Adjuvantome: Adjuvant data base for preclinical evaluation of vaccine and immunotherapy

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The word adjuvant has its origin from the Latin "adjuvare", meaning "to help". It is a general term for substances (factors) which are co-administered with a vaccine with the aim of increasing the effect (immunogenicity) of the vaccine. The research and development of adjuvants has a history of more than 90 years, and their actual mechanism was not immunologically understood for a long time, with a famous sarcastic remark "Immunologist's dirty little secret".

Recent advance in Immunology, however, allowed the development of adjuvants through an innovative scientific approach, and there is fierce competition worldwide for the development of next-generation adjuvants. On the other hand, however, adjuvants range widely in terms of origin and mode of action, and they may be the cause or underlying cause of vaccine toxicity, especially immunotoxicity.

Here, we have constructed a prototype of the Adjuvant Database (ADB) to classify 25 "core" adjuvants by collectively analyzing mouse and rat transcriptome datasets from different tissues. Integrated data of these adjuvant-induced murine responses enabled us to retrieve detailed characteristics of the adjuvants, predict their mechanisms of action and potential safety profiles. We believe this approach provides a flexible but standardized framework to evaluate any adjuvants comprehensively and systematically.