Sex-specific associations of *Roseburia* with uric acid metabolism and hyperuricemia risk in females

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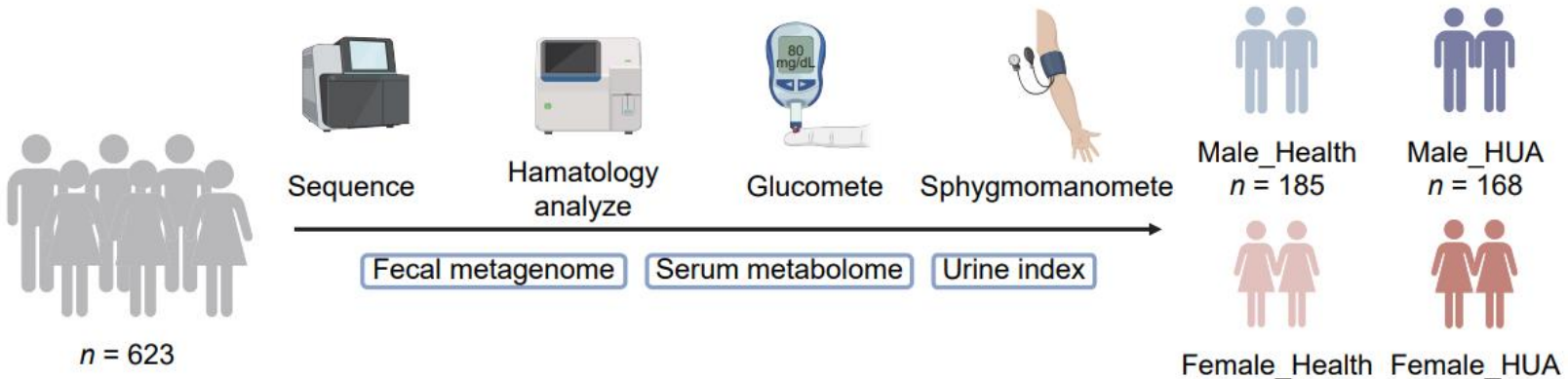
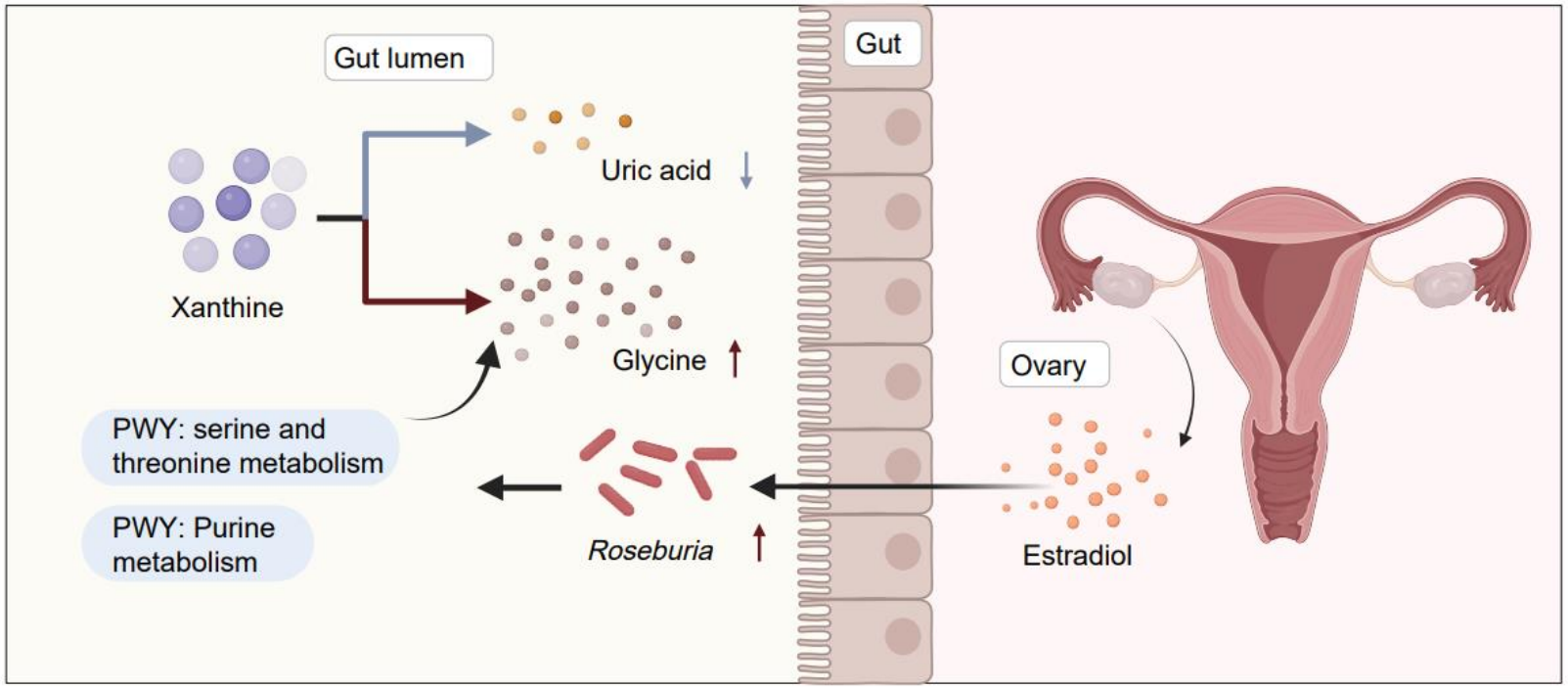
Introduction





Highlights

1. Analysis of 623 population samples suggests microbiological factors behind lower hyperuricemia (HUA) incidence in females.

2. *Roseburia* is a sex-specific genus that may benefit the mitigation of HUA in females.

3. *Roseburia* is positively correlated with estradiol (E2) levels and negatively correlated with uric acid (UA) levels.

4. The xanthine-glycine pathway is positively correlated with the abundance of *Roseburia*, which might contribute to lower UA levels through this pathway.

Sex differences in the effects of HUA on hosts

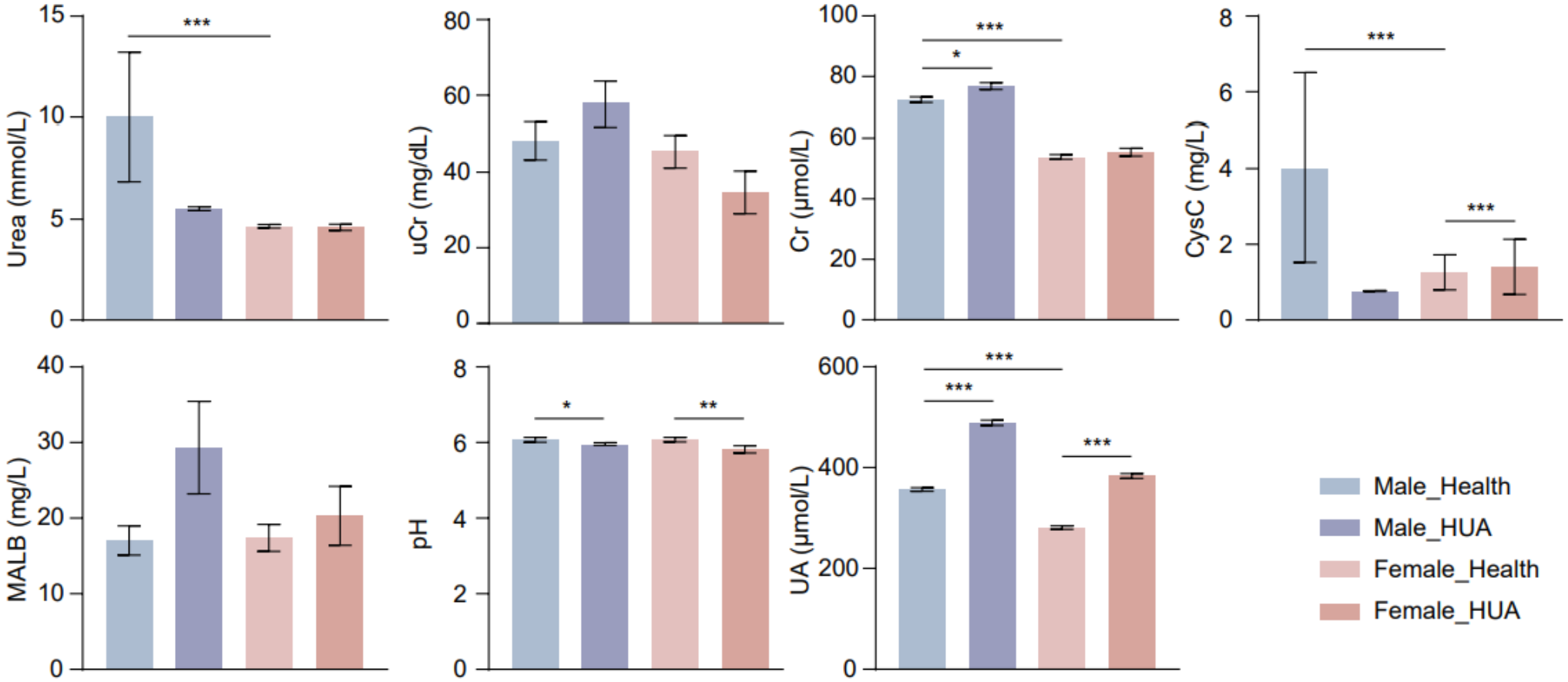


Figure 1. Flowchart of the clinical trial.

Gut microbiota was significantly associated with sex-specific levels of HUA

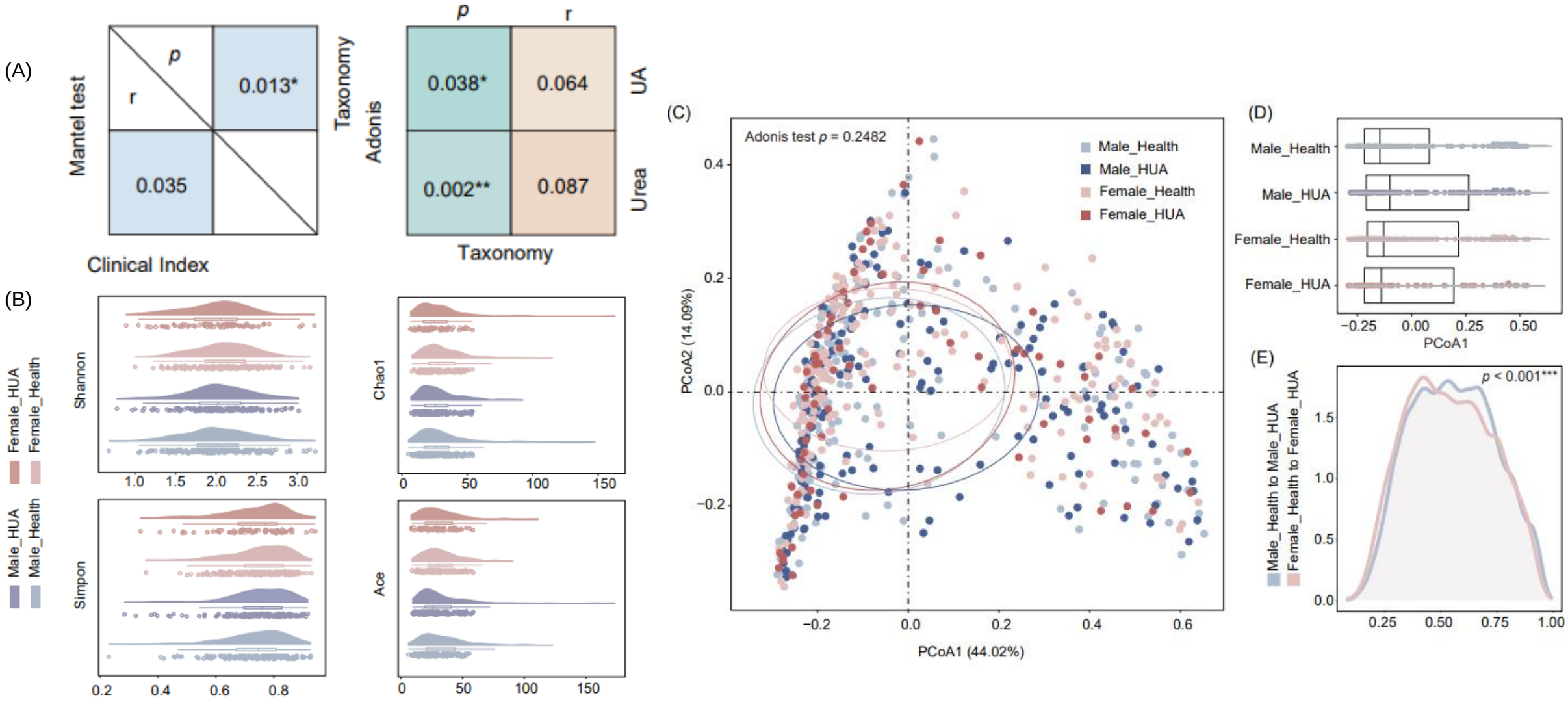


Figure 2. Differences in the structure of gut microbiota.

Enrichment of bacteria that produce short-chain fatty acids (SCFAs) in the intestinal tract of Female_Health

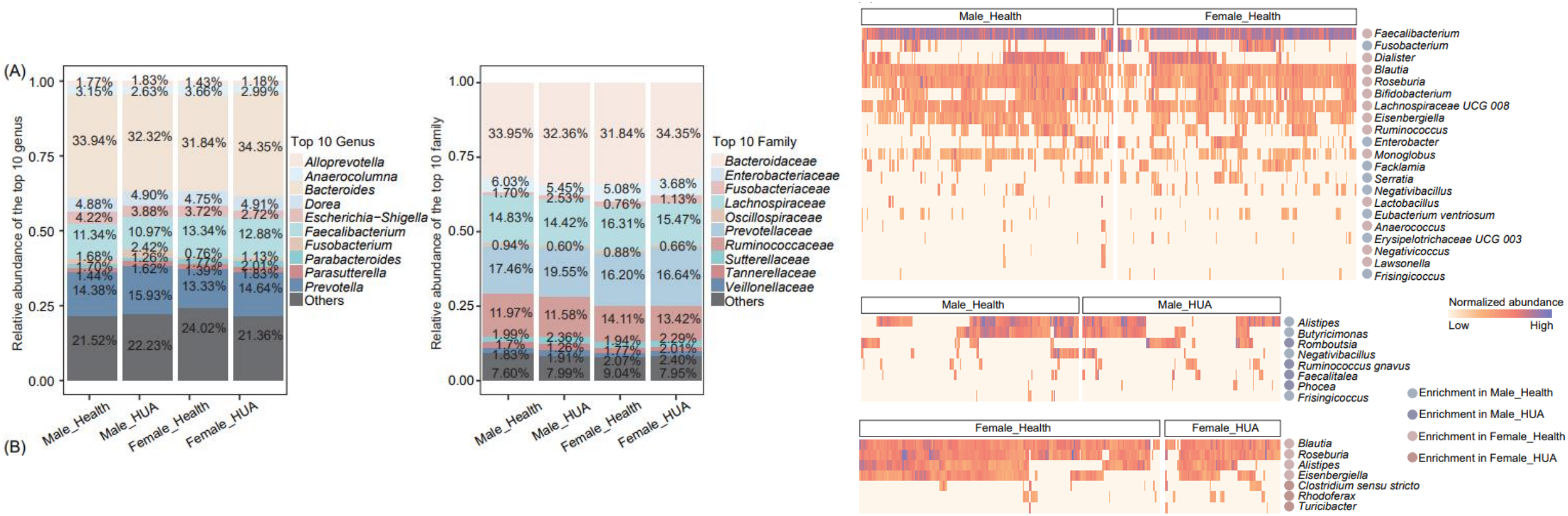


Figure 3. The Female's gut microbiota differed from that of the male and affects characterization in HUA.

Roseburia as a key biomarker for protection against HUA in females

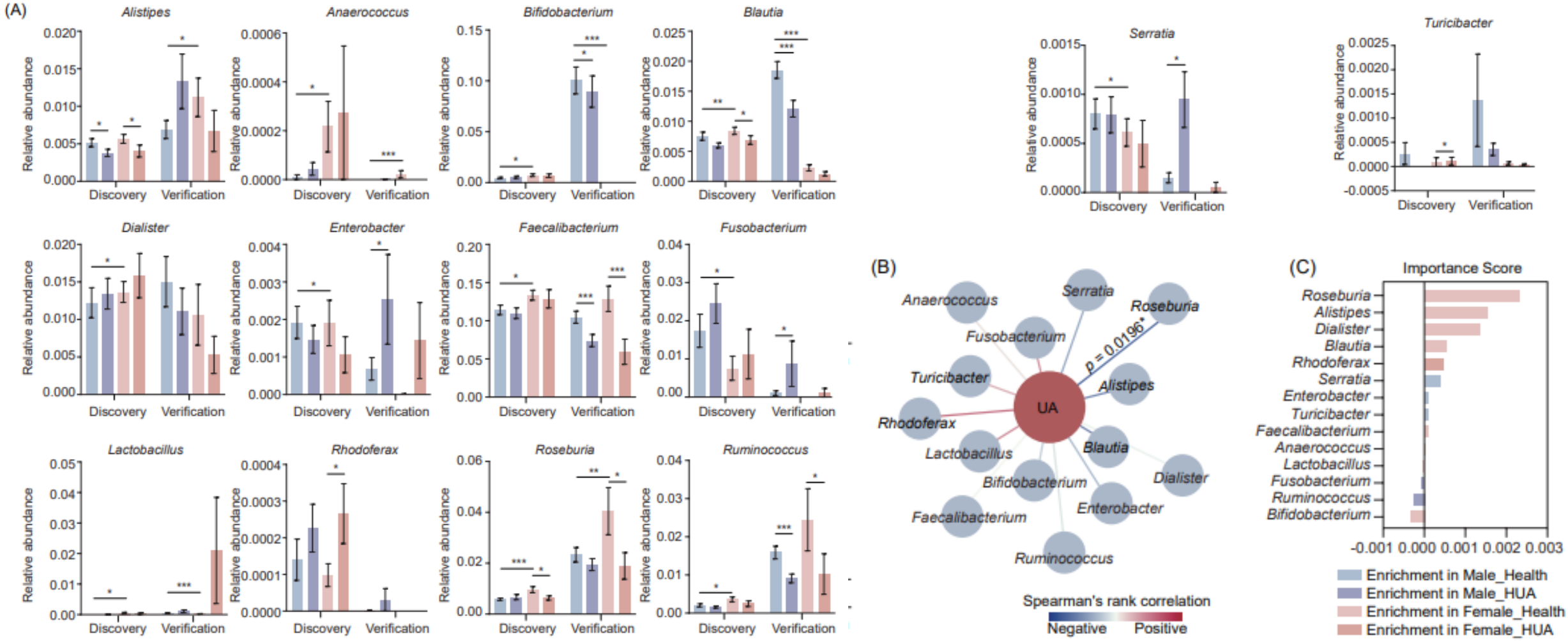


Figure 4. Altered and predictive biomarker of the gut microbiota in female HUA subjects.

Roseburia alleviated HUA in females by upregulating the production of glycine from xanthine

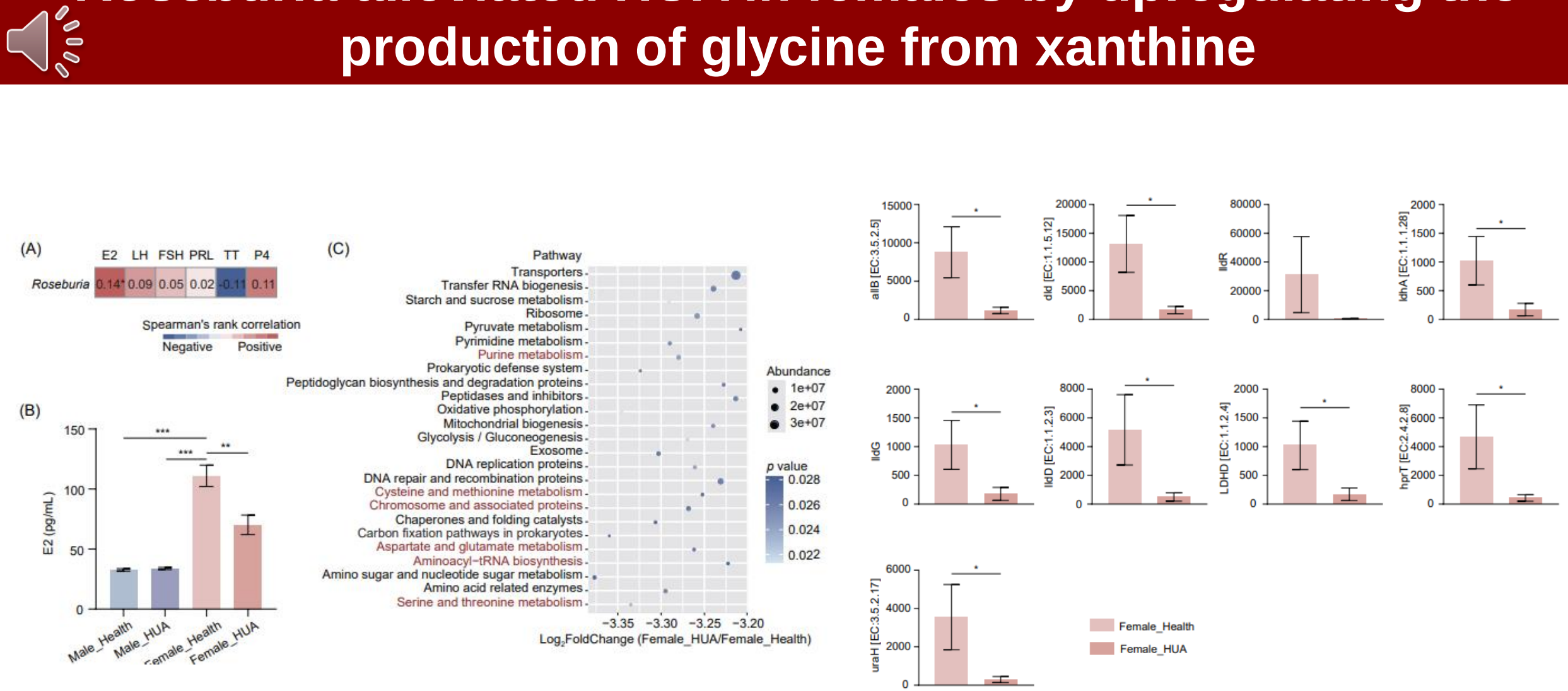
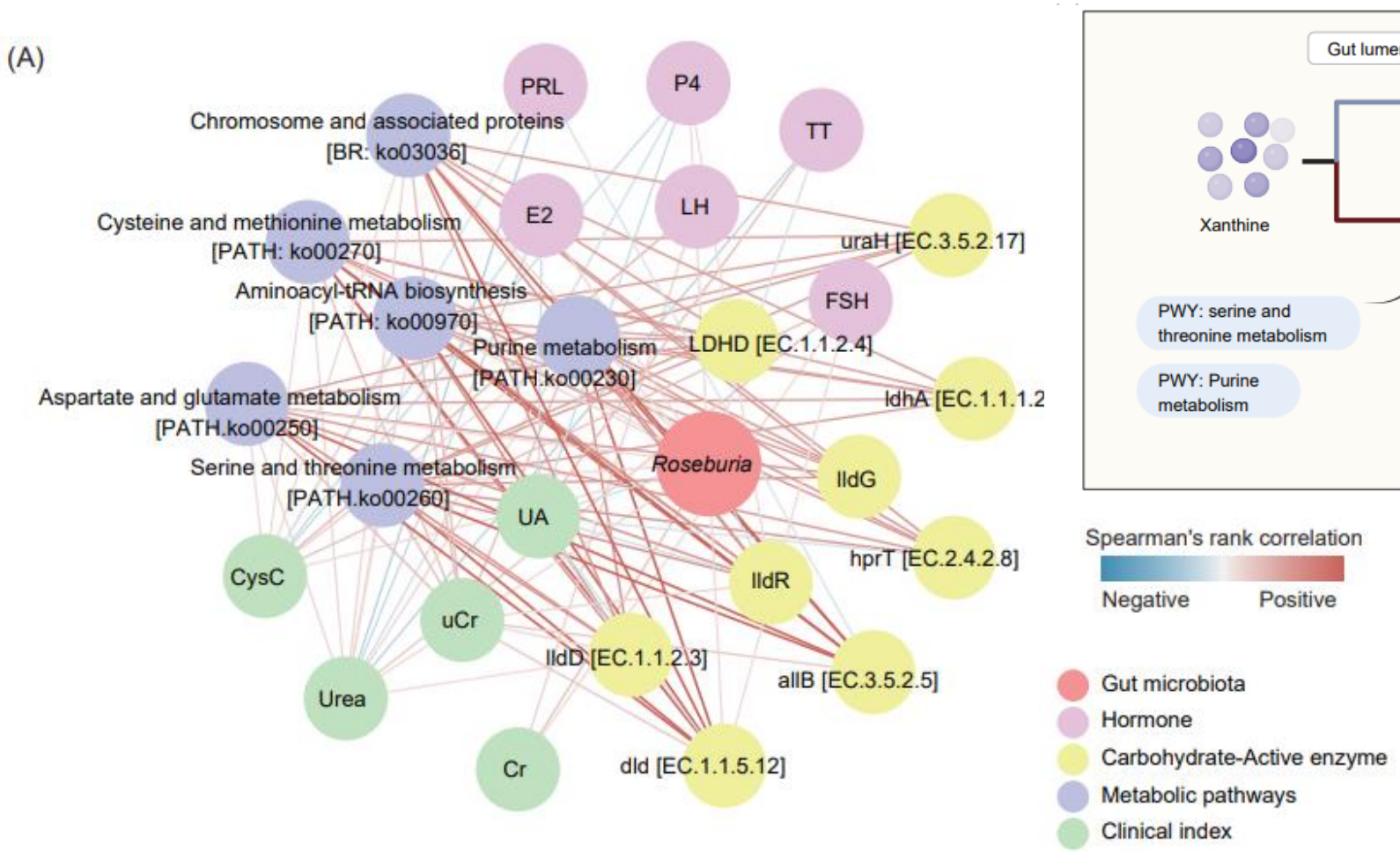


Figure 5. Functional differences in the gut microbiome between diseased and healthy Females.

Mechanism network diagram of sex hormones regulating gut microbes and UA



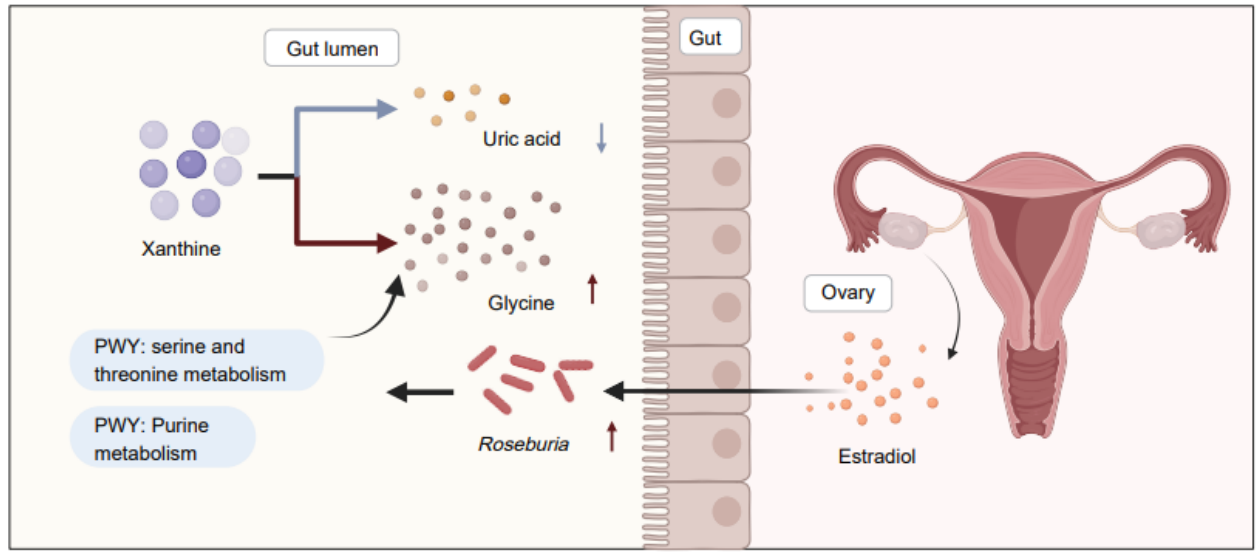


Figure 6. Mechanisms of *Roseburia* on HUA in females.

Summary

- For hyperuricemia (HUA), there is a significant difference between male and female gut microbes and that females have more beneficial genera of gut microbes, which may be one of the reasons why females are less prone to HUA.
- In exploring the gender-specific mitigating effects of gut microbes on HUA in females, we identified *Roseburia* as a key genus.
- Higher estradiol (E2) levels positively correlated with *Roseburia*, allowing this bacterium to exert a more pronounced effect on reducing uric acid (UA) levels.
- These findings not only enhanced our understanding of how sex hormones influence human health by modulating the gut microbiota but also provided a theoretical foundation for developing novel therapeutic strategies for HUA.

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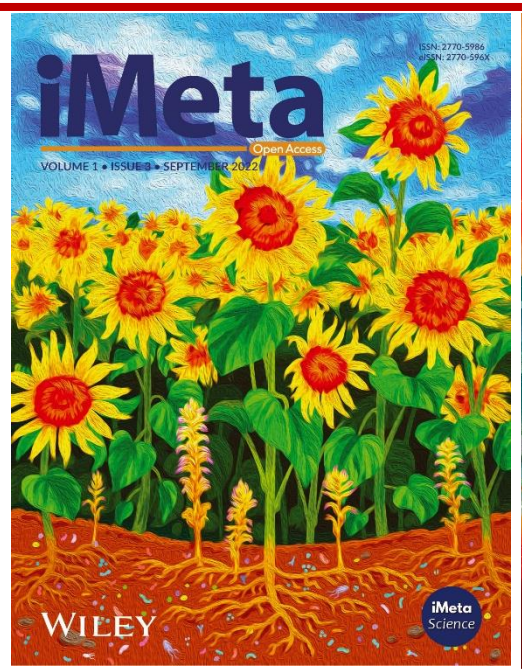

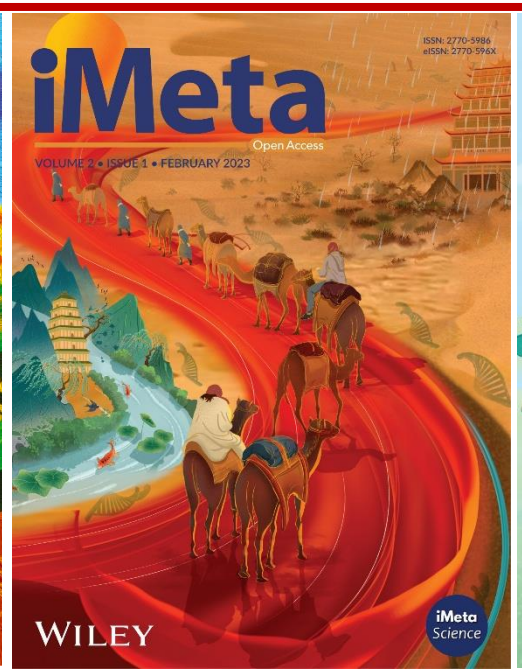

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