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Genotype I of Japanese encephalitis virus virus-like particles elicit sterilizing immunity against Genotype I and III viral challenge in swine

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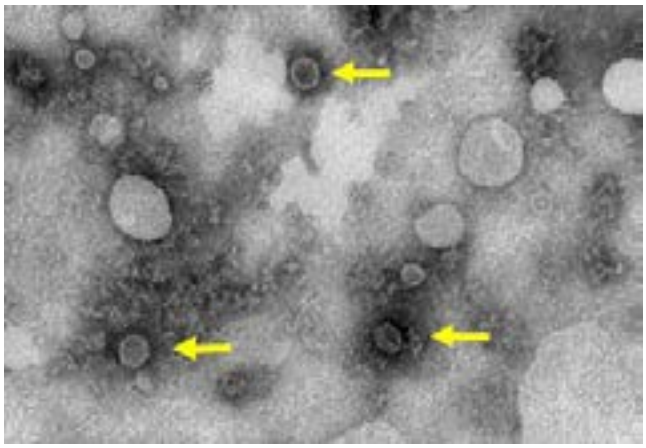
Swine is the most critical amplifying host involved in human Japanese encephalitis (JE) outbreaks. Genotype -specific immunogenicity and sterile protection are concerned for the current genotype III (GIII) virus-derived vaccines in swine, especially emerging genotype I (GI) JE virus (JEV) has replaced GIII virus as the dominant strain. Herein, we aimed to develop a system to generate GI JEV virus-like particles (VLPs) and evaluate the immunogenicity and protection of the GI vaccine candidate in mice and specific pathogen-free swine. A CHO-heparan sulfate-deficient (CHO-HS(-)) cell clone, 51-10 clone, stably expressing GI-JEV VLP was selected and continually secreted GI VLPs without the sign of cell fusion. 51-10 VLPs formed a homogeneously empty-particle morphology and exhibited similar antigenic activity as GI virus. GI VLP-immunized mice showed balanced cross-neutralizing antibody titers against GI to GIV viruses (50% focus-reduction micro-neutralization assay titers 71 to 240) as well as potent protection against GI or GIII virus infection. GI VLP-immunized swine challenged with GI or GIII viruses showed no fever, or viremia or viral RNA in tonsils, lymph nodes and brains as compared with phosphate buffered saline-immunized swine. We, thus, conclude GI VLPs can provide sterile protection against GI and GIII viruses in swine.



Biography

Chiou S S has completed his PhD at the age of 28 years from National Taiwan University and Postdoctoral Studies from School of Medicine, Chang Gung University, Taiwan. He is the Professor of National Chung Hsing University, Taiwan. He has published more than 25 papers in reputed journals.

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