

Deciphering the sexually dimorphic endocrine regulatory network of *Penaeus vannamei* after unilateral eyestalk ablation

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2 中国海洋大学海洋生物遗传学与育种教育部重点实验室,山东青岛 266003 Abstract

Sexual dimorphism in growth and development is commonly observed in decapods, but the sex-biased endocrine regulation induced by eyestalk ablation (ESA) is still unclear. Therefore, we conducted a comprehensive transcriptomic study on the hepatopancreas and eyestalks of both female and male Penaeus vannamei.

1 Landscape of the sex-biased transcriptomic responses

• There are differences in expression at both gene and transcript levels. Sexual differences in energy metabolism and immune stress responses were found.



2 Basal metabolism and co-expression network analysis

- Enzyme activity showed gender difference
- WGCNA determined the hub genes of males and females, indicating the role of hormone regulation.



3 Hormone-related effects of ESA

◆ 20E hormone regulation exhibits sex-dependent temporal, with females responding faster than males, triggering the co-regulatory effect of MF.









The length diversity of 3'UTR exhibited gender specificity. EsA_F_HP

EsA_F_ES

EsA_M_ES

c)



b) The dynamic changes of AS exhibit tissue preference. Longthene NonSig EsA_F_HP EsA_F_ES b) d) EsA_M_HP EsA M H

5 MicroRNA regulation analysis

- Analysis of differential expression of miRNAs
- ◆ Validation of miRNA-target by Dual luciferase reporter



The response of *P. vannamei* to ESA exhibits sexual dimorphism.

- > Tissue-specific AS and sex-bias regulation of APA and miRNA.
- Females respond more rapidly to 20E, while also inducing the production of the MF signal for negative feedback regulation. Besides, females tend to store energy, presumably for subsequent ovarian development.
- In males, the hormonal response is delayed, with frequent lipid metabolism, which is presumed to allocate energy consumption for stress responses and behavioral activities.

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