Title: Necrotic cell death induced by betanodavirus requires viral RNA replication-dependent that mediated via viral death inducers

Hung-Cheng Wu*, Jen-Leih Wu , Heuy-Ling Chu , Jiann-Ruey Hong

Abstract

The RNA nervous necrosis virus induces necrotic cell death in fish, but its molecular mechanism is still unsolved. In this study, we demonstrated that betanodavirus-induced mitochondria-mediated necrotic cell death is initiated at the level of RNA replication and requires key viral death inducers at the middle-late replication stage. We determined that viral genomic replication is required for red-spotted grouper nervous necrosis virus (RGNNV)-induced cell death. Results indicated that UV irradiation of the virus could effectively block viral replication and cell death. We cloned the RGNNV RNA dependent RNA polymerase (RdRp; termed protein A) and determined if it was involved in the induction of cell death. Results indicated that protein A was initially expressed 48 h post-infection and localized to the cytoplasm. Furthermore, knockdown of protein A expression completely block viral genomic replication and blocked expression of the viral death inducer proteins α and B2, which correlated with inhibition of phosphatidylserine exposure, mitochondria-mediated death signaling, and an increased cell viability at 72 h post-infection. Furthermore, the knockdown of protein g expression by siRNA, partially inhibited necrotic cell death following RGNNV infection. Together, these results indicated that RGNNV-induced mitochondria-mediated necrotic cell death is dependent on viral RNA replication-dependent viral death inducers and their expression at the middle-late replication stage. These findings may provide new insights into RNA virus-induced host pathogenesis.

Biography

Hung-Cheng Wu., candidate for Ph. D. of National Cheng-Kung University, Taiwan. He bas taught biochemistry and biotechnology for 10 years in Chia Nan University of Pharmacy & Science. His main research interest is in the nervous necrosis virus induces necrotic cell death in fish, and anitviral effect by siRNA.

Hung-Cheng Wu
Assistant Professor
Chia Nan University of Pharmacy & Science ,
Taiwan, and also
Ph. D student,
Institute of Biotechnology, National Cheng-Kung University
Taiwan
E-mail:L6892113@mail.ncku.edu.tw