A reciprocal interaction between L-lysine and *Holdemanella biformis* modulates intestinal barrier function and anxiety in irritable bowel syndrome

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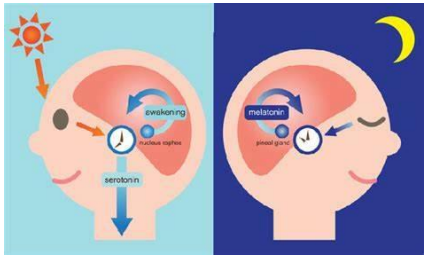
Introduction

Harsh Maritime Conditions



Circadian Rhythm Disorder

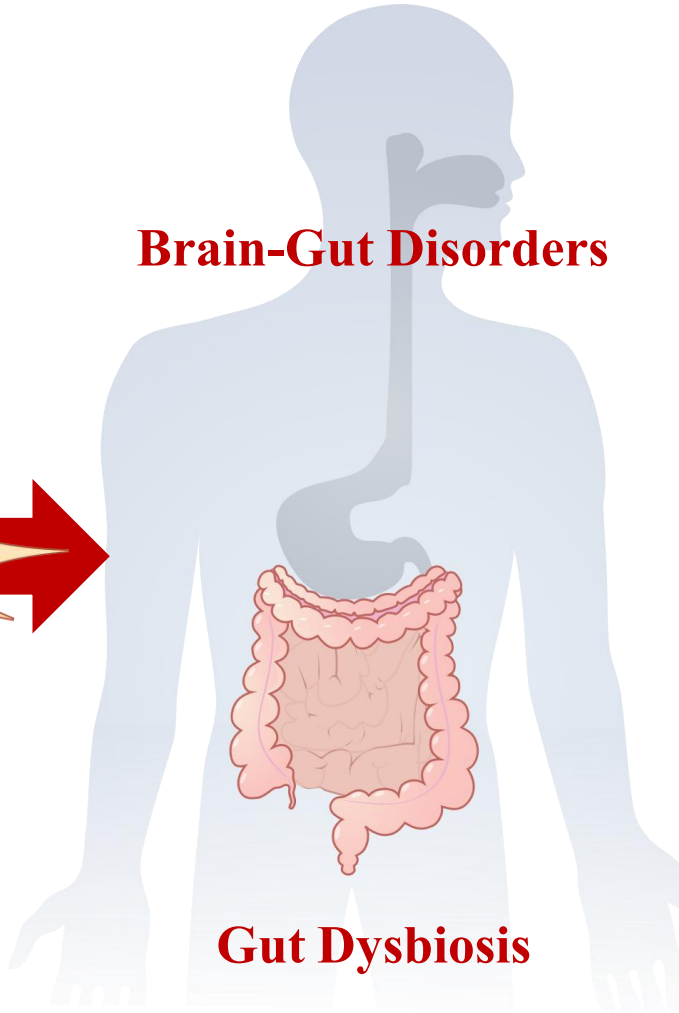
Limited Food Supplies

Motion Sickness

Psychological Factors

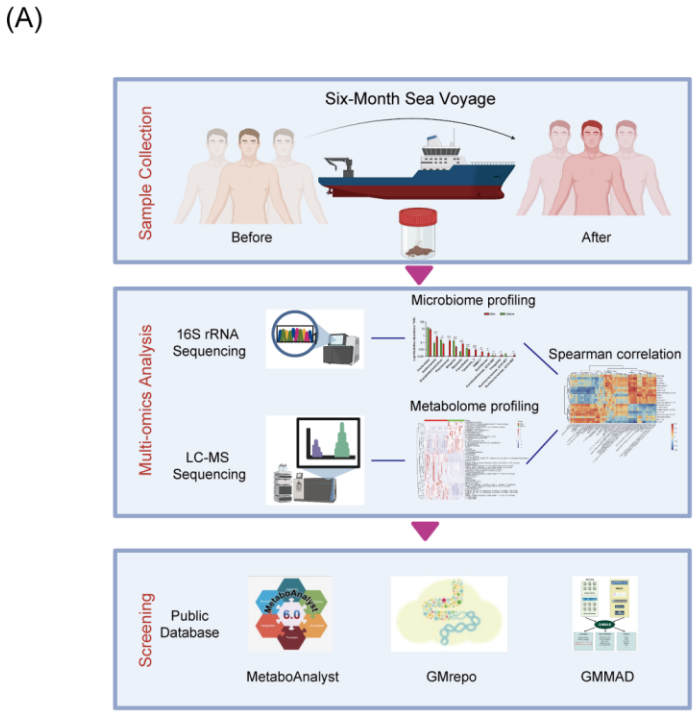
Stress

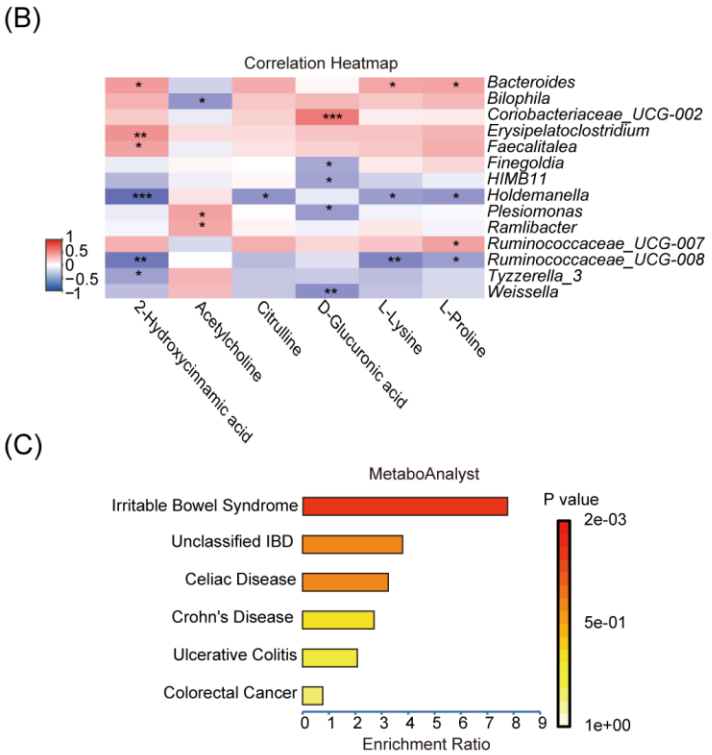
Brain-Gut Disorders

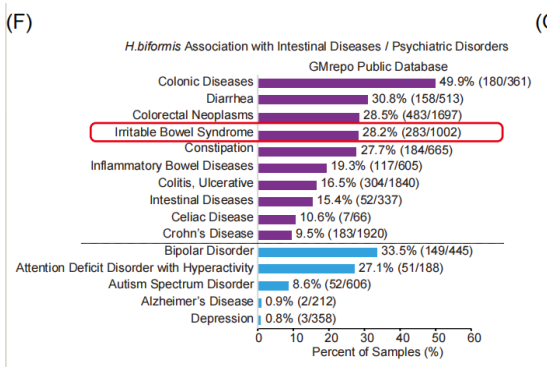


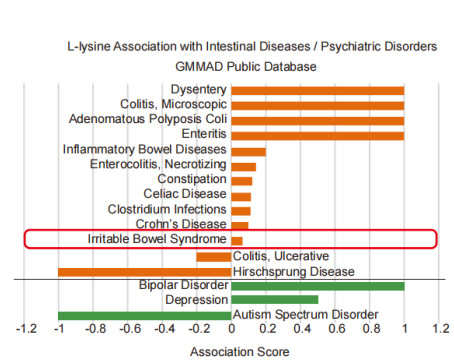
Gut Dysbiosis

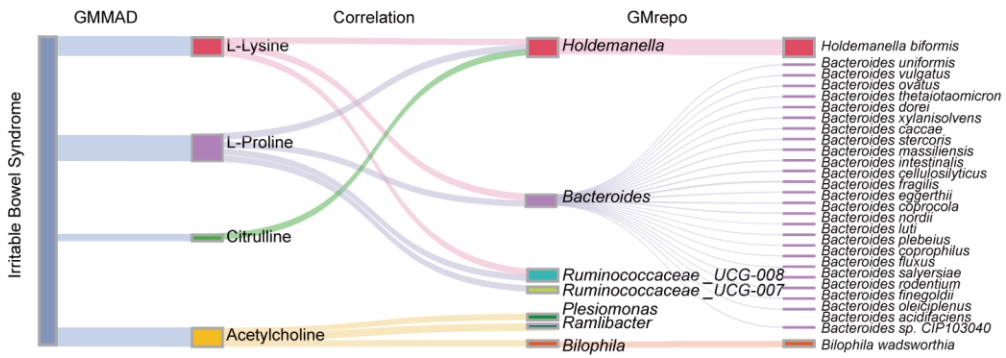
Results

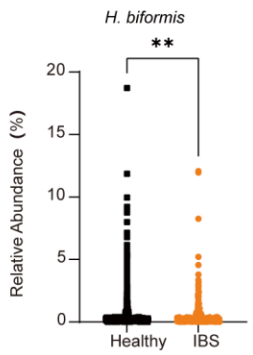






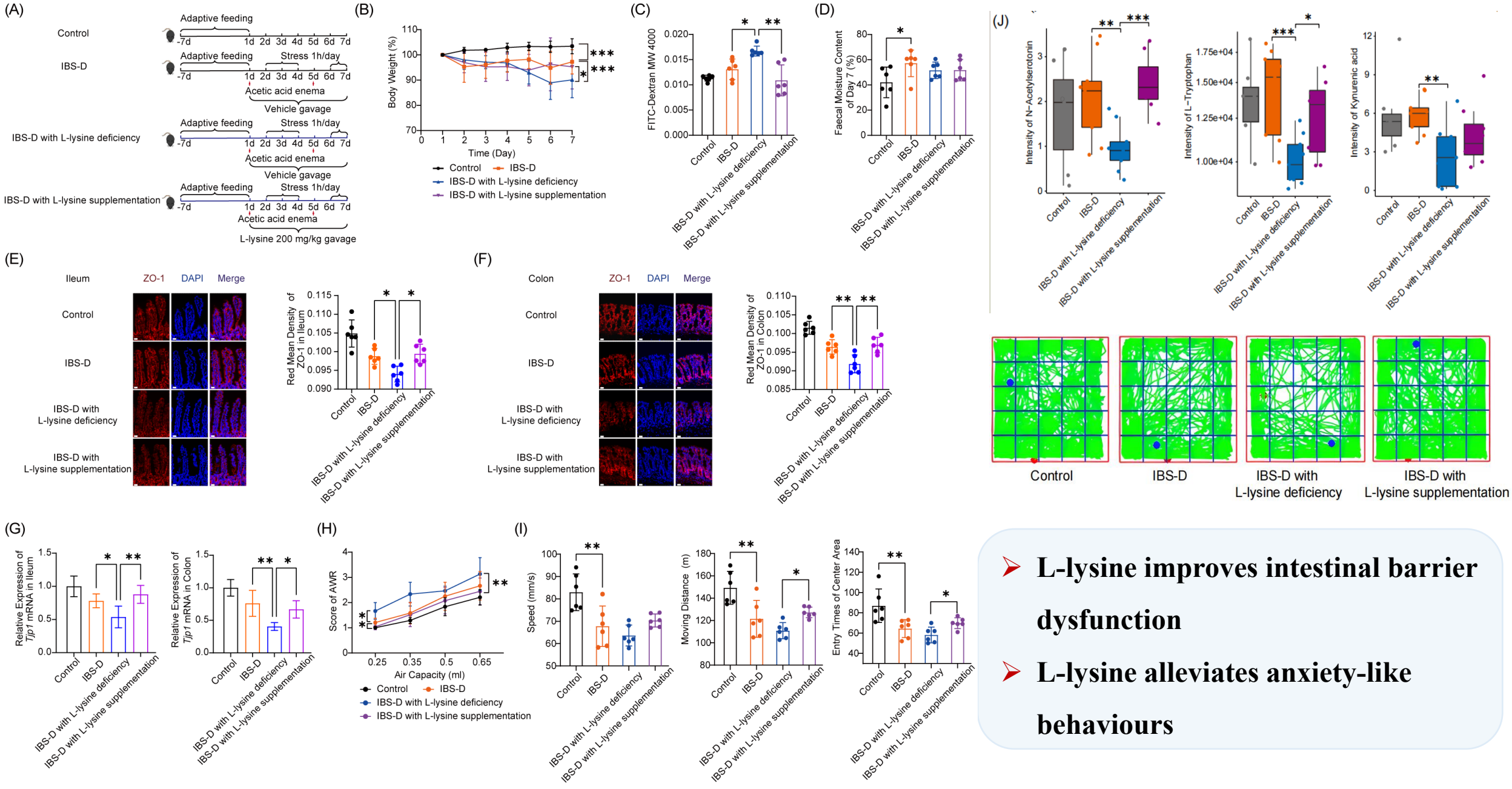






- **L-lysine is negatively correlated with *H. biformis***
- **Associations between L-lysine and *H. biformis* are correlated with IBS**

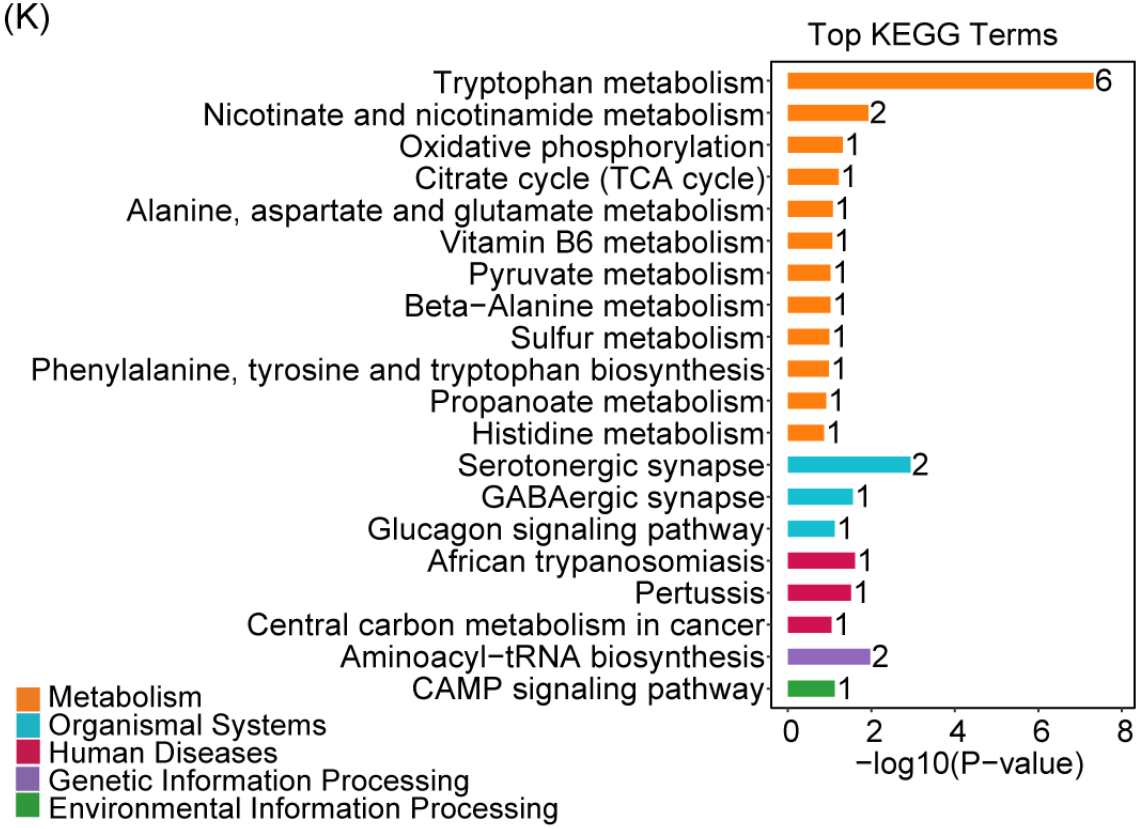
Results



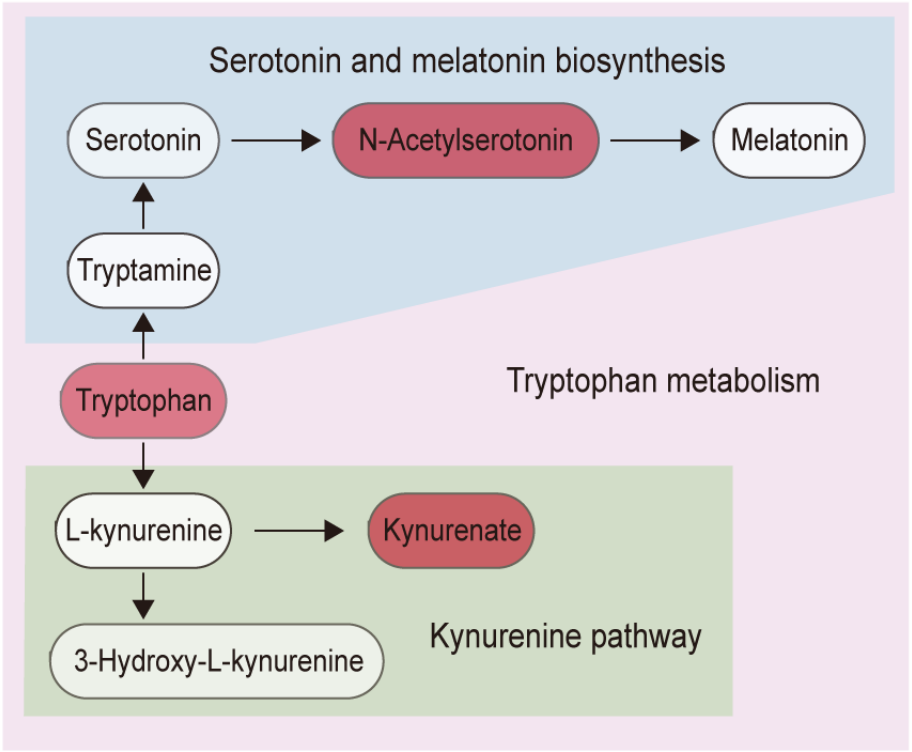
- **L-lysine improves intestinal barrier dysfunction**
- **L-lysine alleviates anxiety-like behaviours**

Results

(K)

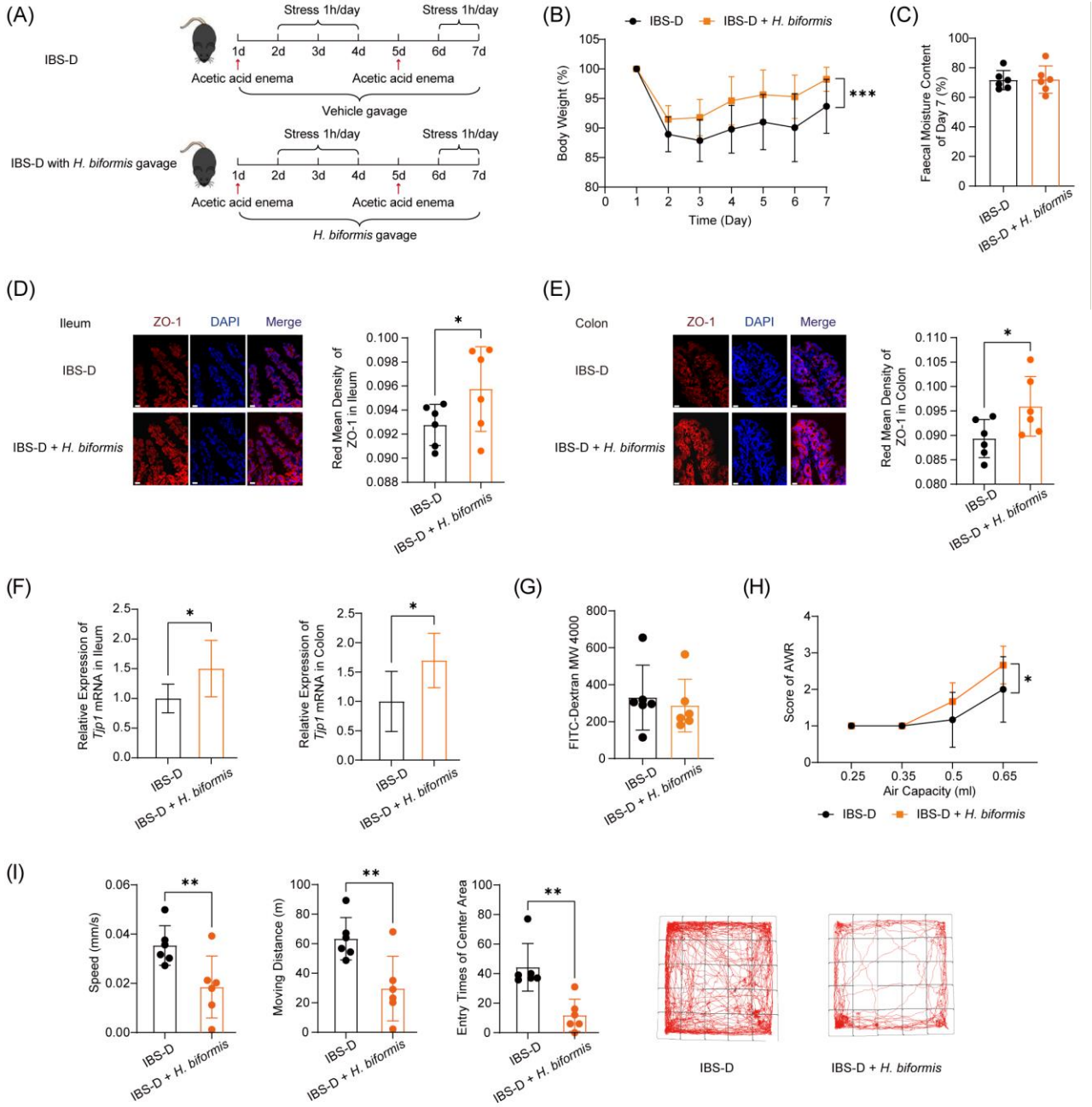


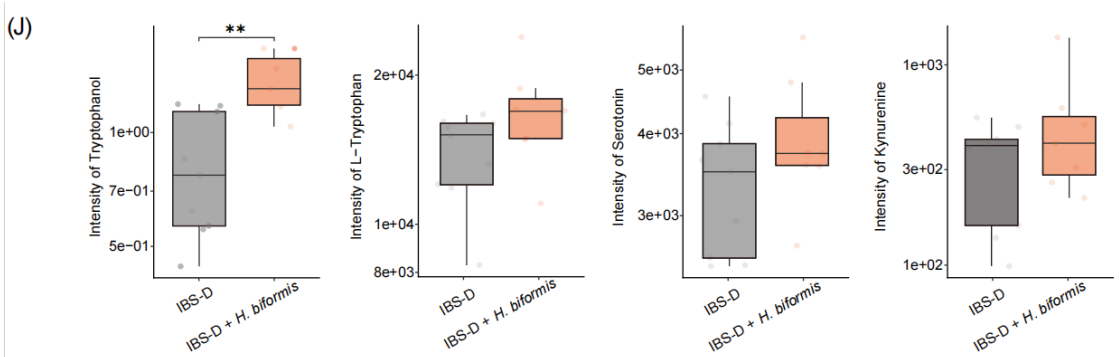
(L)



- **L-lysine alleviates anxiety-like behaviours, potentially via modulation of tryptophan metabolism and gut-brain axis function**

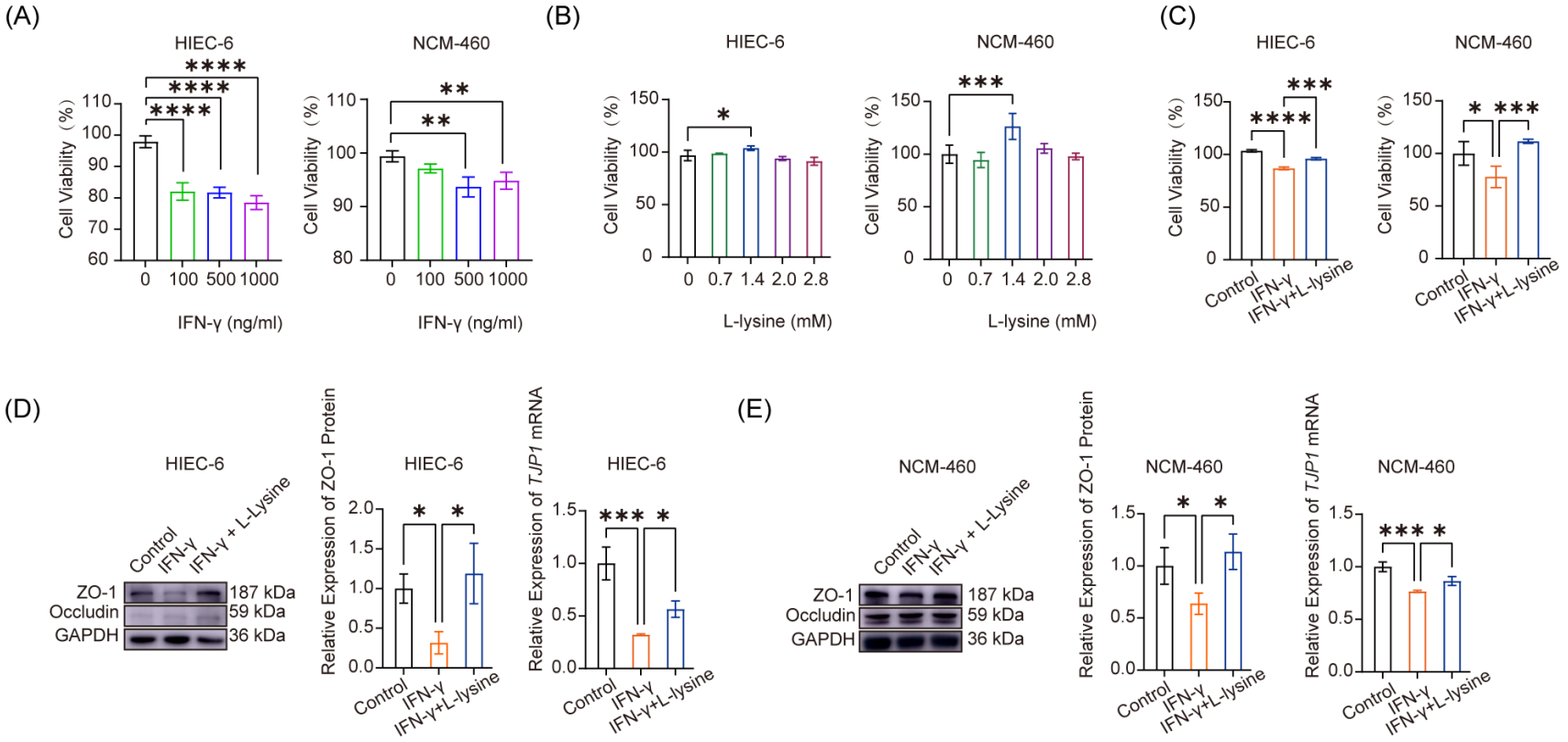
Results





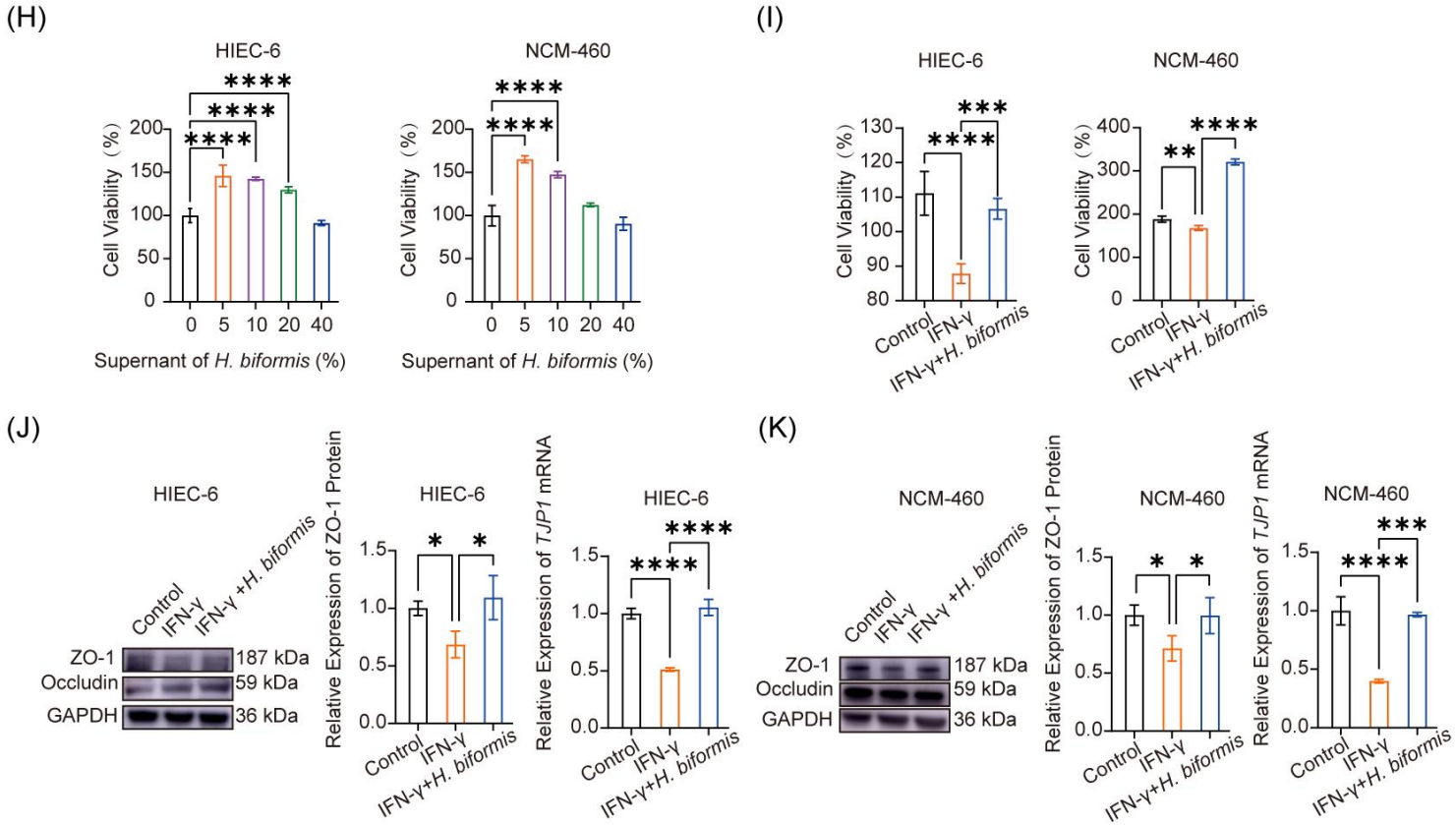
- ***H. biformis*** **alleviates intestinal barrier dysfunction**
- ***H. biformis*** **aggravates anxiety-like behaviours**

Results



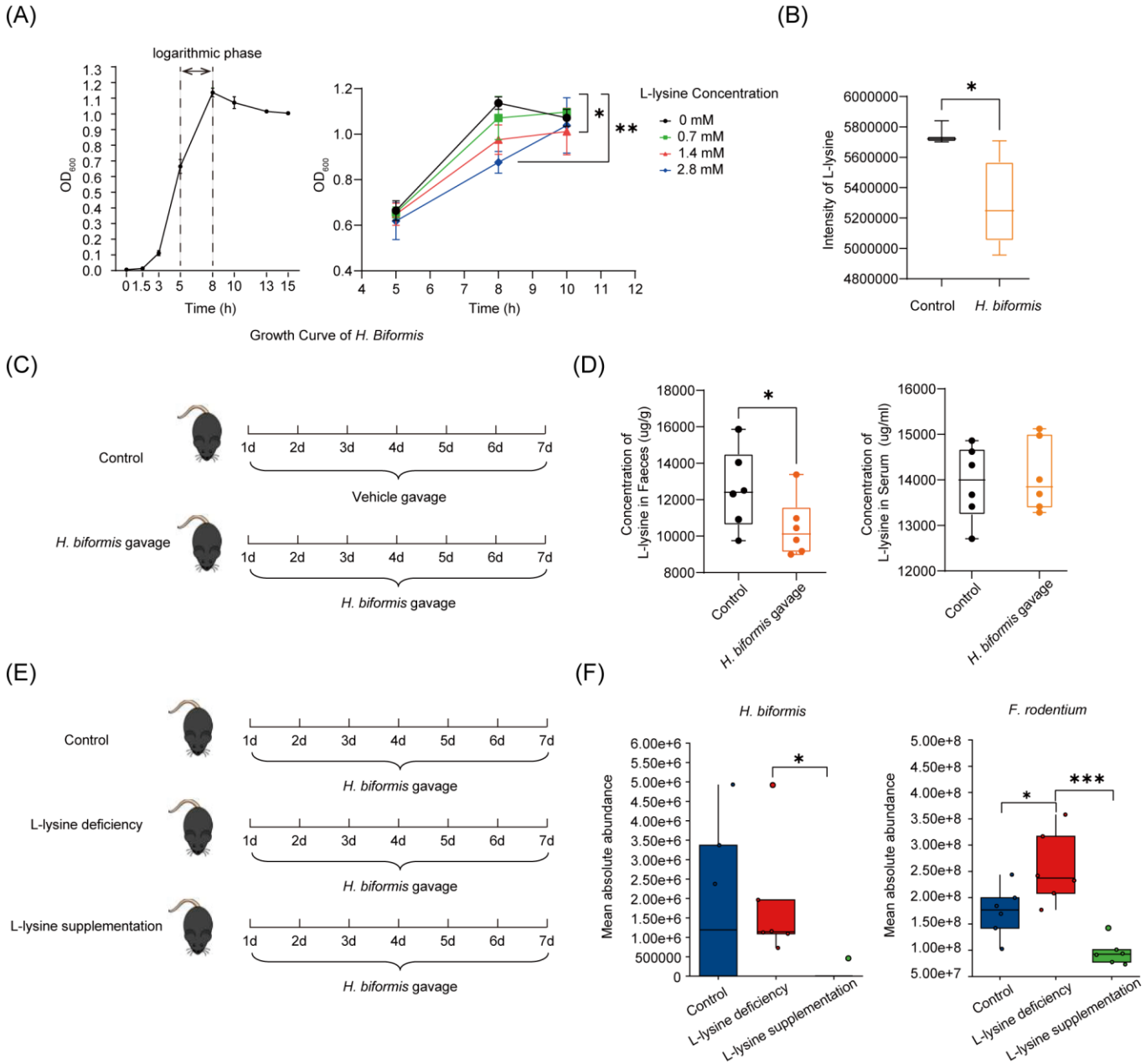
- **L-lysine enhance ZO-1 cell tight junctions and promote epithelial wound healing**

Results



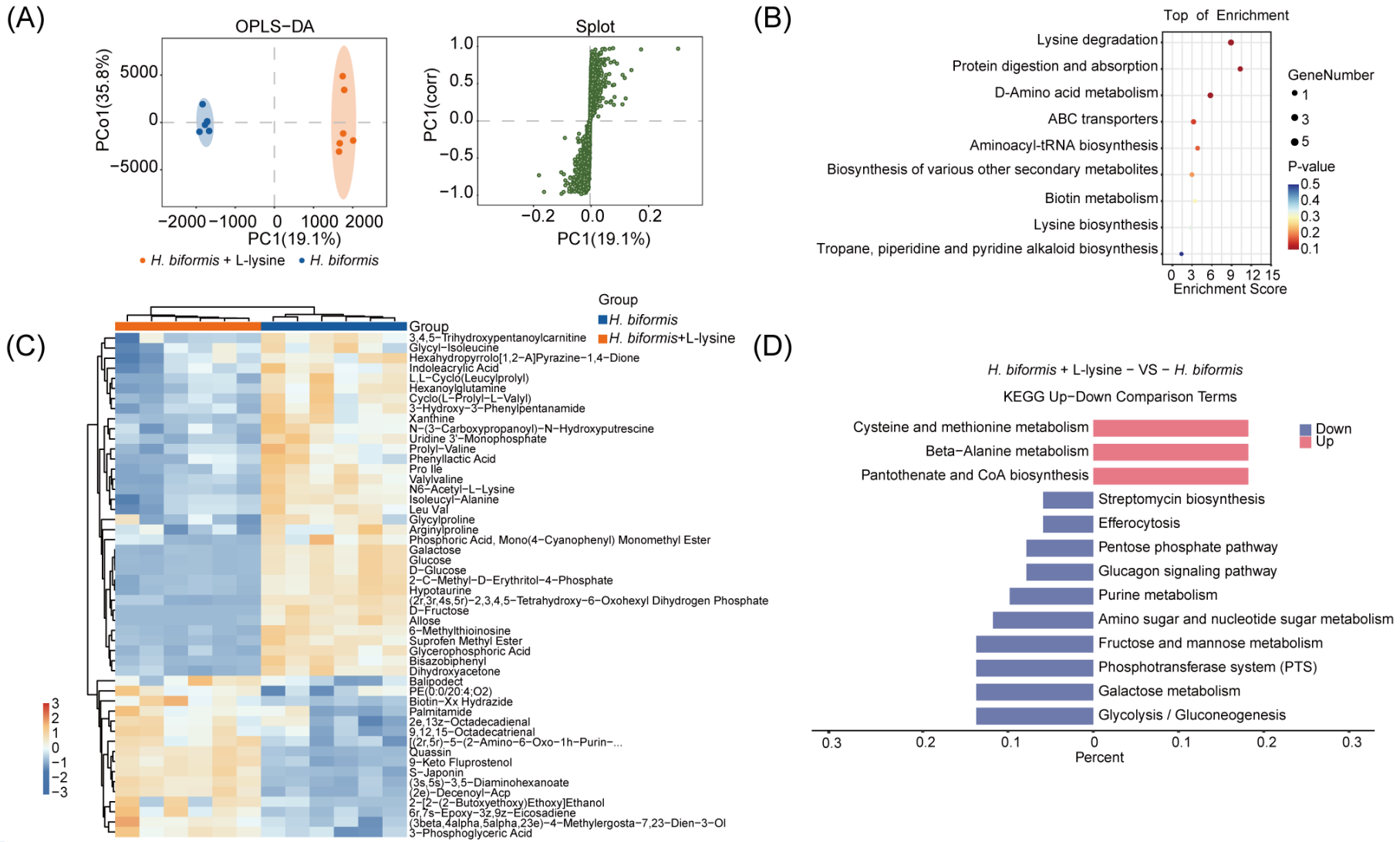
- ***H. biformis*** **enhance ZO-1 cell tight junctions and promote epithelial wound healing**

Results



- ***H. biformis*** **can metabolize L-lysine while L-lysine inhibits the growth of** ***H. biformis***

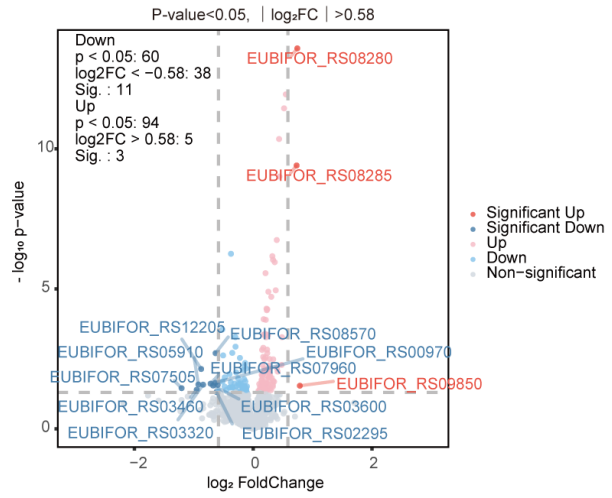
Results



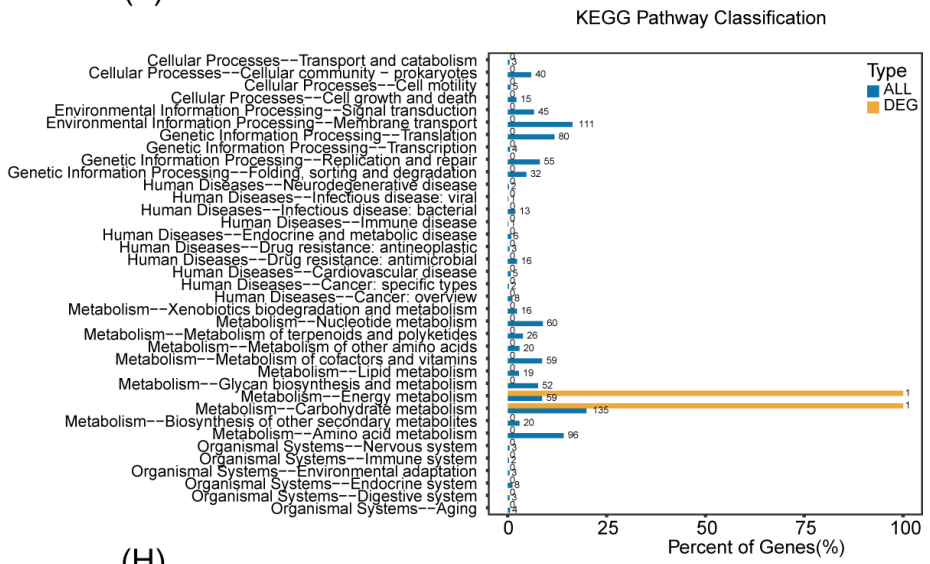
- ***H. biformis*** **metabolizes L-lysine via the lysine degradation pathway**
- **L-lysine exposure led to significant downregulation of core energy-yielding processes in *H. biformis***

Results

(E)



(F)



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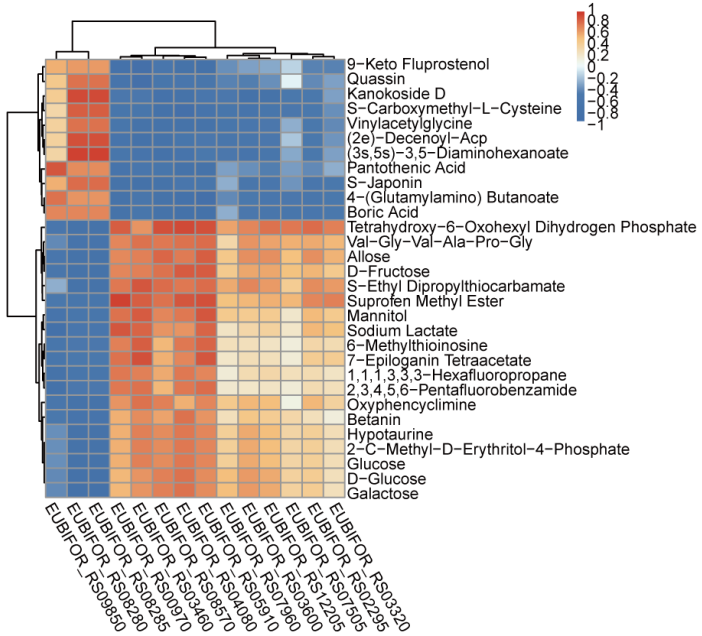
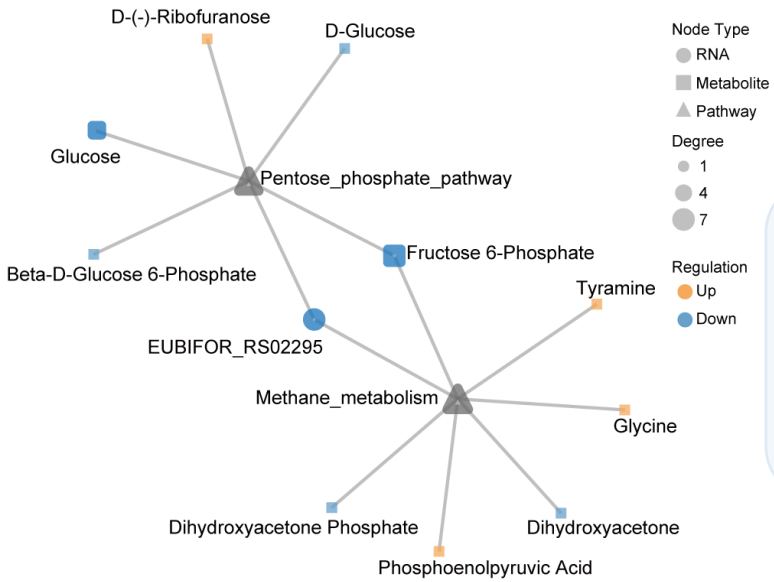
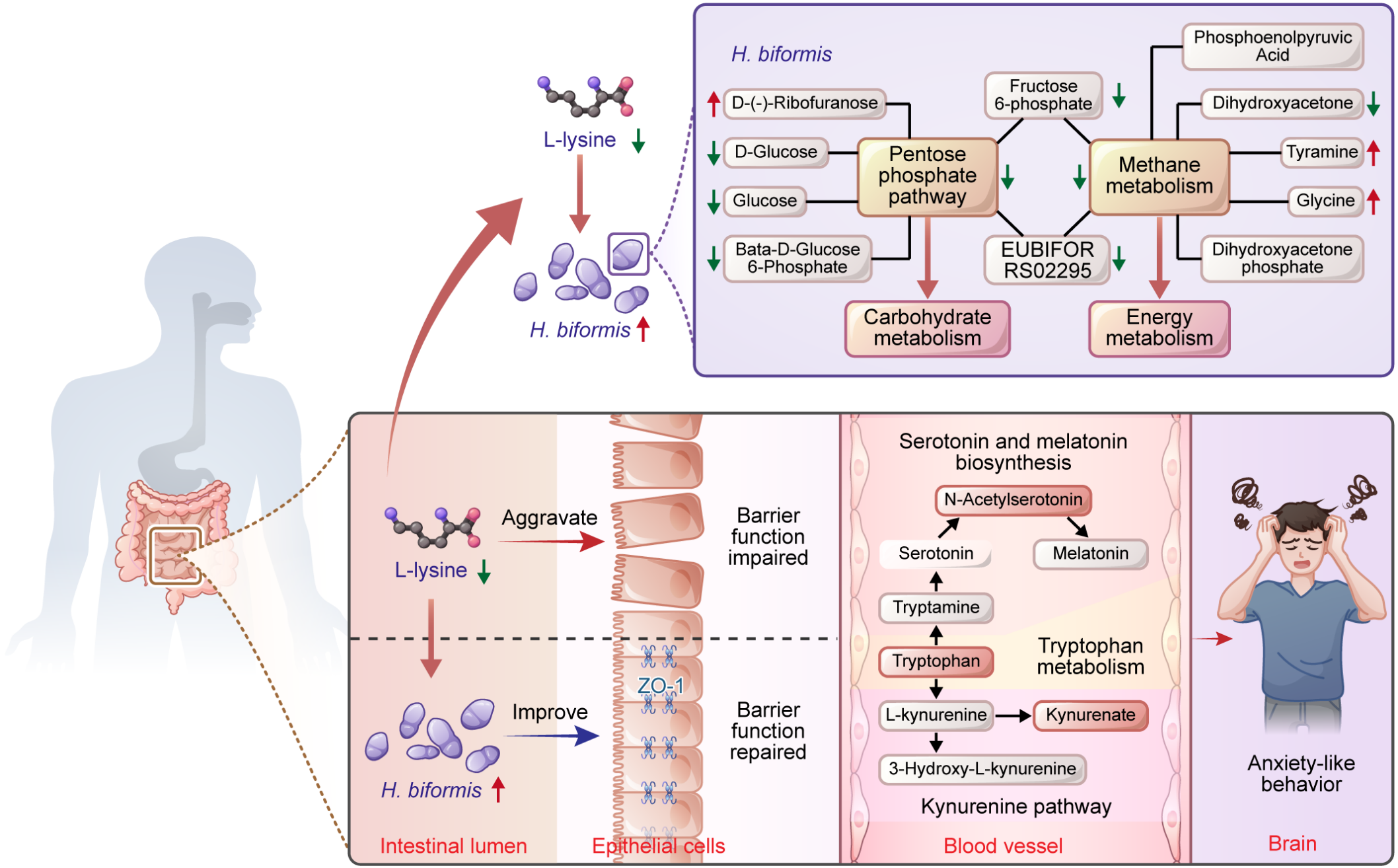


(H)



- **L-lysine inhibits *H. biformis* growth by downregulating carbohydrate and energy metabolism**

Summary


H. biformis
L-lysine
H. biformis
D-(-)-Ribofuranose
D-Glucose
Glucose
Bata-D-Glucose 6-Phosphate
Pentose phosphate pathway
Fructose 6-phosphate
EUBIFOR RS02295
Methane metabolism
Phosphoenolpyruvic Acid
Dihydroxyacetone
Tyramine
Glycine
Dihydroxyacetone phosphate
Carbohydrate metabolism
Energy metabolism
L-lysine
Aggravate
Barrier function impaired
ZO-1
Improve
Barrier function repaired
H. biformis
Intestinal lumen
Epithelial cells
Serotonin and melatonin biosynthesis
N-Acetylserotonin
Serotonin
Melatonin
Tryptamine
Tryptophan
Tryptophan metabolism
L-kynurenine
Kynurenate
3-Hydroxy-L-kynurenine
Kynurenine pathway
Blood vessel
Anxiety-like behavior
Brain

Summary

- L-lysine improves intestinal barrier dysfunction and alleviates anxiety-like behaviours by modulating the tryptophan metabolism pathway.
- *Holdemanella biformis* (*H. biformis*) enhances intestinal barrier function but exacerbates anxiety-like behaviours.
- *H. biformis* metabolizes L-lysine primarily by the lysine degradation pathway, while L-lysine inhibits *H. biformis* growth, likely through downregulation of carbohydrate and energy metabolism pathways.

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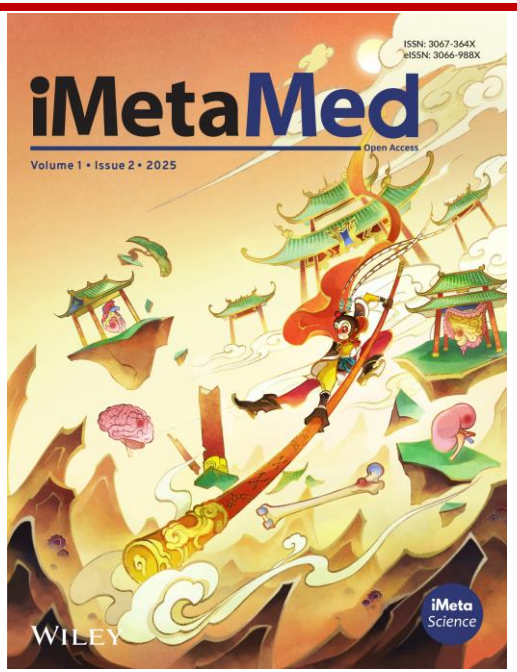

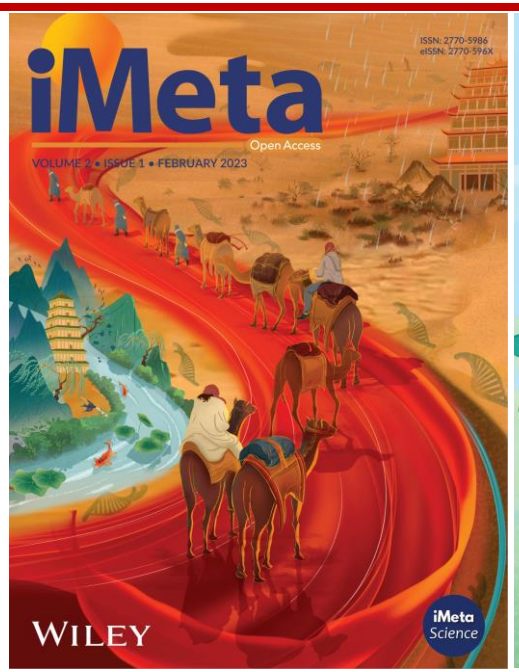

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