

Thesis Title                      Sexual Dimorphism of N-Acetyltransferase  
and Melatonin Levels in the Optic Lobe  
of the Giant Freshwater Prawn,  
*Macrobrachium rosenbergii*

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### ABSTRACT

N-acetyltransferase activity (NAT), the rate-limiting enzyme for melatonin synthesis, is distributed in all parts of the optic lobe of the giant freshwater prawn, *Macrobrachium rosenbergii* de Man. The purpose of this study was to determine the NAT activities and melatonin contents in optic lobes of the male and female prawns and to determine if NAT level in one optic lobe would be when the other was ablated. Male and female *M. rosenbergii* were unilaterally eyestalk-ablated on the right side. The right eyestalks were kept frozen for NAT determination. One week later, the left eyestalks were cut and their optic lobes were determined for NAT activities simultaneously with the right ones. Melatonin levels in all of the optic lobes were also determined by radioimmunoassay. The results indicate that NAT activity in the right optic lobe of the male was significantly higher than that of the female ( $P < 0.01$ ). In the male, the left and the right optic lobe NAT level did not differ. However, a slight but significant decrease in NAT activity was detected in the left optic lobe of the female, compared to the right one. ( $P < 0.05$ ). Like the NAT activity, melatonin level in the right optic lobe of the male was significantly higher than that of the female ( $P < 0.01$ ). Significant decrease in melatonin level was also detected in the left optic lobe of both sexes. The results indicate an existence of sexual dimorphism of NAT

activity and melatonin levels in the prawns and certain interaction between the two sides of the optic lobe that regulates the levels of NAT and melatonin of the two optic lobes. In *P. monodon*, there is no a significant difference in the levels of NAT activity although a slightly higher level in female could be detected. The NAT levels in male and female *P. monodon* were maintained at the same levels throughout 24 hr.

The knowledge of the NAT sexual dimorphism might be applicable for sexing *M. rosenbergii* which would benefit its aquaculture in the future.