



# Changes in the gut microbiome during fasting-induced molting and its effects on gut-liver function

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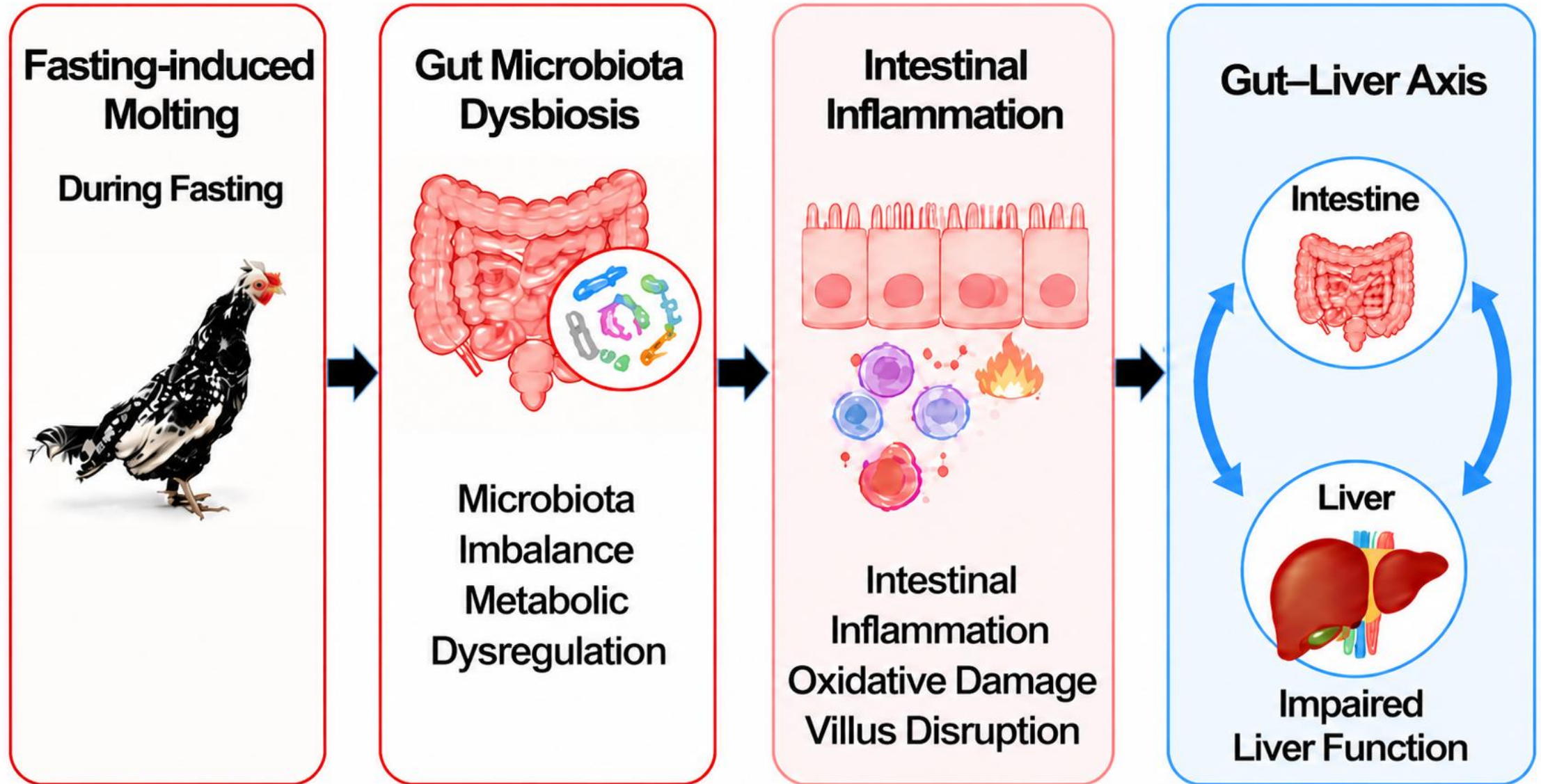
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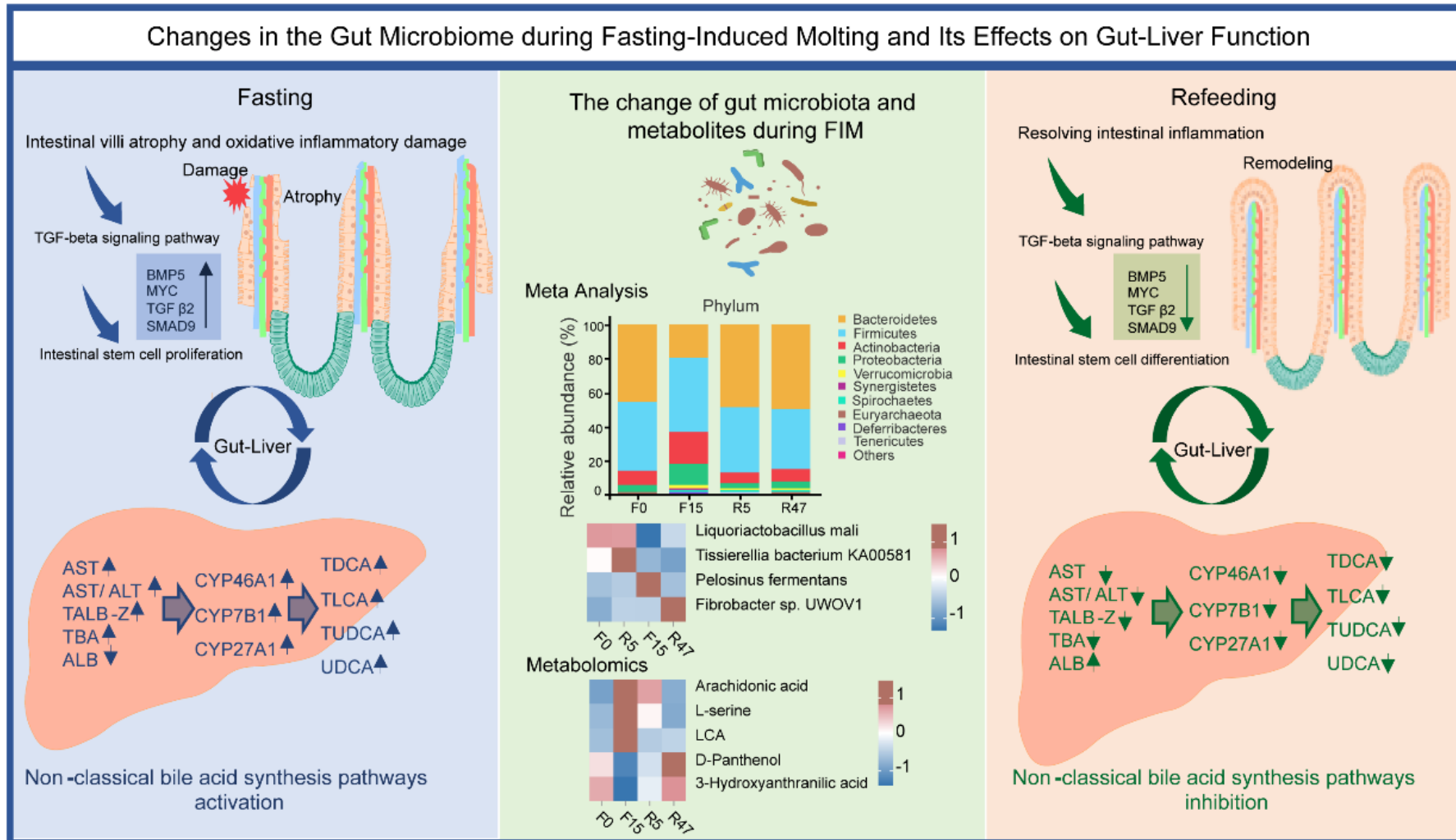
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# Introduction



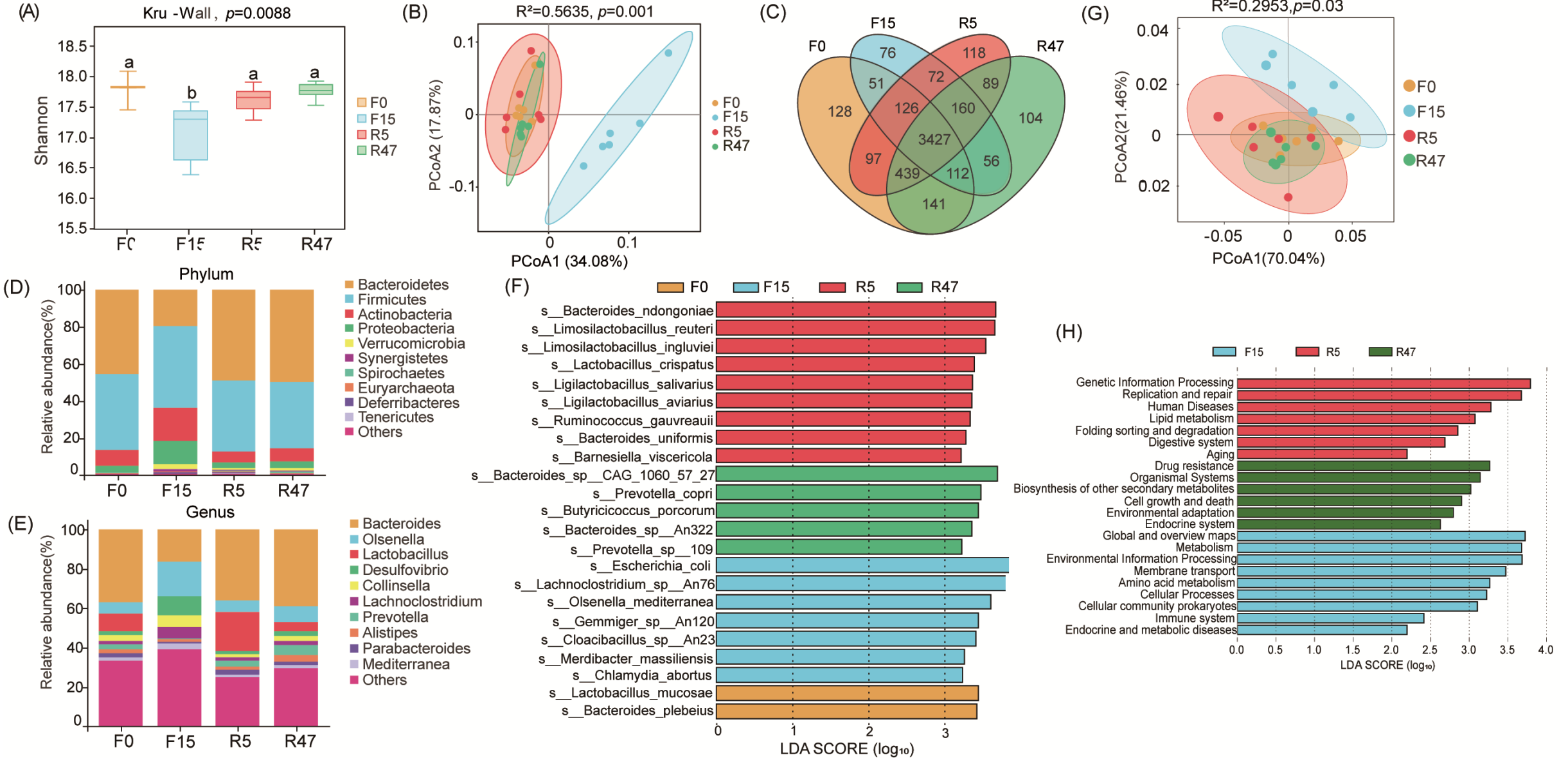
# Highlights



- This study establishes a dynamic profile of gut microbiota and metabolite changes during fasting-induced molting (FIM).
- This study investigated the impact of the gut microbiota and metabolites on gut-liver function during FIM.
- This study provides guidance for improving FIM management and feeding strategies to extend the lifespan of laying hens.



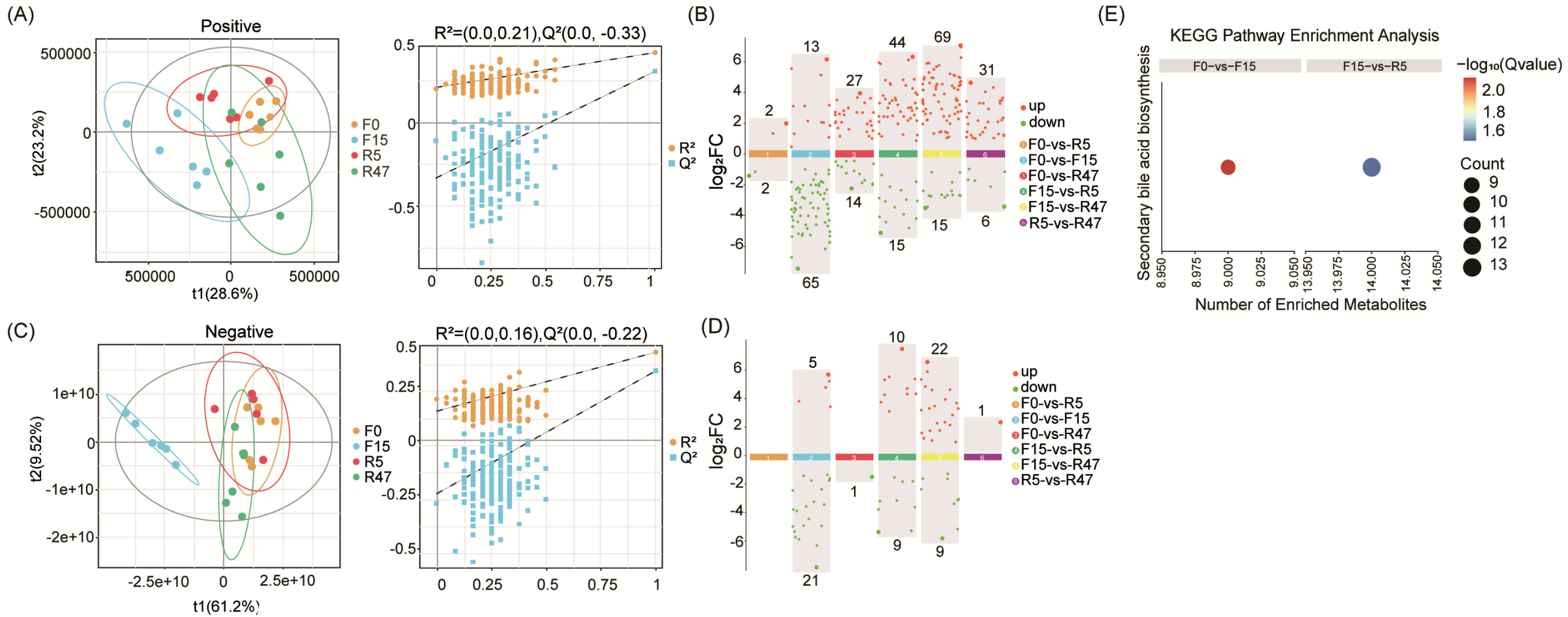
# Result 1: Gut microbial-metabolite dynamics during FIM



Alteration of the gut microbial composition in laying hens during FIM.



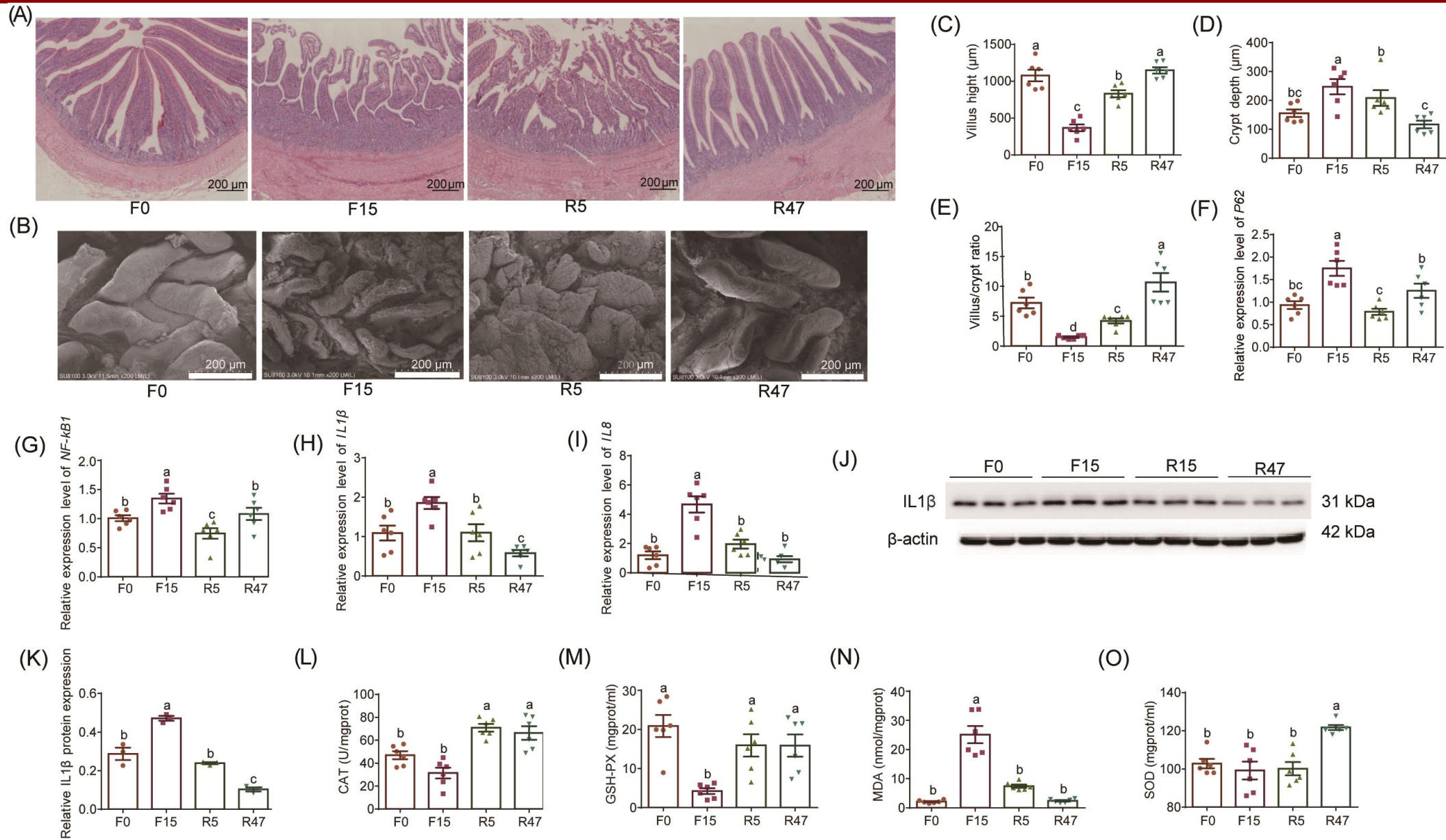
# Result 1: Gut microbial-metabolite dynamics during FIM



Alteration of the gut metabolites composition in laying hens during FIM.



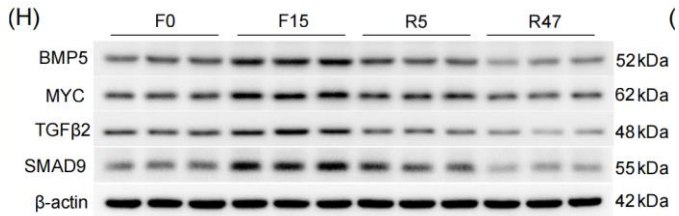
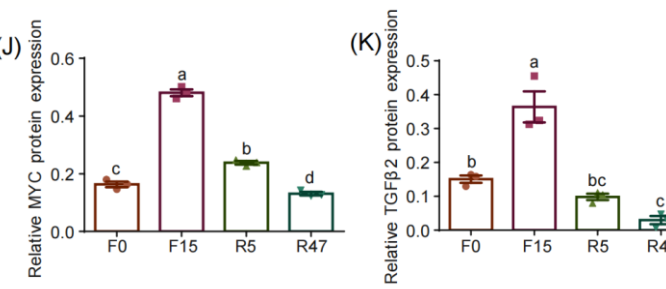
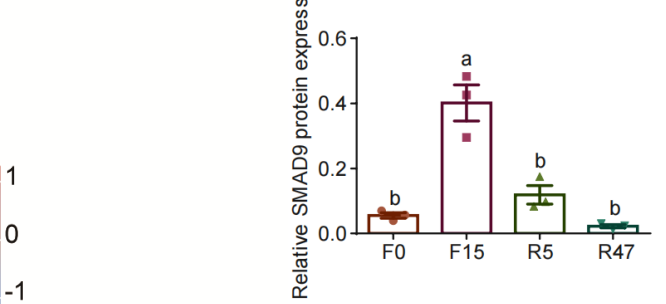
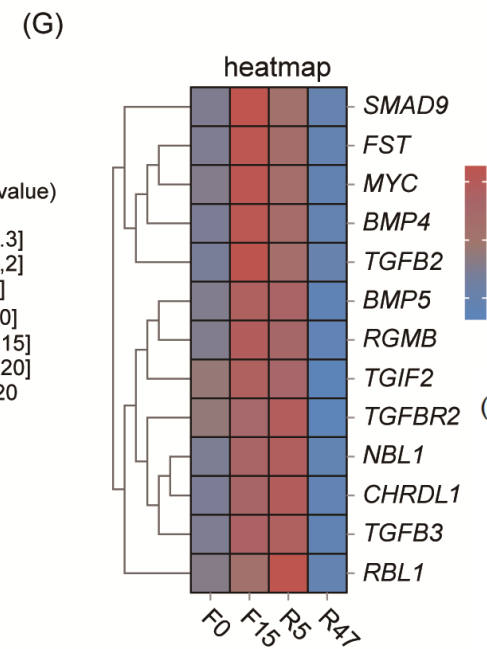
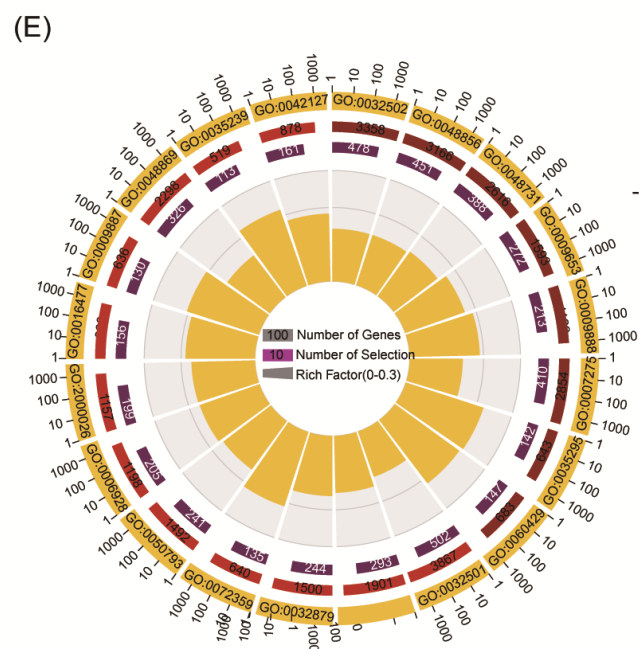
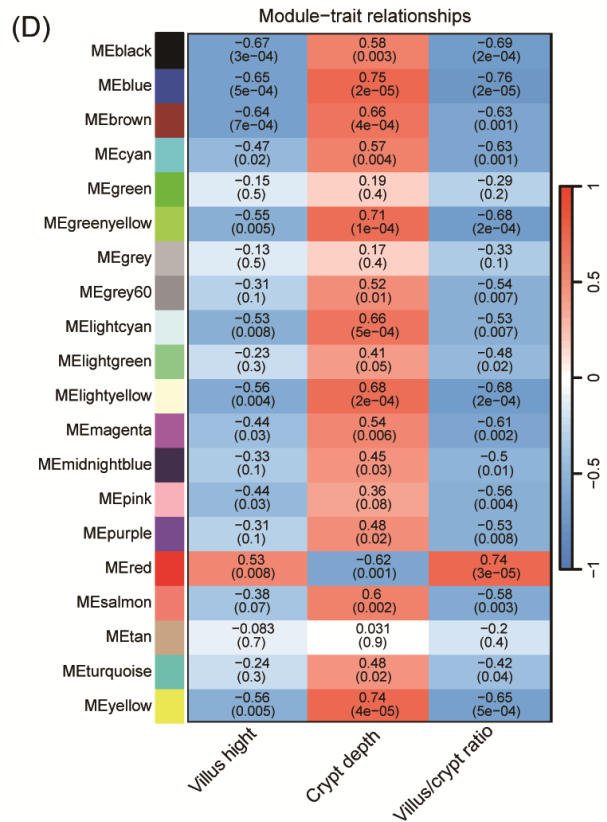
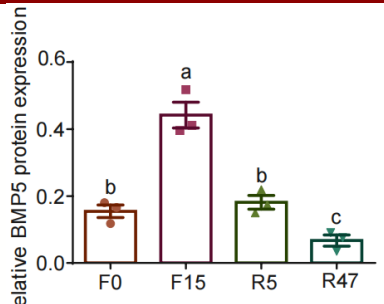
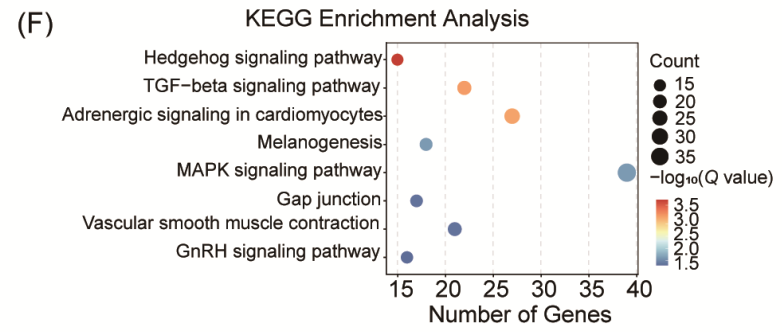
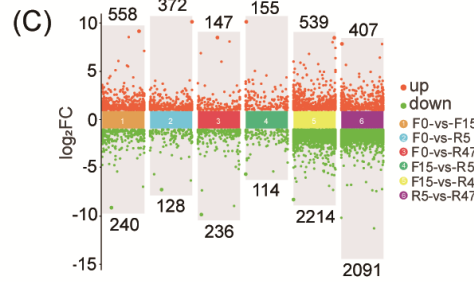
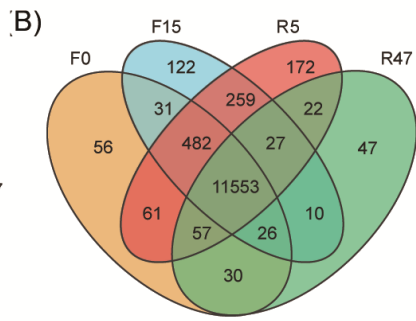
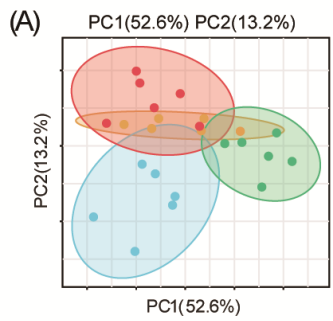
# Result 2: Intestinal mucosa remodeling during FIM



Analysis of the jejunal transcriptome data during FIM.



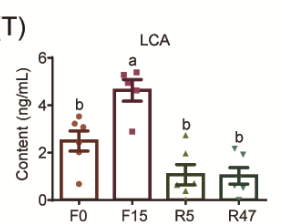
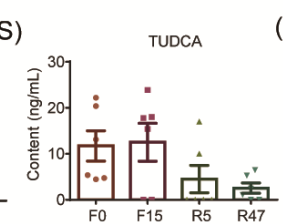
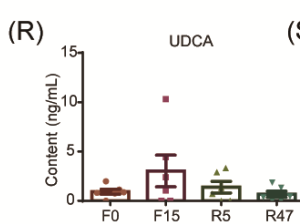
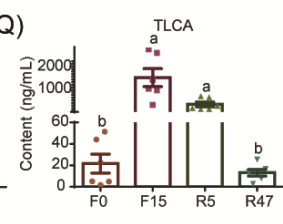
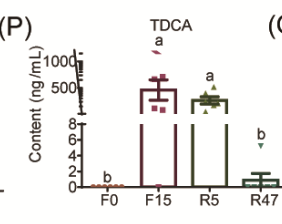
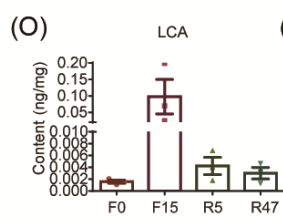
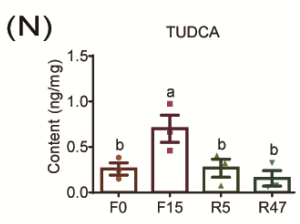
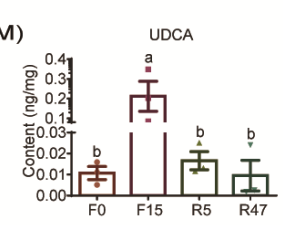
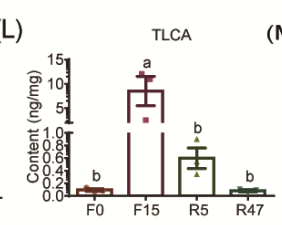
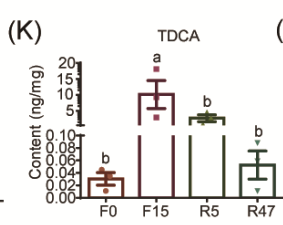
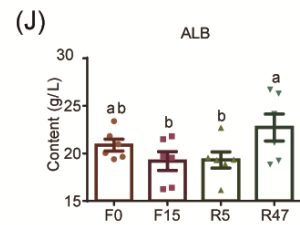
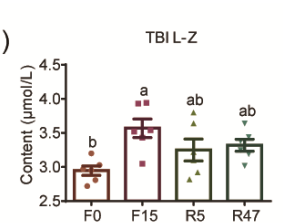
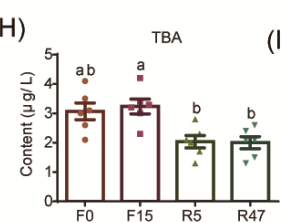
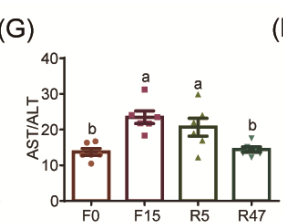
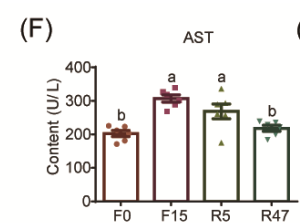
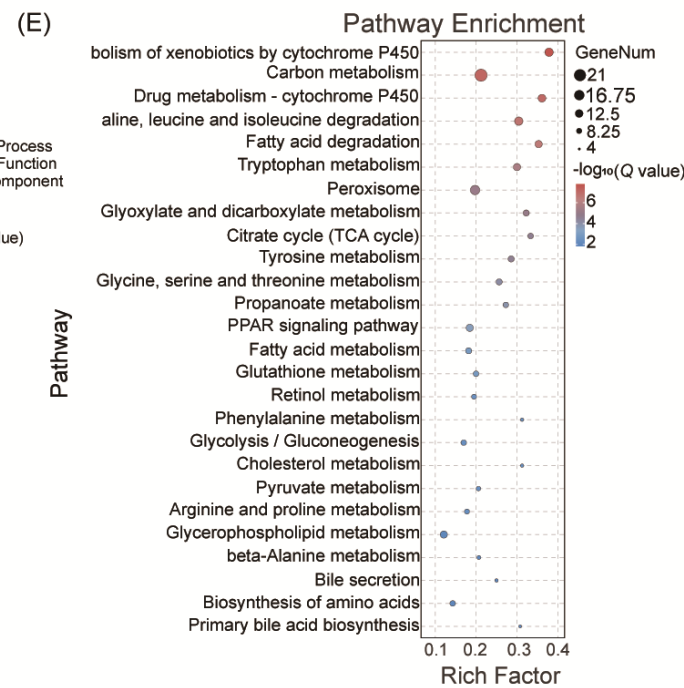
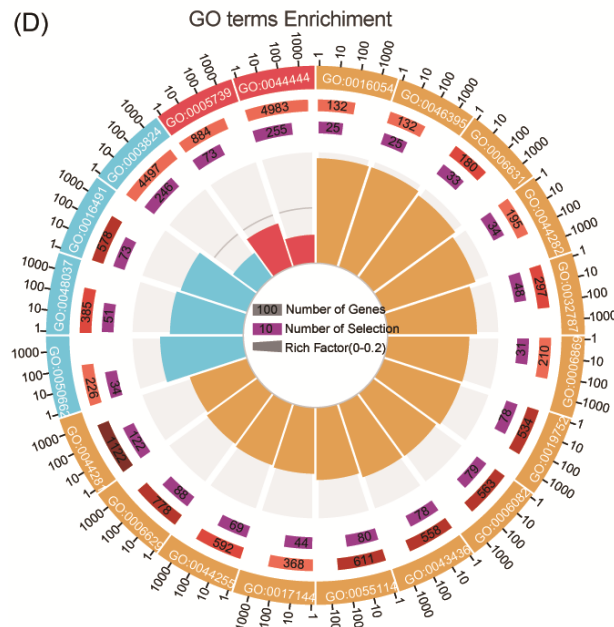
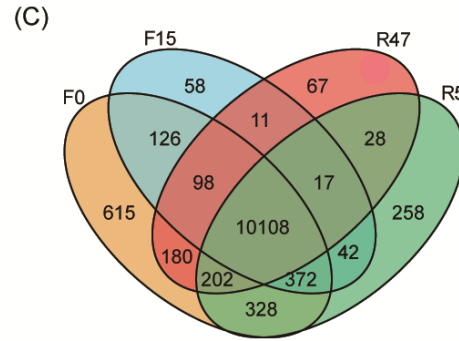
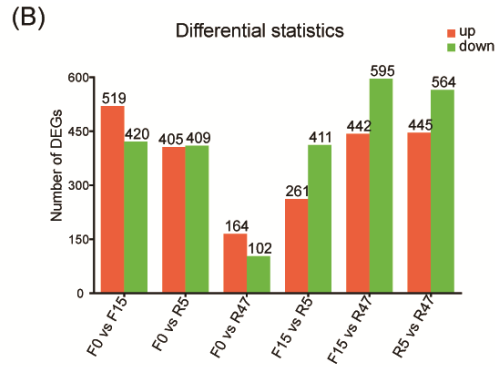
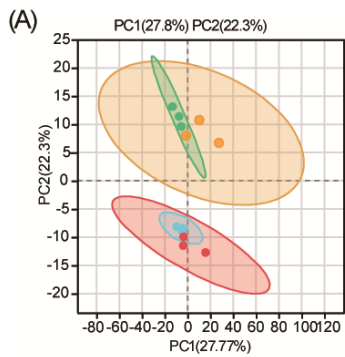
# Result 3: RNA-seq analysis of the mechanism underlying intestinal mucosa remodeling



Analysis of the jejunal transcriptome data during FIM.



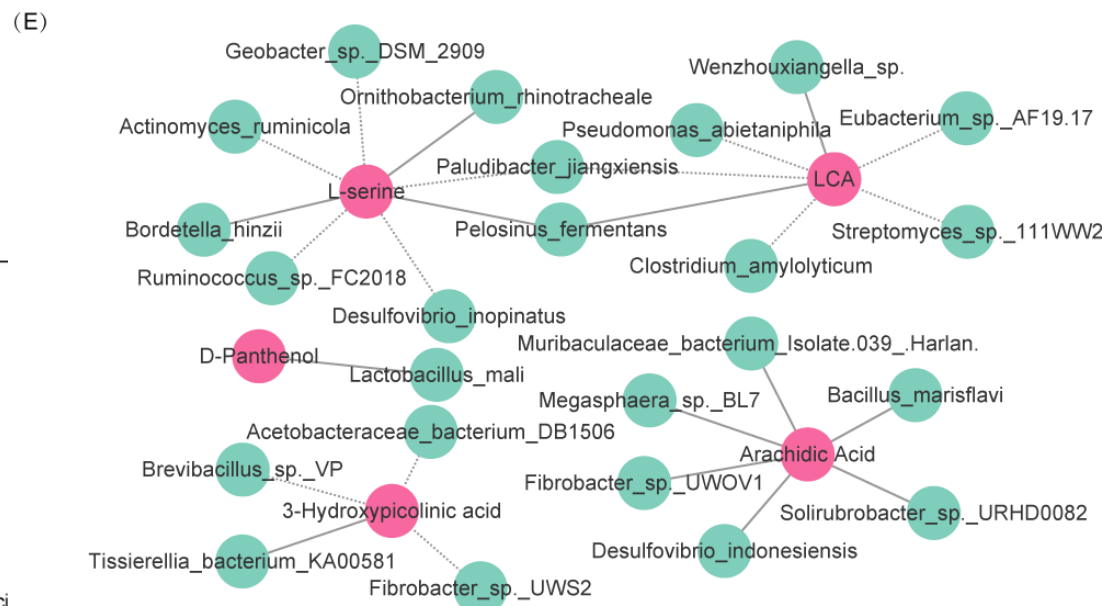
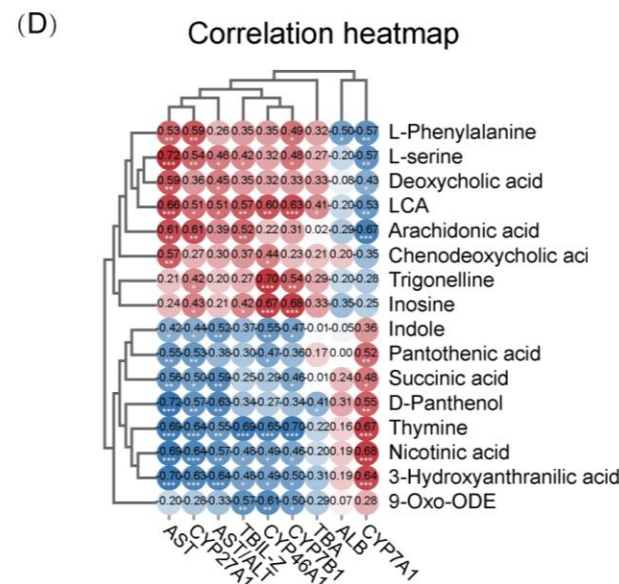
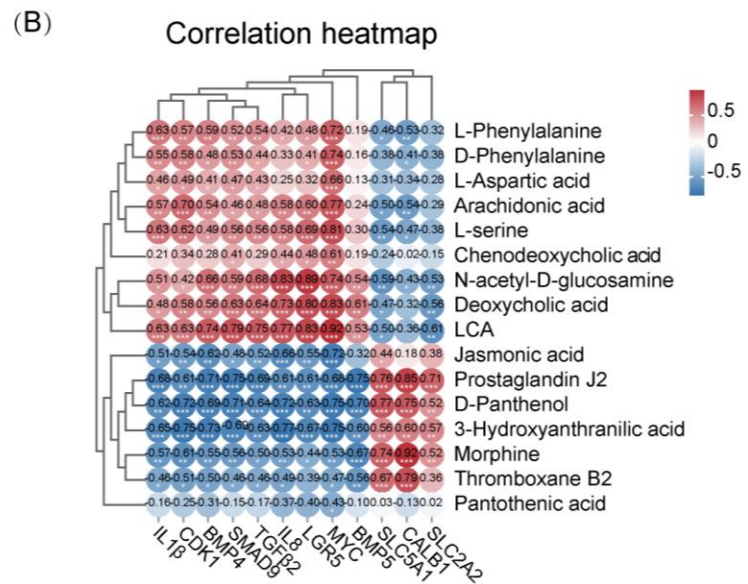
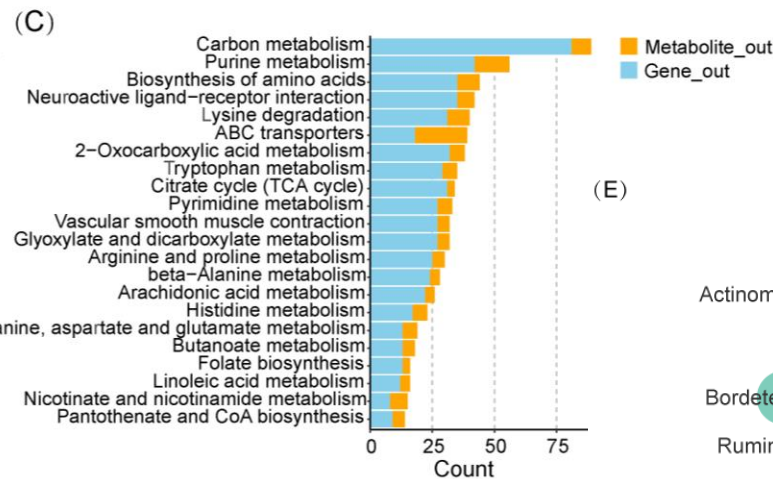
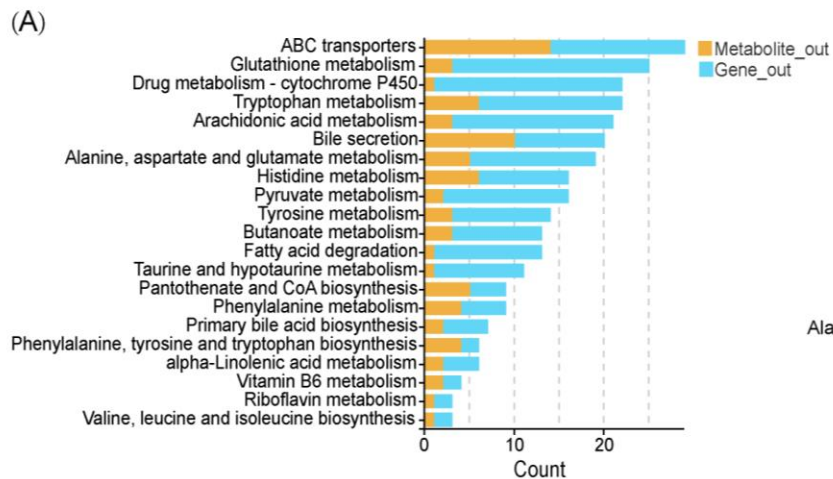
# Result 4: Changes in liver function during FIM



Changes in liver function during FIM.



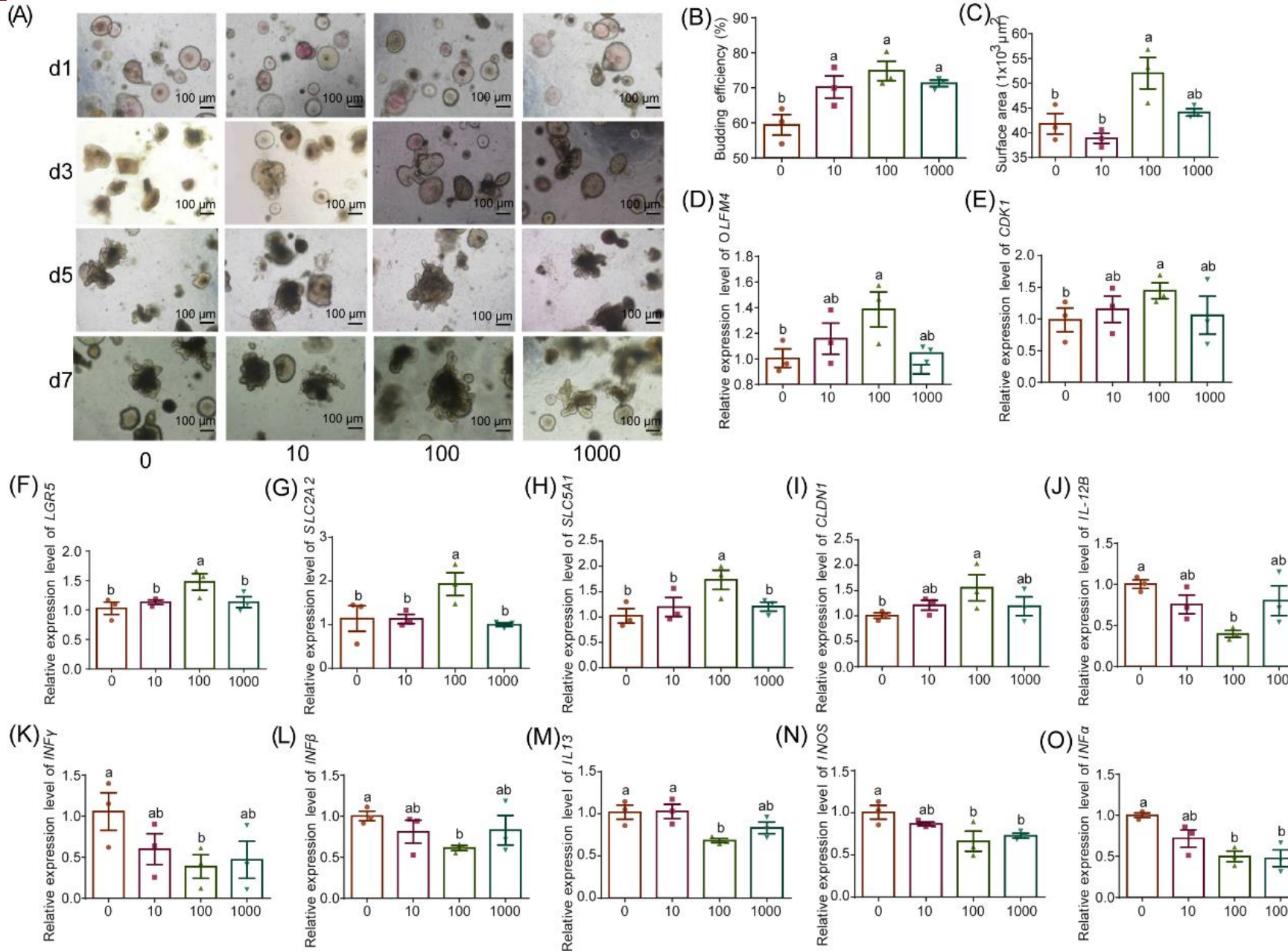
# Result 5: Changes in liver function during FIM



Multi-omics integration analysis.



# Result 6: D-Panthenol promotes the growth of chicken small intestinal organoids



The effect of D-Panthenol on the growth of chicken intestinal organoids.



# Summary

- ❑ During fasting, the rise in harmful microorganisms and their metabolites promotes oxidative injury and inflammatory responses in the gut, ultimately causing villus atrophy. Fasting may also activate the TGF- $\beta$  signaling pathway, which enhances intestinal stem cell proliferation;
- ❑ Fasting impairs liver function and stimulates a non-canonical bile acid synthesis pathway, leading to intrahepatic bile acid accumulation;
- ❑ We identified key gut microbes linked to gut–liver function during the FIM period—*Liquorilactobacillus mali* and *Tissierellia bacterium KA00581*—as well as associated metabolites, including D-panthenol and 3-HAA.

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