

Hepatopancreas-Ovary Crosstalk Dynamically Modulates Fatty Acid Metabolism During Ovarian Maturation in *Litopenaeus vannamei*

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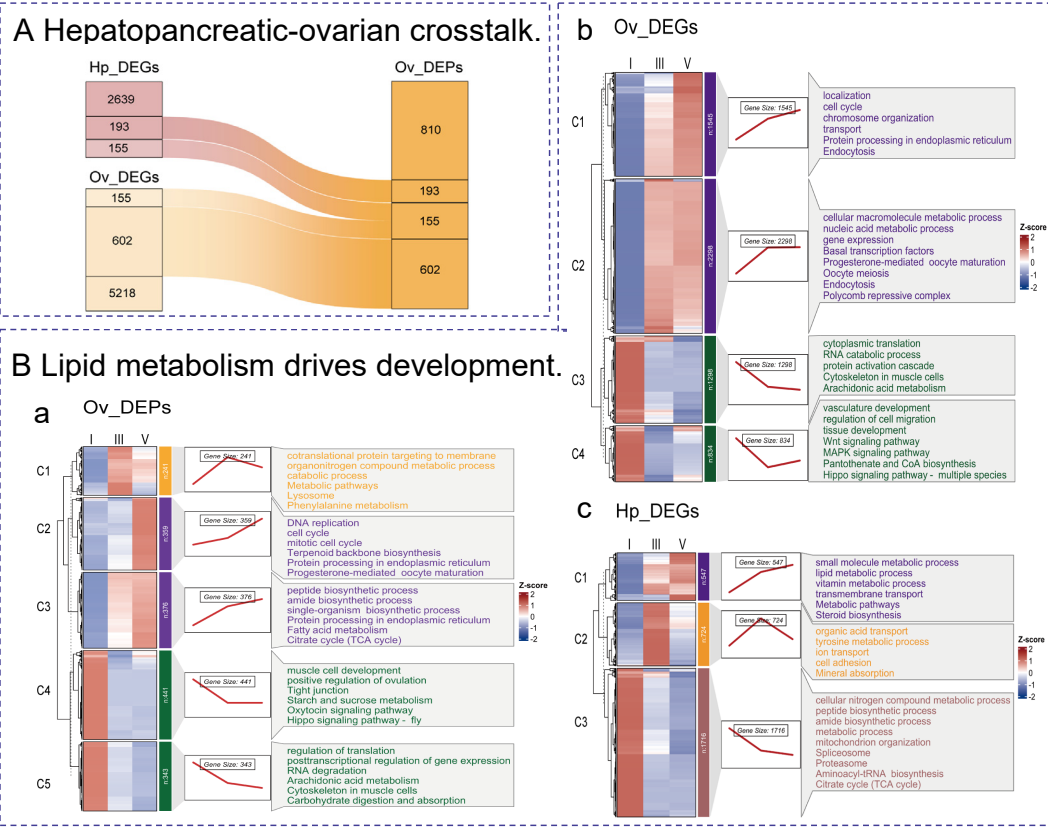
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Summary

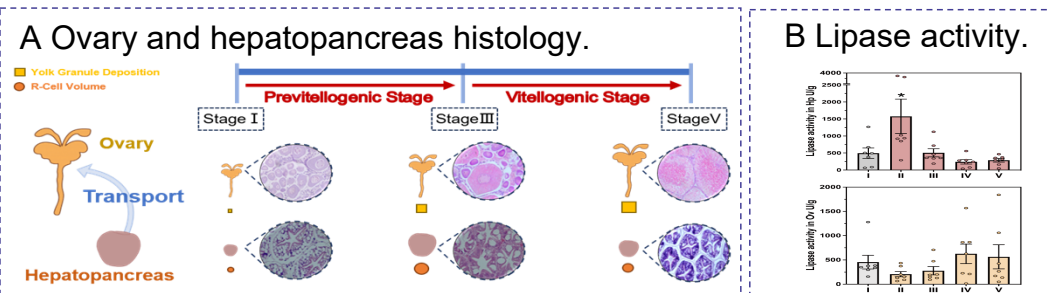
The reproduction of *Litopenaeus vannamei* is closely linked to the metabolic status. Our multi-omics analysis reveals a lipid-centric hepatopancreas-ovary axis, which exhibits stage-specific activation and involves proteins derived from both tissues. **These results enhance understanding of ovary-hepatopancreas communication, providing a scientific basis for improved gonadal regulation in shrimp.**

Results

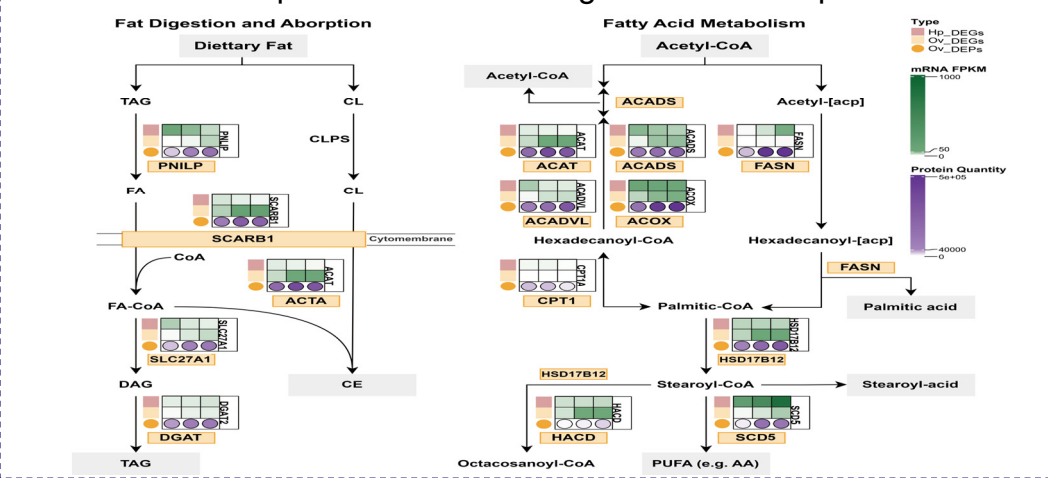
1. The hepatopancreas-ovary axis regulates maturation through organ crosstalk in *Litopenaeus vannamei*.



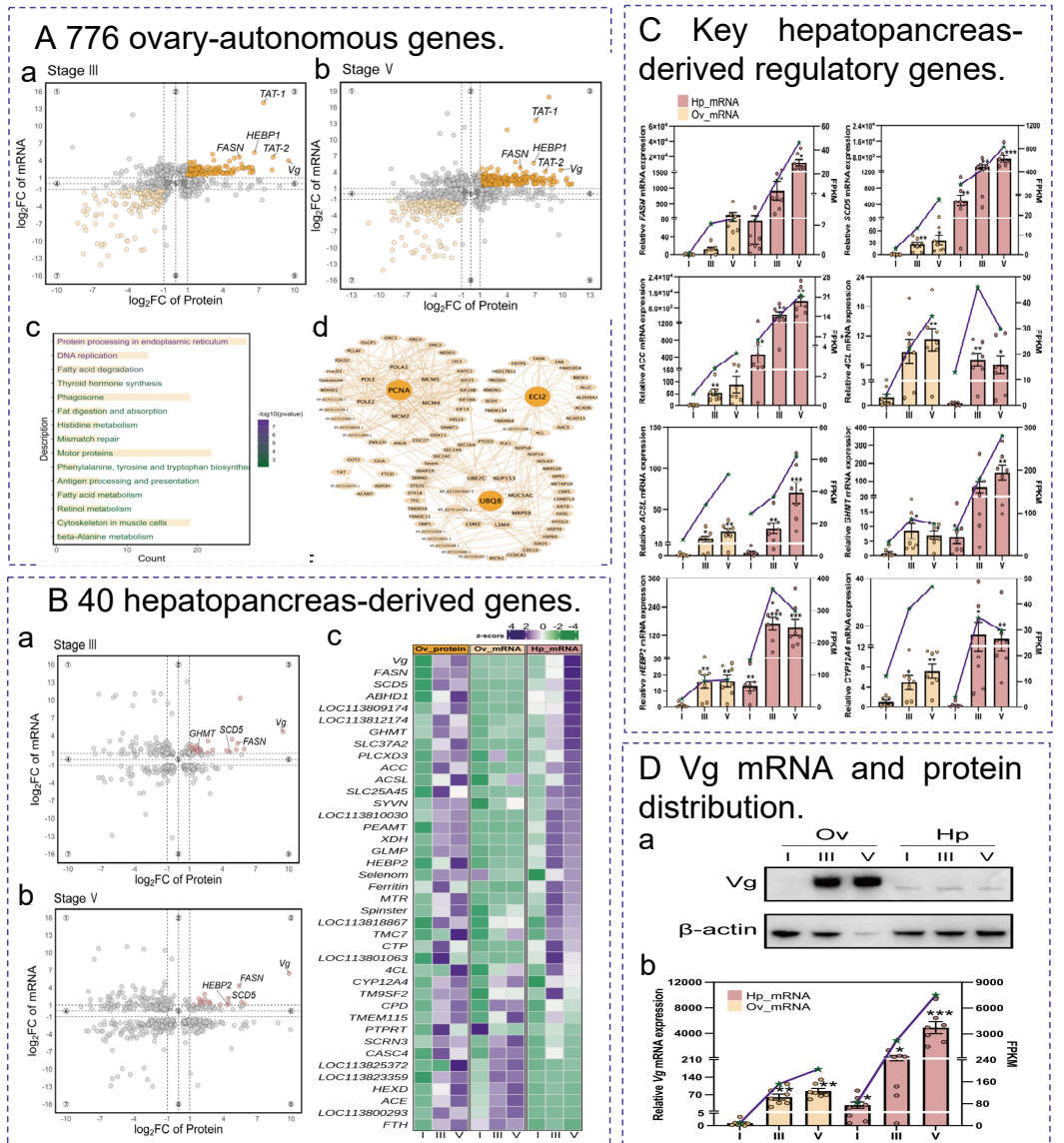
2. Sequential lipid metabolic activation occurs from the hepatopancreas (early) to the ovary (late).



C Multi-omics of lipid metabolism during ovarian development.



3. Identifies a dual regulatory system for ovarian maturation: 776 ovary-autonomous genes and 40 hepatopancreas-derived transportable proteins.



Conclusion

Our findings reveal a lipid-centered hepatopancreas-ovary axis that regulates ovarian maturation. Specifically, this axis features a temporal division of labor: the hepatopancreas is activated early, whereas ovarian gene expression peaks during late maturation. Also, we identify 776 ovary-autonomous genes and 40 hepatopancreas-derived regulators. Taken together, we establish a new framework for understanding the crosstalk between extra-gonadal and reproductive tissues in crustacean reproduction.

Acknowledgements

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