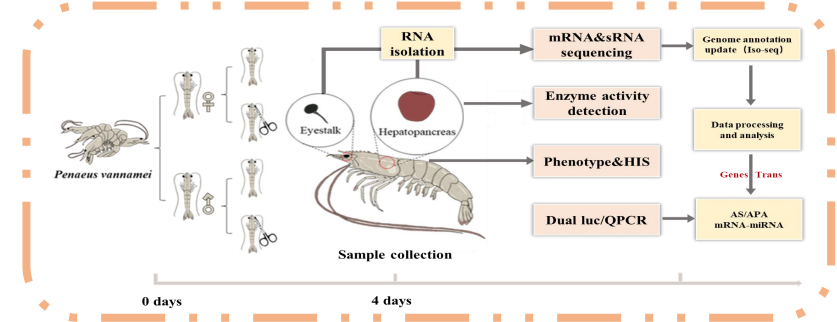


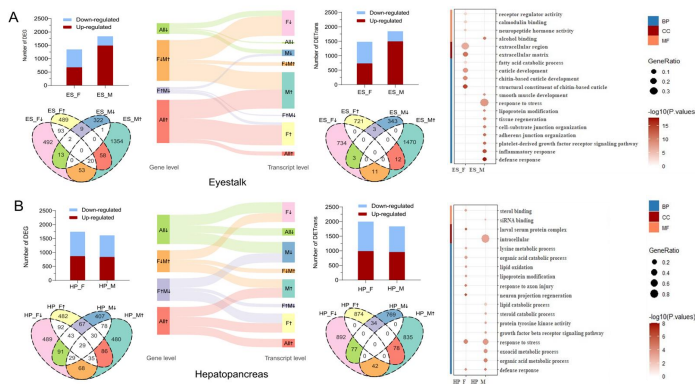
Abstract

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*.



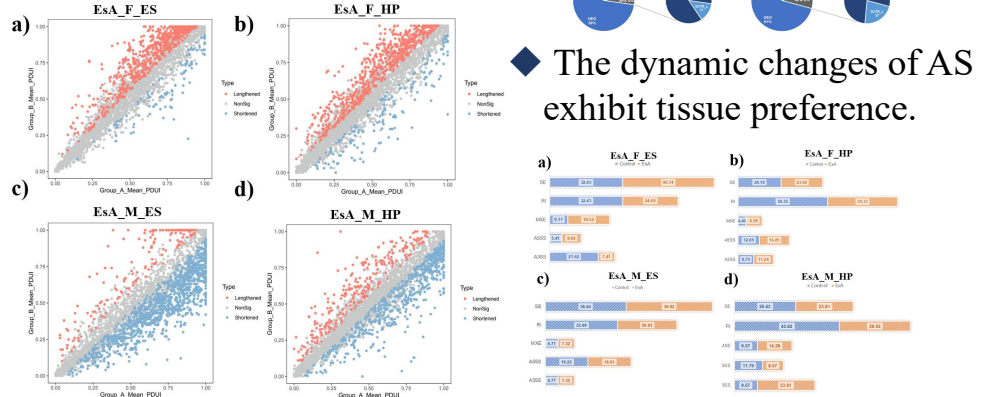
1 Landscape of the sex-biased transcriptomic responses

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



4 Alternative splicing (AS) & polyadenylation (APA) analysis

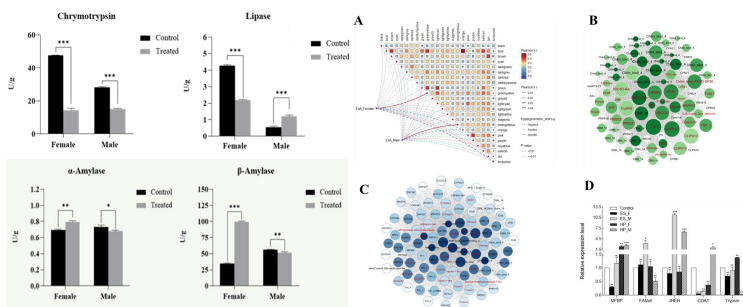
◆ AS: over 26% ; APA: ~ 7%.
◆ The length diversity of 3'UTR exhibited gender specificity.



◆ The dynamic changes of AS exhibit tissue preference.

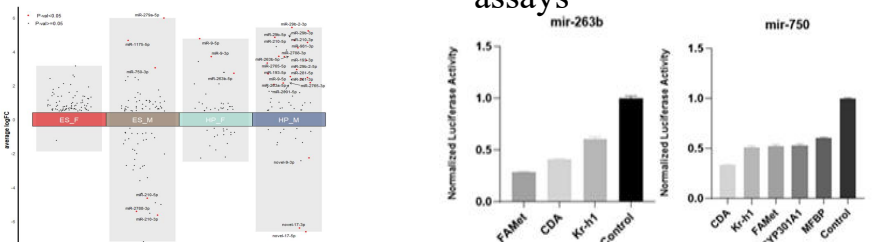
2 Basal metabolism and co-expression network analysis

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



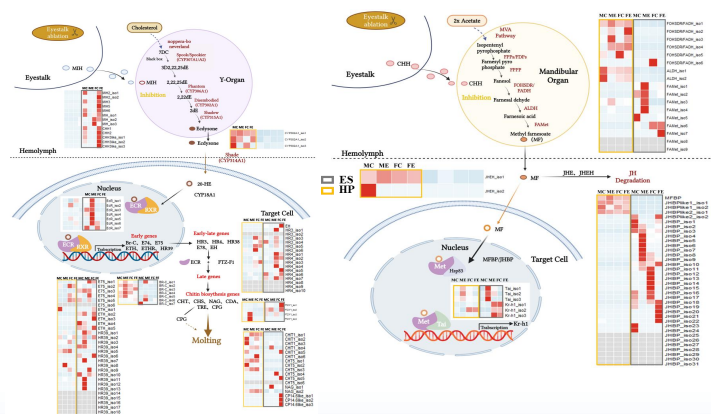
5 MicroRNA regulation analysis

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

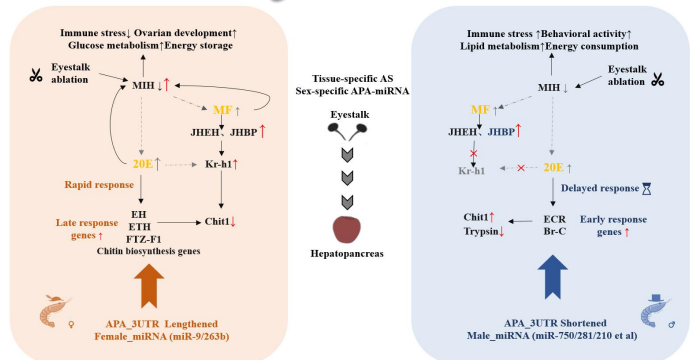


3 Hormone-related effects of ESA

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



Conclusion



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.