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UNSATURATED SQUALENE CONTENT IN EMULSION VACCINE ADJUVANTS PLAYS A CRUCIAL ROLE IN ROS-MEDIATED ANTIGEN UPTAKE AND CELLULAR IMMUNITY

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In the context of vaccine immunogenicity, it is important to evaluate whether co-culturing candidate adjuvants can promote antigen uptake by antigen-presenting cells and lead to enhance vaccination feasibility. Here, we explored mechanistic reasoning toward embracing the interface between the physicochemical and biological signatures for core oil selection in vaccine immunogenicity. Our results showed that treatment of dendritic cells (DCs) and splenocytes with a squalene-based emulsion (referred as SqE) induced reactive oxidative species (ROS) production and resulted in an increase in apoptotic and necrotic cells in a concentration- and time-dependent manner. Furthermore, DCs co-cultured with cellular debris of SqE-pretreated splenocytes resulted in a higher level of ovalbumin (OVA) antigen uptake by DCs than those co-cultured with untreated splenocytes. Interestingly, the potency was rather attenuated when splenocytes pretreated with a typical ROS inhibitor, N-acetyl-cysteine. Notably, SqE possesses a high impact on eliciting ROS-mediated antigen uptake compared with a squalane-based emulsion (SqA). Concordantly, immunogenicity studies have shown that SqE is better able than SqA to activate antigen-presenting cells, and to enhance antigen-specific T-cell immunity. Accordingly, our results highlight the importance of unsaturated squalene core oil in the adjuvant activity of emulsions and offer insight into the design and development of vaccine adjuvants.

Biography

Ming-Hsi Huang obtained his PhD degree in 2004 in Materials Chemistry from University Montpellier I in France. He worked as a Postdoctoral fellow and an Assistant Investigator in Vaccine Research and Development Centre of NHRI. Currently, he is an Associate Investigator in NIIDV of NHRI, Taiwan. He has published more than 30 SCI journal articles, 1 book chapter, and granted 5 patents.

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