Sex-specific metabolic changes in liver of Atlantic Cod (*Gadus morhua*) under photoperiod manipulation

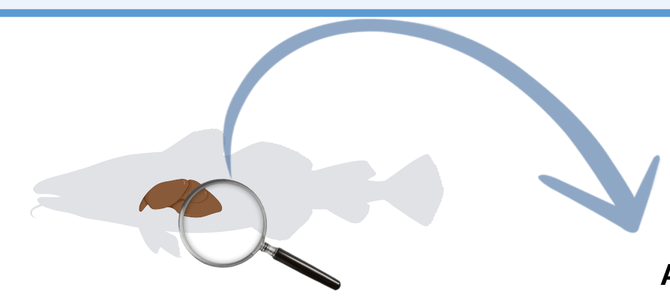
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INTRODUCTION

Photoperiod manipulation

Acts as a **primary environmental signal**, rhythmically modulating **endocrine profiles** through **neuroendocrine pathways.**



Key **metabolic organ** in response to **photoperiodic changes.**

Onset of puberty

- Growth rate
- Fillet quality
- Post-spawning mortality

Application of

Continuous light (CL)

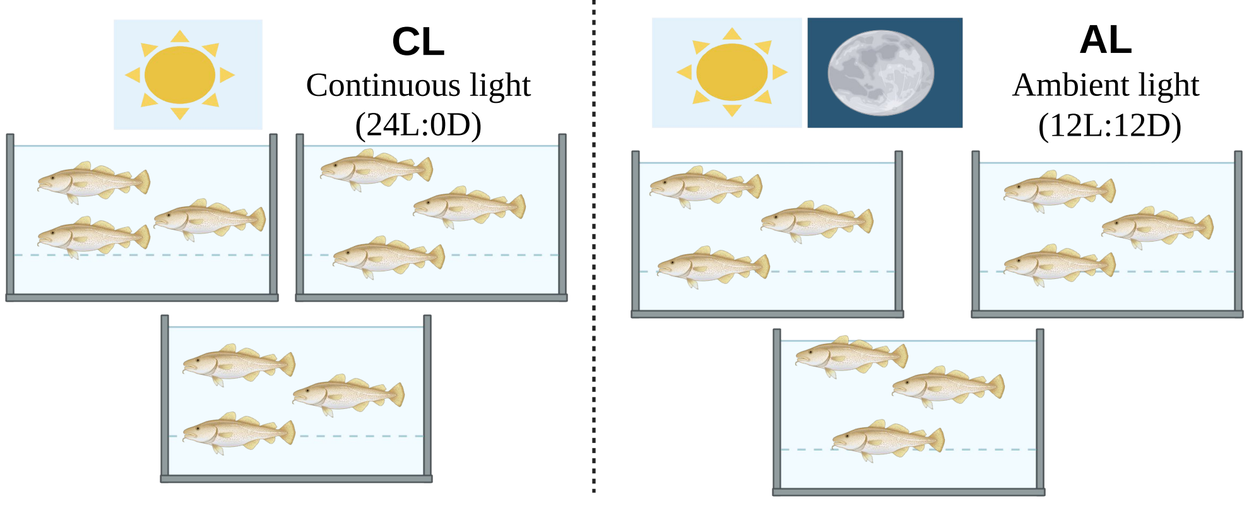
Delayed or inhibition puberty

OBJECTIVE

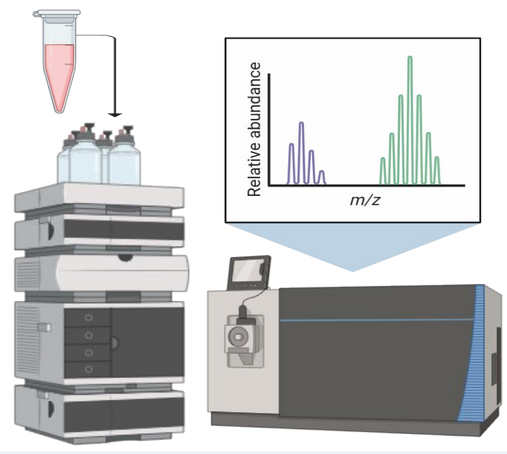
To examine the influence of **photoperiod manipulation** on the **metabolomic profiles** in **cod liver**



MATERIALS & METHODS



Liquid Chromatography Coupled with Mass Spectrometry

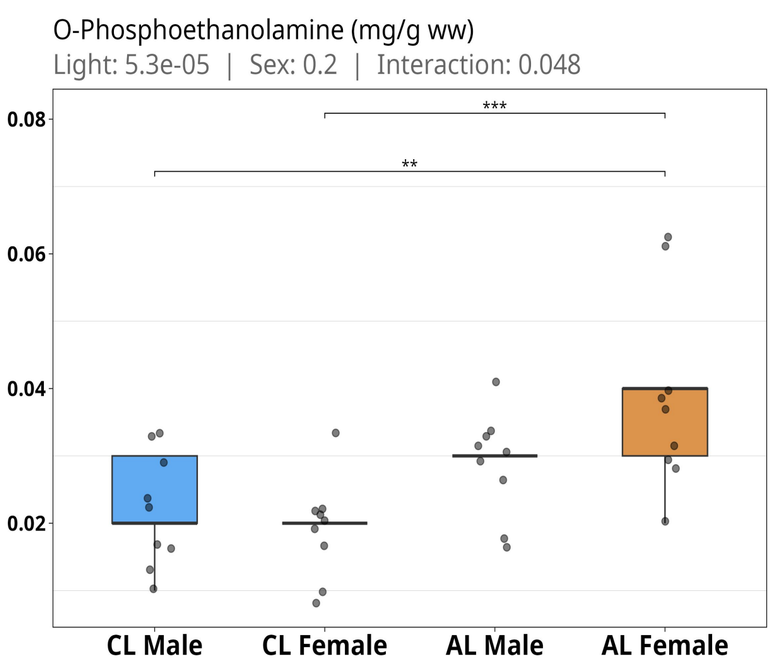


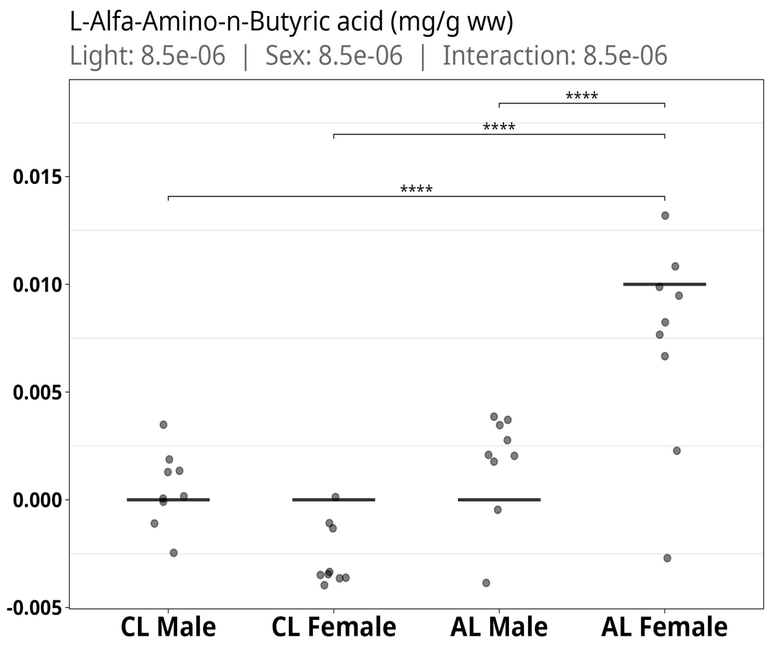
High-Performance Thin Layer Chromatography



RESULTS

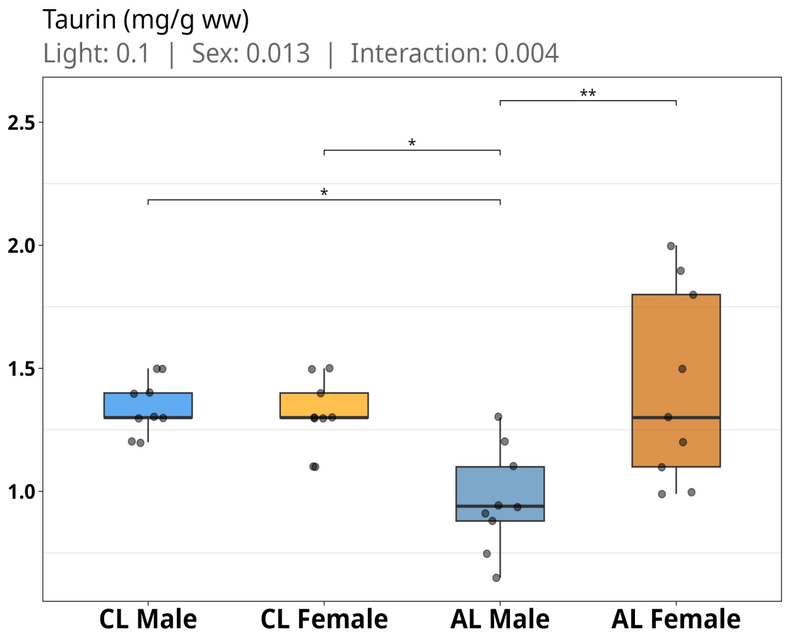
Metabolism





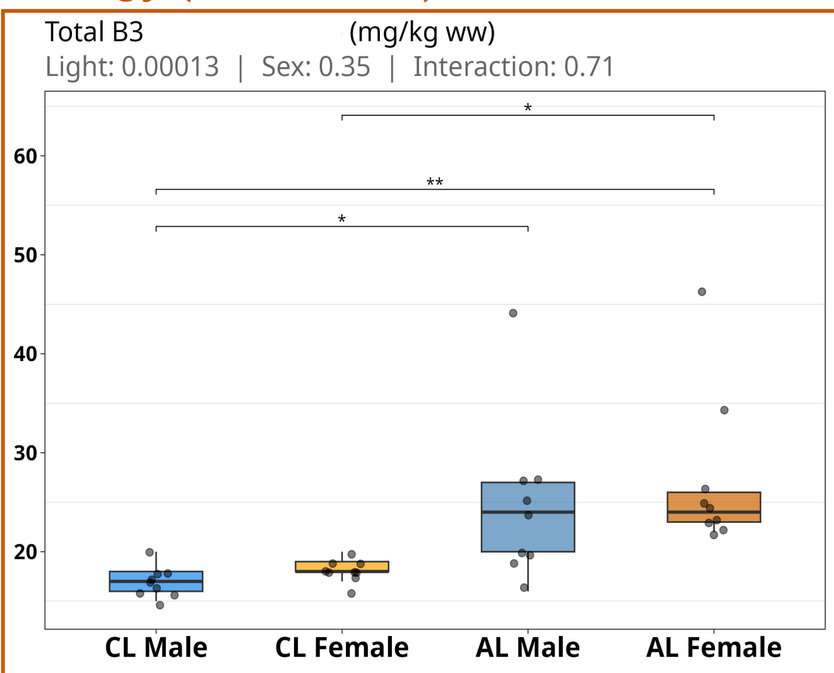
Here is a significant interaction between photoperiod manipulation and sex for L-alpha-amino-n-butyric acid and O-phosphoethanolamine, indicating that their metabolic regulation depends on the combined effect of sex and light regimen.

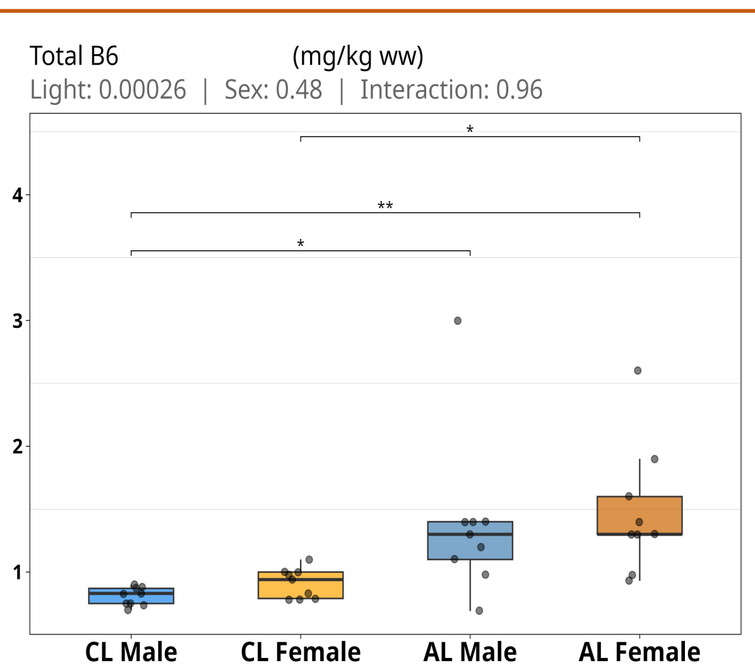
Stress Response



Taurine exhibited a significant interaction; while no overall differences were found between photoperiod regimes, a sex-specific pattern emerged where levels differed significantly between males and females under AL but converged under CL.

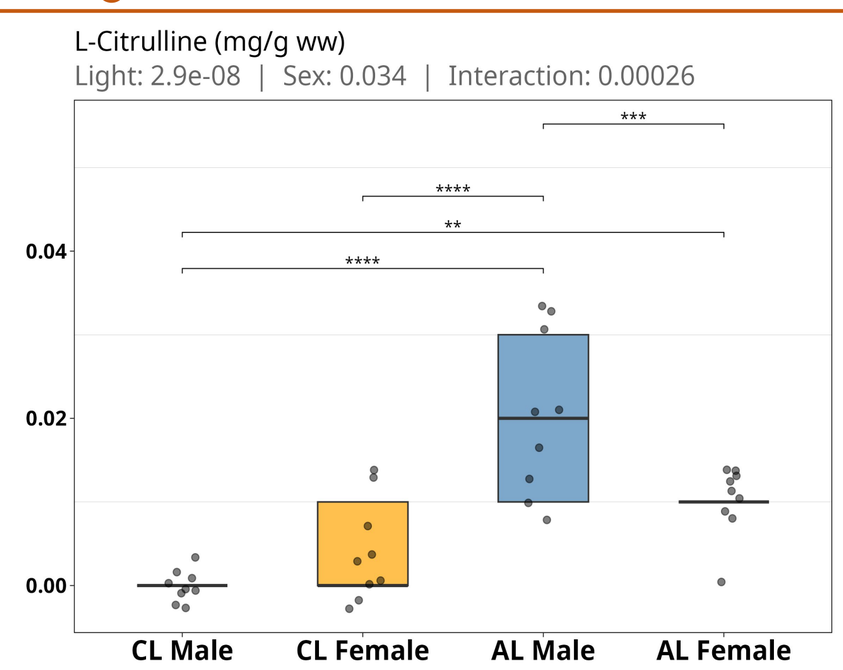
Energy (B Vitamins)





Low levels of B-complex vitamins were found in fish under CL, indicating a higher metabolic cost compared to AL.

Nitrogen



Citrulline levels showed an interaction, suggesting that nitrogen metabolism is modulated differently in each sex when exposed to CL.

CONCLUSIONS

- The highly significant interactions observed between AABA, citrulline, and taurine demonstrate that males and females employ completely different physiological strategies when adapting to CL.
- These results suggest a higher physiological cost associated with exposure to CL, potentially due to increased metabolic demand.
- B-complex vitamins under CL provide clear chemical evidence of a high physiological cost.

Acknowledgments

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