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Targeted delivery in rational vaccine design

Novel vaccine strategies include the so-called subunit vaccines, which encompass only the part of the pathogen to which immune recognition results in protection. The high purity of these vaccines makes adverse events less likely, but it also makes the vaccines less immunogenic and therefore potentially less effective. Vaccine adjuvants that increase and modulate the immunogenicity of the vaccine are therefore added to solve this problem. Besides aluminum salts, which have been used in vaccines for 90 years, a number of novel vaccine adjuvants include delivery systems like liposomes and emulsions have been included in licensed vaccines over the last 30 years. However trial-and-error has been the explorative approach of choice, for the design of novel vaccine adjuvants due to major gaps in the knowledge about immunological activation processes. Increasing insight into immunological mechanisms and how to manipulate them has replaced empirical with rational design of adjuvants, leading to vaccine adjuvants with increased and customized immunogenicity profiles without compromising vaccine safety. I will present an overview of where vaccine adjuvant research is today. I will furthermore show an example where the newest knowledge in innate immunology enables the rational design of a novel CTL inducing vaccine adjuvant.

Biography

Gabriel Pedersen is an immunologist and head of section for the Adjuvant Research group at the Center for Vaccine research, Statens Serum Institut, Copenhagen. Gabriel did his PhD at University of Bergen, Norway, focusing on pandemic influenza vaccines, before moving to Karolinska Institutet, Sweden, to do a postdoc in B cell biology, with particular focus on innate-like B cells. Since 2016, he has focused on adjuvant research on SSIs novel pipeline of adjuvants, particularly focusing on liposome and emulsion-based adjuvant and delivery systems.

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