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Mechanism of action of the oil in water emulsion vaccine adjuvant MF59

Ennio De Gregorio
Novartis Vaccines and Diagnostics, Italy

The oil-in-water emulsion MF59 has been tested in human in combination with several antigens and is licensed for pandemic and seasonal flu vaccines. Despite the large use of oil-in-water emulsions and their proven efficacy and safety in humans, their mechanism of action is only partially understood. We have found that MF59 activates innate immunity genes including cytokines and other genes involved in blood cell recruitment at injection site in mouse. In agreement with the local gene expression profiles, we could show that MF59 promoted a rapid infiltration of blood cells in the muscle. By using fluorescent OVA antigen we could demonstrate that MF59 promotes antigen uptake by several blood cell types and increases the transport of the antigen from the muscle to the draining lymph nodes. Recently, we dissected the relative contribution of the various components of the MF59 emulsion to innate immune genes activation, antigen uptake, cell migration and adjuvanticity. We have also assessed the requirement of several innate immune-related genes including Nlrp3 inflammasome and MyD88 for MF59 adjuvanticity and local innate immune activation.

Biography

Ennio De Gregorio has completed his Ph.D from EMBL in Heidelberg, Germany and postdoctoral studies from CNRS in Paris, France. Since 2008 he is the Head of Immunology in Novartis Vaccines and Diagnostics research center in Siena, Italy.