Innate immune mechanism of vaccines; DNA, Flu and Malaria vaccines

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Profile
2008-Present Program officer, Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japanese government
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2003-2008 Group Leader, Akira Innate Immunity Project, ERATO, JST
2000-2003 Staff Scientist, IND primary reviewer, Center for Biologics and Evaluation Research (CBER), Food and Drug Administration (FDA), USA.
1996-2000 Post-doctoral Fellow, CBER, FDA
1995-1996 Senior Resident, Anesthesiology / ICU, Department of Anesthesiology School of Medicine, Yokohama City University, Kanagawa, Japan
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Abstract
Optimal vaccine efficacy requires not only a protective antigen, but also a strong immune activator as an adjuvant. Most viral vaccines, such as influenza vaccines and non-viral genetic vaccines (e.g., DNA vaccines), contain nucleic acids, which appear to act as essential “built-in” adjuvants. Specific receptors, including toll-like receptors, retinoic-acid-inducible protein I (RIG-I)-like receptors, and nucleotide-binding oligomerization domain (NOD)-like receptors, can detect specific nucleic acid patterns, depending on the immunized tissue, cell type, and intracellular localization. The resultant immune activation is uniquely regulated by intra- and inter-cellular signaling pathways, which are indispensable for the ensuing vaccine immunogenicity, such as antigen-specific T- and B-cell responses. I would like to provide our data suggesting that elucidation and manipulation of immune signaling and interactions by nucleic acid adjuvants are essential for maximizing the immunogenicity and safety of viral and DNA vaccines.