

# Proteomic interaction among WSSV449 and proteins involved in the Toll-mediated NF- $\kappa$ B pathway in Pacific white shrimp

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## Abstract

Shrimp aquaculture is one of the most rapid growing businesses and is practiced worldwide, including in Thailand. According to the statistics of the Food and Agriculture Organization (FAO) of the United Nations, marine and brackish water shrimp culture production expanded from less than 10,000 metric tons in 1970 to more than 3,000,000 metric tons in 2011. Among the cultivated shrimps, the most popular farmed shrimp is the Whiteleg shrimp (*Penaeus vannamei*) which accounts for 67% of the whole shrimp production. Each year, enormous losses come from disease outbreaks which are mainly from viruses. One of the most fatal shrimp diseases is the White spot syndrome virus (WSSV) which causes 90-100% mortality within 3-10 days. In order to dissect the functions of viral and host cell proteins involved in pathogenesis and defense mechanisms, protein interaction analysis was used. From the previous study of a genome-wide analysis of White spot syndrome virus showed that WSSV449 was similar to the *P. vannamei* Tube protein of the Toll pathway and it appears that both proteins have the same function in activating the NF- $\kappa$ B pathway. Notably, the NF- $\kappa$ B pathway is often utilized by viruses to benefit their infection and replication. They also showed that WSSV449 facilitated the expression of *WSV069(ie1)*, *WSV303* and *WSV371* through this pathway. But to date, mechanisms of NF- $\kappa$ B activation by WSSV449 have not yet been shown. Regarding to the similarity of WSSV449 and Tube protein, the interaction among WSSV449 and proteins involved in the Toll-mediated NF- $\kappa$ B pathway may be the mechanism of NF- $\kappa$ B pathway activation by WSSV449, which resulted in the expression of *WSV069(ie1)*, *WSV303* and *WSV371*. Therefore, this work attempts to find protein interaction between WSSV449 and proteins involved in the Toll-mediated NF- $\kappa$ B pathway by yeast two-hybrid assay.

After testing protein interaction between WSSV449 and proteins involved in the Toll-mediated NF- $\kappa$ B pathway which include *MyD88*, *Tube*, *TRAF6* and *Dorsal* using yeast two-hybrid assay, results showed that WSSV449 did not interact with any of these proteins. Two other proteins, *Pelle* and *Cactus* are in the process of gene cloning and testing protein interaction. In the activation of the Toll-mediated NF- $\kappa$ B pathway by WSSV449 there might also be other WSSV proteins involved which may act as potential activators. Therefore, we have preliminarily screened *MyD88* with the WSSV library and found potential WSSV interacting partners, which the identification by sequencing is in progress.