

Purification, crystallization and preliminary X-ray crystallographic studies of virus-like particles formed by grouper betanodavirus particles

Yu-Chun Luo (羅昱淳)¹, Kai-Fa Huang (黃開發)², Cheng-Chung Lee (李政忠)², Chun-Hsiung Wang (王俊雄)¹, Andrew H.-J. Wang (王惠鈞)², and Chan-Shing Lin (林全信)¹

¹Department of Marine Biotechnology and Resources, National Sun Yat-sen University, Kaohsiung 80424, Taiwan, ROC

² Institute of Biological Chemistry, Academia Sinica, Taipei 115, Taiwan

The grouper is a high-value fish in the live seafood retail market. Grouper nervous necrosis virus (GNNV) causes a high ratio of mortality, near 100% in larvae and juveniles, which has led to significant economic losses on the aquaculture of the marine fish. Piscine betanodavirus genome consists two segments of single-stranded (+)-RNAs. Virus-like particles (VLPs), assembled from capsid structural subunits of the dragon grouper (*Epinephelus lanceolatus*) nervous necrosis virus (DGNNV), which are highly similar to the native $T = 3$ quasi-symmetric virion. The VLPs protein from dragon grouper nervous necrosis virus has been identified and expressed in *Escherichia coli*. The native protein was purified and crystallized by sitting-drop vapor diffusion. Crystals were obtained in one week and a complete X-ray diffraction data set has been collected to 7.5 Å resolution. Preliminary processing of the DGNNV VLPs diffracting data suggests that the crystal belong to space group $R3$ or $R32$ and has unit-cell parameters $a = b = 353.03$ Å, $c = 800.44$ Å, $\alpha = \beta = 90^\circ$, $\gamma = 120^\circ$ or $a = b = 353.00$ Å, $c = 800.40$ Å, $\alpha = \beta = 90^\circ$, $\gamma = 120^\circ$, respectively. The further analysis of these data are under way.