32nd International Conference on
VACCINES AND IMMUNIZATION &
4th Annual Summit on
INFANCY, CHILD NUTRITION & DEVELOPMENT
November 09-10, 2018 | Atlanta, USA

Immunogenicity and protective efficiency in mice of a smallpox DNA vaccine candidate

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Smallpox, a disease caused by variola virus, has been eradicated from the planet in the 1980s following a global immunization program conducted by the World Health Organization. However, the adverse reactions of the current live smallpox vaccine and potential use of smallpox as a bioterrorism weapon have highlighted the need to develop a new effective vaccine for this infectious disease. In the present study, a DNA vaccine vector was produced which was optimized for expression of the vaccinia virus L1 antigen in a mouse model. Plasmid-encoded IgM-tL1R, which contains a truncated L1R gene fused to an IgM signal sequence, was constructed and expressed under the regulation of an SV40 enhancer. The expressed recombinant tL1 proteins were successfully secreted into the culture media. The DNA vaccine was administered to mice by electroporation, and animals were subsequently challenged with lethal doses of vaccinia virus. We observed that immunization with IgM-tL1R induced robust neutralizing antibody responses and provided complete protection against a vaccinia virus infection. Isotyping studies revealed a lower IgG1/IgG2 a ratio following vaccination with IgM-tL1R suggesting the stimulation of Th1 immune responses. Our results propose that an optimized DNA vaccine, IgM-tL1R, can be effective in eliciting an anti-vaccinia virus immune response and provide protection against lethal orthopoxvirus challenge.

Biography

Sunghyun Hong has completed his M.D. at the age of 30 years from Kangwon National University. He is the researcher of ABION Cor., a bio pharmaceutical drugs and companion diagnostics development organization. He has published more than 9 papers in reputed journals.

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