

Immunologic Adjuvant Combination for Enhanced Immune Response to Vaccines and for Immunotherapy

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Technology description

Adjuvant Boosts Frequency, Functionality, and Longevity of Killer T Lymphocytes

This adjuvant makes vaccines more effective by enhancing response of immune cells that provide protection against pathogenic bacteria and viruses. Vaccines are composed of an antigen and an adjuvant. Antigens are the foreign substances that provoke an immune response, such as proteins on the surface of viruses and bacteria. The presence of an antigen can cause the immune system to produce antigen-specific antibodies and killer T lymphocytes. The adjuvant is the component of the vaccine that enhances this immune response. The antibodies and T lymphocytes generated following vaccination should provide long-lasting protection against the disease-causing organism. However, most vaccines are capable of generating only antibody responses, which limits the impact of vaccinations against many clinically relevant pathogens (HIV, malaria, TB, and respiratory viruses). Researchers at the University of Florida have combined lipoteichoic acid (LTA) and an anti-OX40 monoclonal antibody to form an adjuvant that boosts the functionality, and longevity of killer T lymphocytes. This enhanced response should make existing vaccines more effective and may enable vaccine development for additional diseases.

Technology

For safety reasons modern vaccine formulations are increasingly based on purified pieces (subunits) of antigens derived from the target pathogen. However, subunit antigens are intrinsically poor immunogens and therefore must be mixed with substances called adjuvants to enhance immunogenicity. There are only a few adjuvants (Alum and MF59) approved for human use and currently used adjuvanted inactivated/subunit vaccines largely elicit humoral immunity; often require repeated immunization to sustain the response for long periods of time; and typically stimulate poor cellular (CD8 T cell) responses. There is emerging consensus that vaccines against many highly virulent pathogens will require both antibodies and CD8 T cells. OX40 is a glycoprotein, expressed on the surface of activated T-cells that can promote various activities such as T-cell proliferation, survival, and enhanced killing of pathogens. Lipoteichoic acid (LTA) is a major immunostimulatory component of Gram-positive bacteria. By combining the LTA from beneficial intestinal bacteria,

Lactobacillus, acidophilus, and an agonist OX40 antibody for vaccination, this novel adjuvant promotes long-term systemic and mucosal antigen-specific memory responses that are superior to that generated by currently available adjuvants used in human vaccines. Additionally, this new dual-adjuvant promises to generate an enhanced therapeutic response when used with immunotherapy candidates.

Application area

Adjuvant that enhances both humoral and cell-mediated immune responses for vaccines and possibly for immunotherapy applications

Advantages

Enhances the efficacy of subunit vaccines, allowing for improved protection

Induces both systemic and mucosal virus-specific CD8 T-cells to provide durable protection against viral pathogens

The adjuvant components are either generally recognized as safe (GRAS) or are predicted to have very low probability of producing an adverse reaction

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