enhancing the vaccines cost-effectiveness. As this most likely will result in lower required doses of the vaccine, tolerability will be improved as well. The newly developed conjugates are suitable for mucosal or parental application, for the prophylaxis or treatment of infectious diseases, inflammatory and autoimmune diseases, cancer as well as allergies.

Commercial Opportunity

The technology is offered for co-development and/or licensing.

Patent Situation

Priority was filed in December 2009 and published (WO2011080259). European application granted (EP251923). US patent application (US20130039939A1) pending.

Further Reading

Knothe et al. 2011 "The NKT cell ligand galactosylceramide suppresses allergic airway inflammation by induction of a Th1 response", Vaccine 29 (2011) 4249–4255

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