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KORNNIKA KHANOBDEE : MORPHOLOGICAL AND BIOCHEMICAL STUDIES OF GIANT BLACK TIGER PRAWN, PENAEUS MONODON INFECTED WITH YELLOW-HEAD VIRUS. THESIS ADVISORS : BOONSIRM WITHYACHUMNARNKUL, M.D., Ph.D., TIM FLEGEL, Ph.D., PRASERT SOBHON, Ph.D., VICHAI BOONSAENG, Ph.D. 117 P. ISBN 974-663-673-1

This study was undertaken to investigate the morphological and biochemical changes in giant black tiger prawn, *P. monodon*, following yellow-head virus (YHV) infection at various time sequences. The study included (1) the total haemocyte count, (2) light microscopy (LM) with haematoxylin & eosin and Wright & Giemsa stains, (3) labeling of nuclear DNA by 4,6-diamidine-2-phenylindole dihydrochloride (DAPI) and TdT-mediated dUTP nick-end labeling (TUNEL), (4) Transmission electron microscopy (TEM) and (5) determination of specific activity of lactate dehydrogenase (LDH). The shrimp were injected with virulent YHV, and several tissues were studied at different time intervals after the injection. The total haemocyte count at 0 h was $12.29 \times 10^6 \pm 1.93 \times 10^6$ cells/ml. The number decreased to about half of the control level ($p<0.05$) at 6 h post-injection. It declined progressively ($p<0.05$) at every sampling point to almost zero at 36 h post-injections. Abnormal nuclei, including pyknosis and karyorrhexis were observed in haemocytes and other tissues, starting from 12 h post-injection. By LM study, it was found that the lymphoid organ of the shrimp was the first organ attacked by YHV, which was at 6 h post-injection. The lymphoid organ also showed the highest degree of destruction, compared to other organs under studied. Extensive destruction by YHV was also observed in haematopoietic tissue and gills at 24 and 36 h post-injection. At 24 h post-injection, nuclear margination and cellular vacuolation were noticed. Labeling study by DAPI and TUNEL showed both chromatin condensation and fragmentation, which are characteristics of apoptosis, in gills and the lymphoid organ of the infected shrimp. The pathological features, particularly in the lymphoid organ, were progressive from 12 h toward 36 h post-injection. The features were further supported by TEM observation, which showed the lymphoid organ of YHV infected shrimp having marginated, condensed and fragmented chromatin without concurrent cytoplasmic damages. The LDH levels were significantly increased in heart and muscles of the moribund YHV-infected shrimp, compared to the control ones, which could reflect and increased glycolysis-dependent energy production. These results strongly suggests that *P. monodon* infected with YHV results in apoptosis in cells of several vital organs, and is probably the cause of the animal death.