

Glucomannan promotes *Bacteroides ovatus* to improve intestinal barrier function and ameliorate insulin resistance

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<https://doi.org/10.1002/imt2.163>



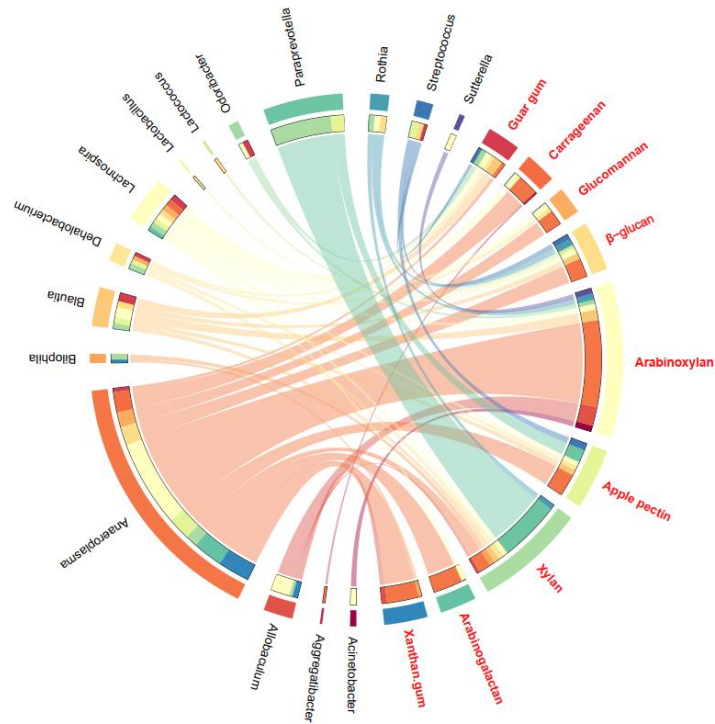
Background

Bioactive dietary fiber selectively influence gut microbiota

Targeted modification of gut microbiota and related metabolites via dietary fiber

Qixing Nie, Yonggan Sun, Mingzhi Li, Sheng Zuo, Chunhua Chen, Qiongni Lin, Shaoping Nie *

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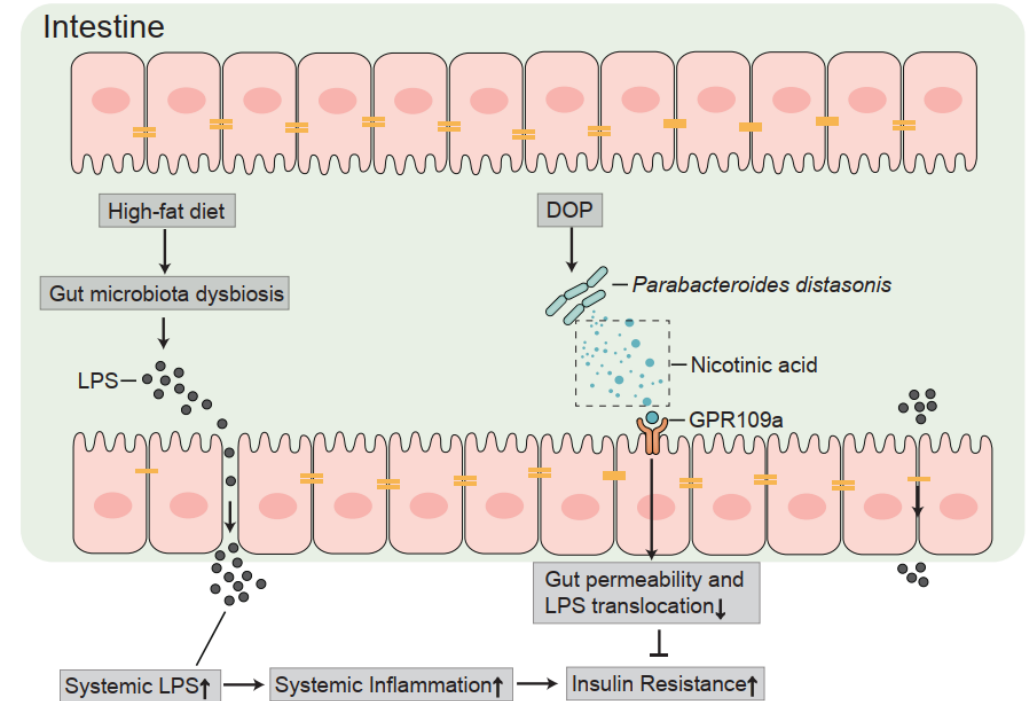
Change of gut microbiota by different dietary fiber

Nie Q, et al. *Carbohydrate Polymers*, 2023

Article

<https://doi.org/10.1038/s41467-023-43622-3>

Parabacteroides distasonis ameliorates insulin resistance via activation of intestinal GPR109a



DOP promotes *Parabacteroides distasonis* to produce nicotinic acid, which alleviates insulin resistance by activation of intestinal GPR109a

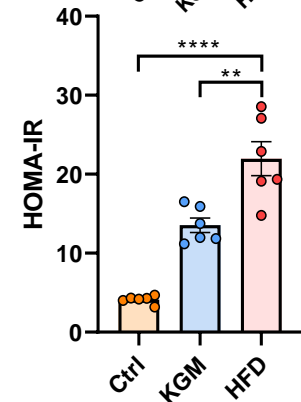
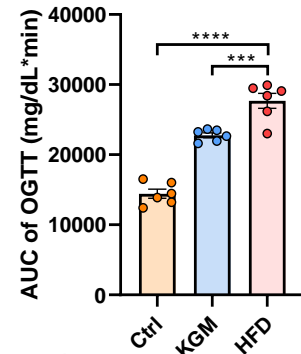
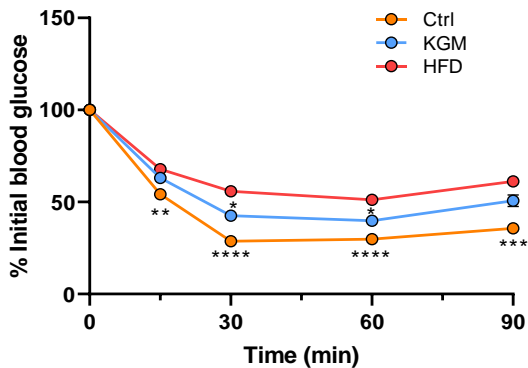
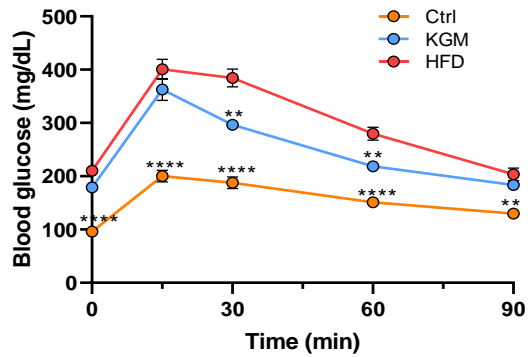
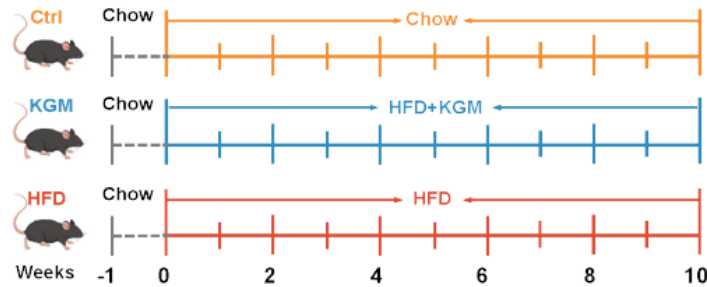
Sun Y, Nie Q, et al. *Nature communications*, 2023



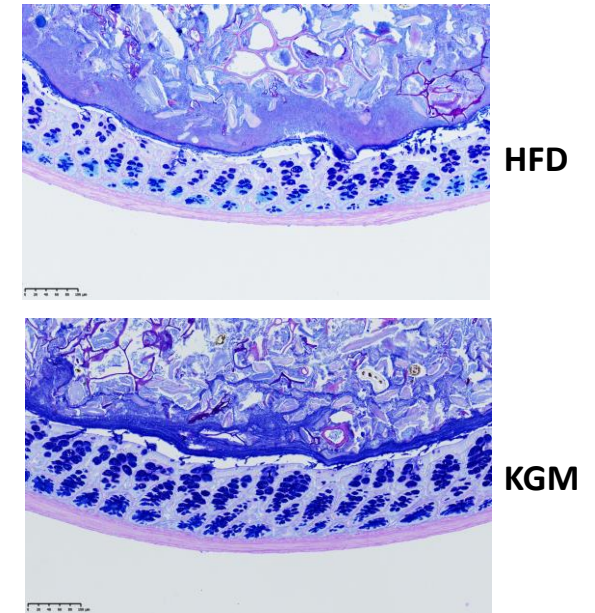
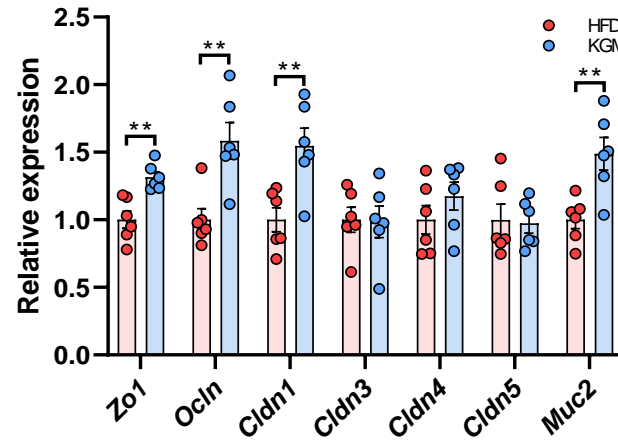
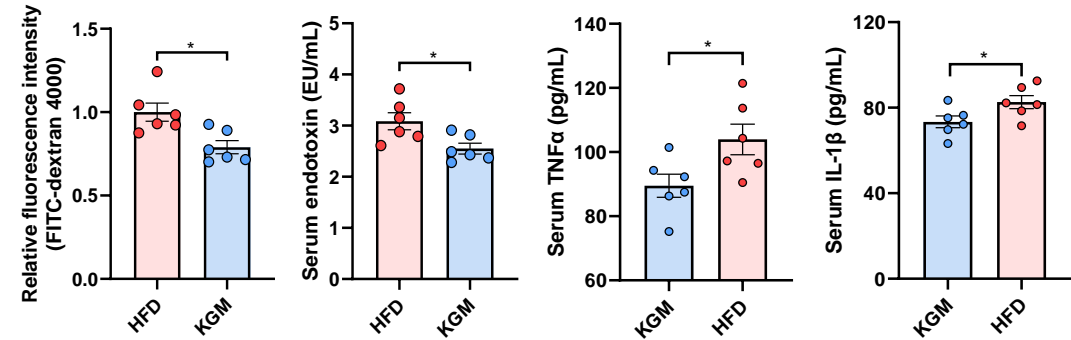
Results

konjac glucomannan alleviates insulin resistance

improve insulin resistance



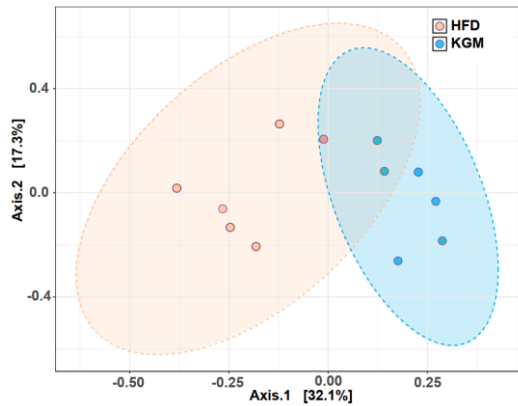
improve endoxemia and inflammation



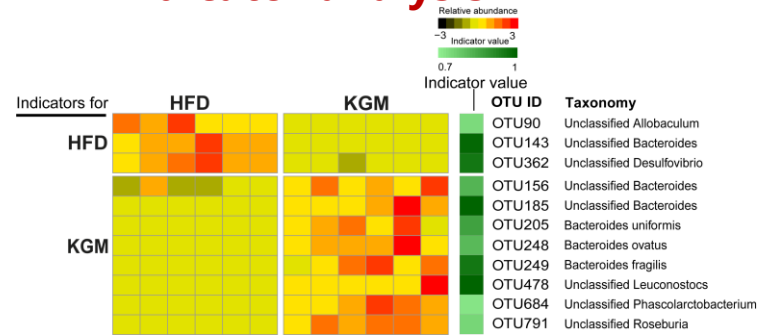
Results

KGM influence the composition of gut microbiota

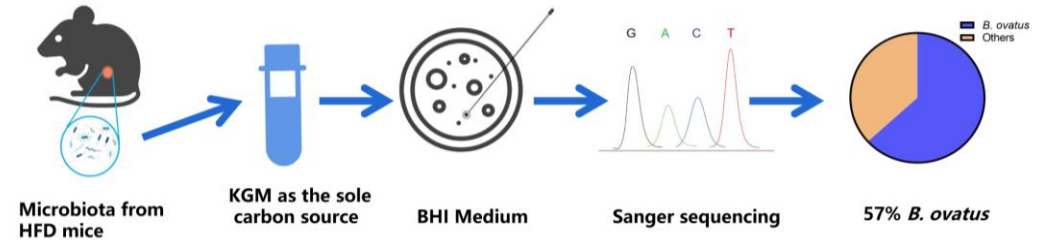
PCoA analysis



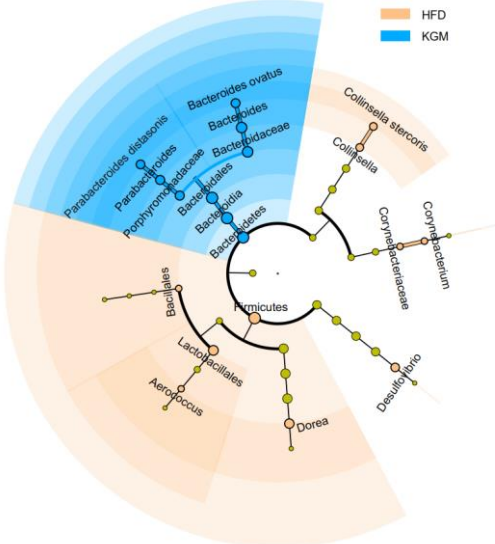
indicator analysis



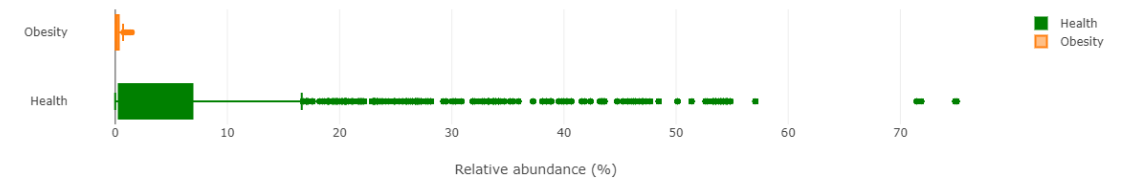
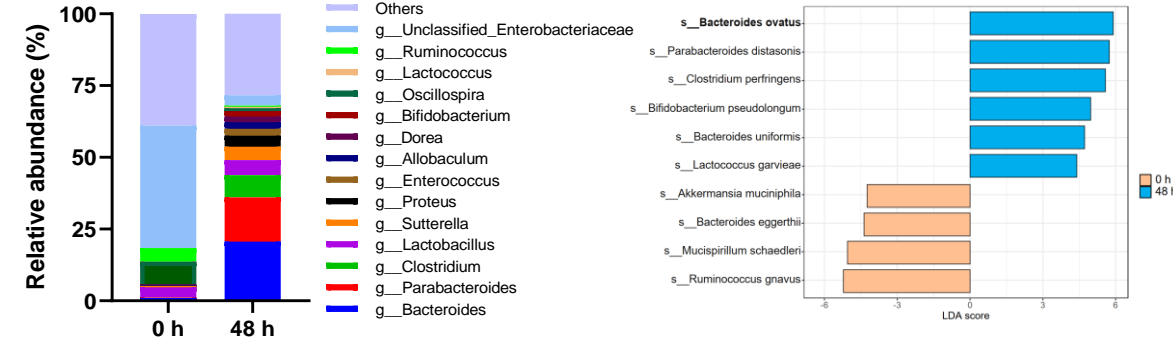
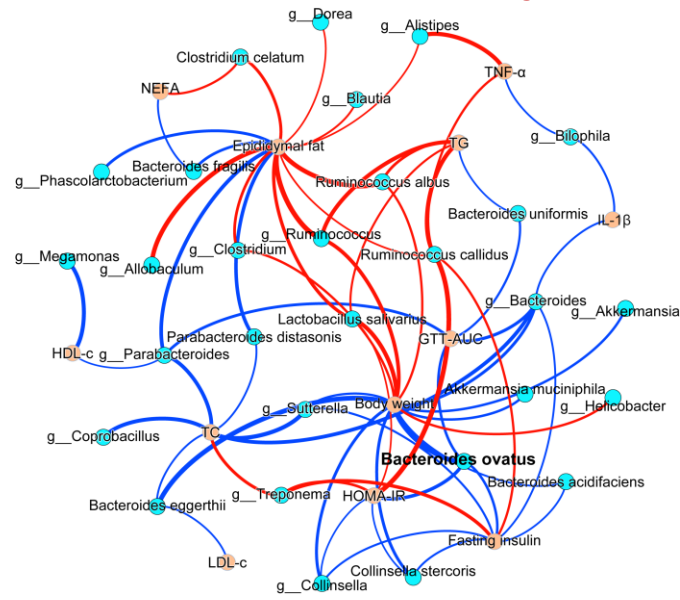
Screening of bacteria strain



LefSe analysis



Correlation analysis



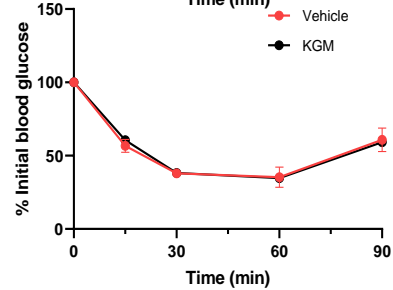
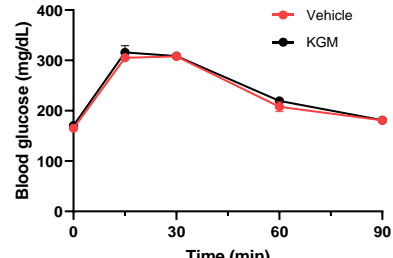
Change of gut microbiota composition



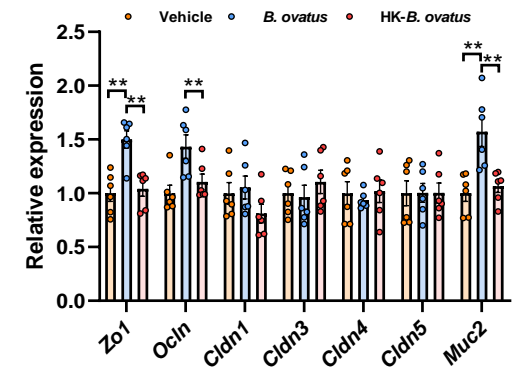
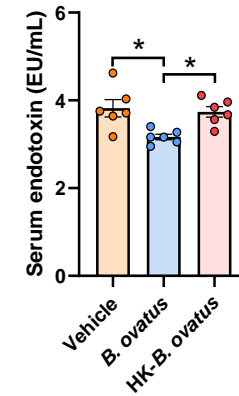
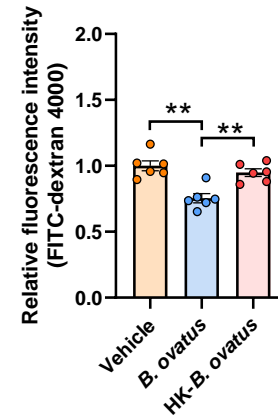
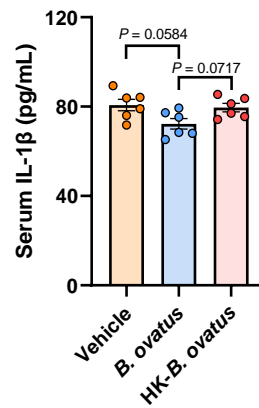
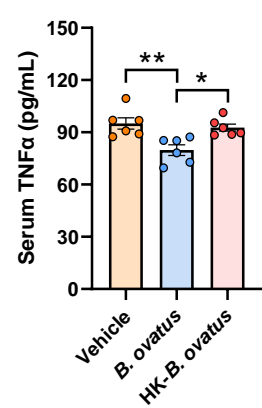
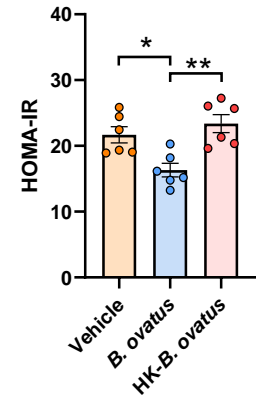
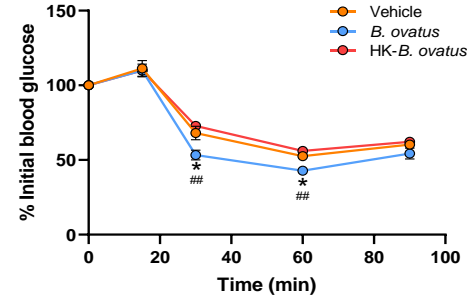
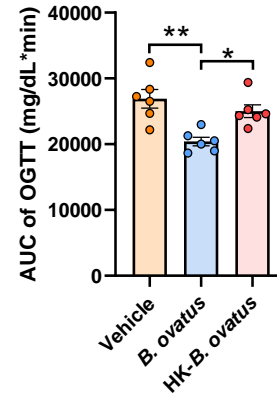
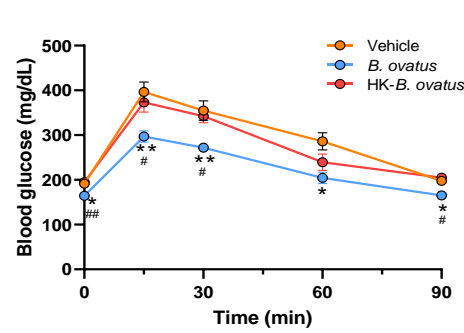
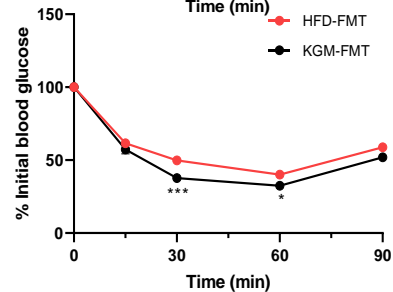
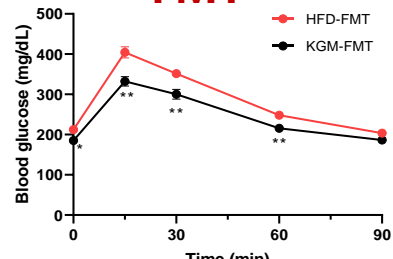
Results

Bacteroides ovatus treatment alleviates IR

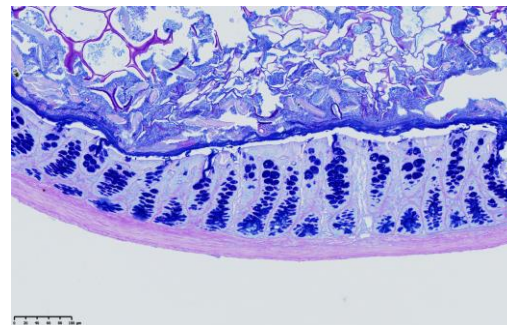
Abx treatment



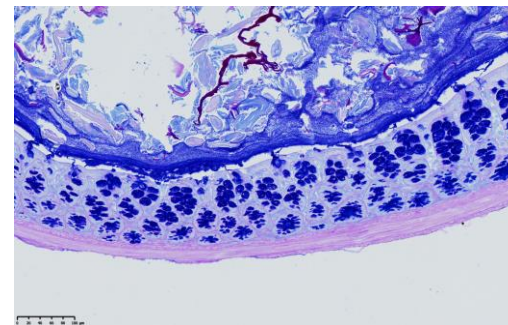
FMT



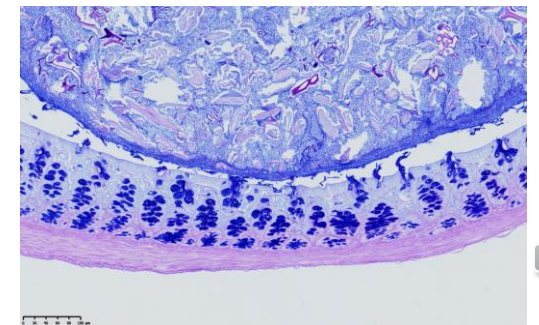
Vehicle



B. ovatus



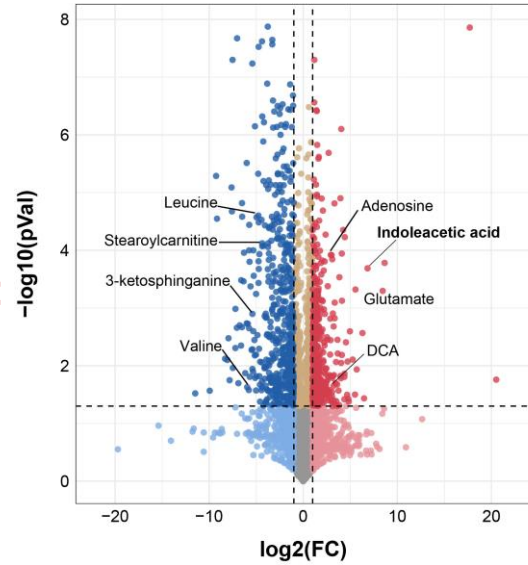
HK-*B. ovatus*



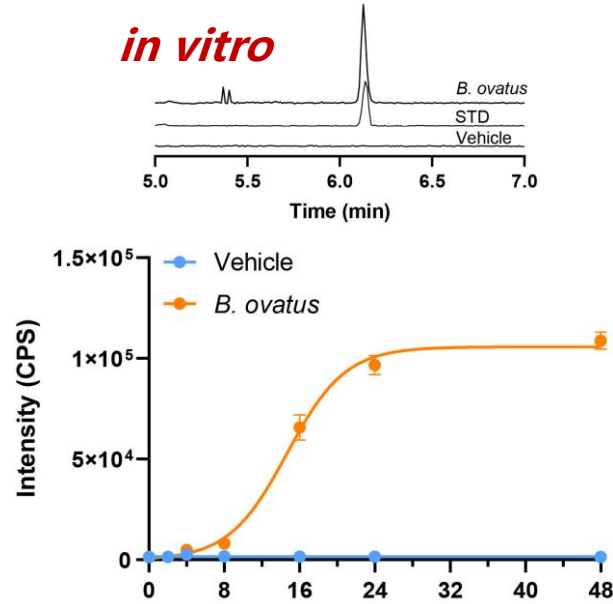
Results

Bacteroides ovatus produce IAA

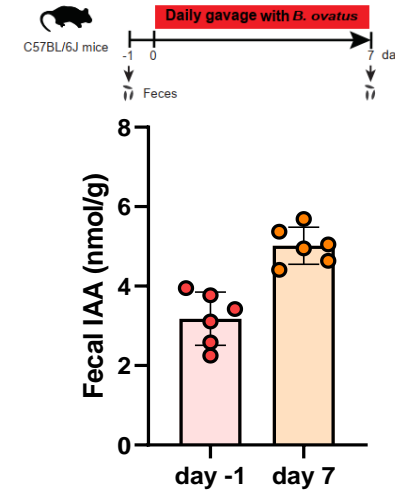
volcano plot



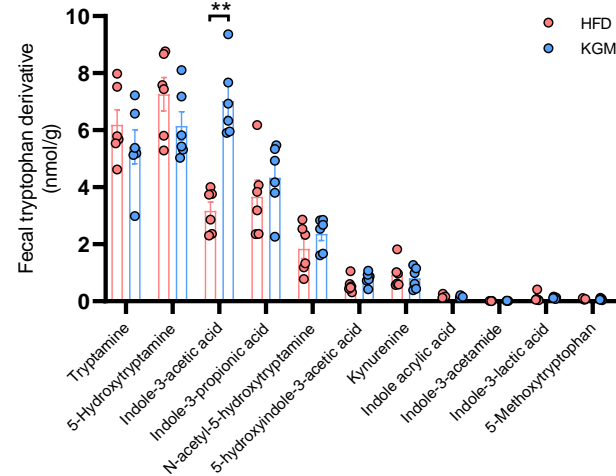
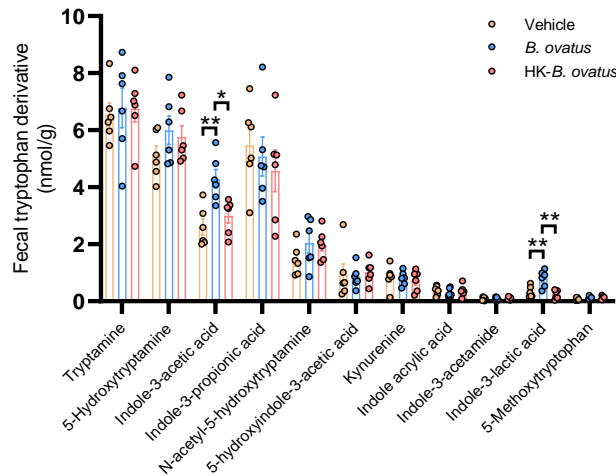
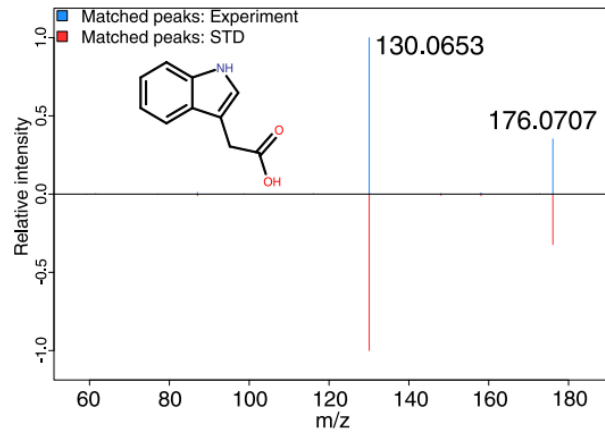
in vitro



in vivo



mirror plot

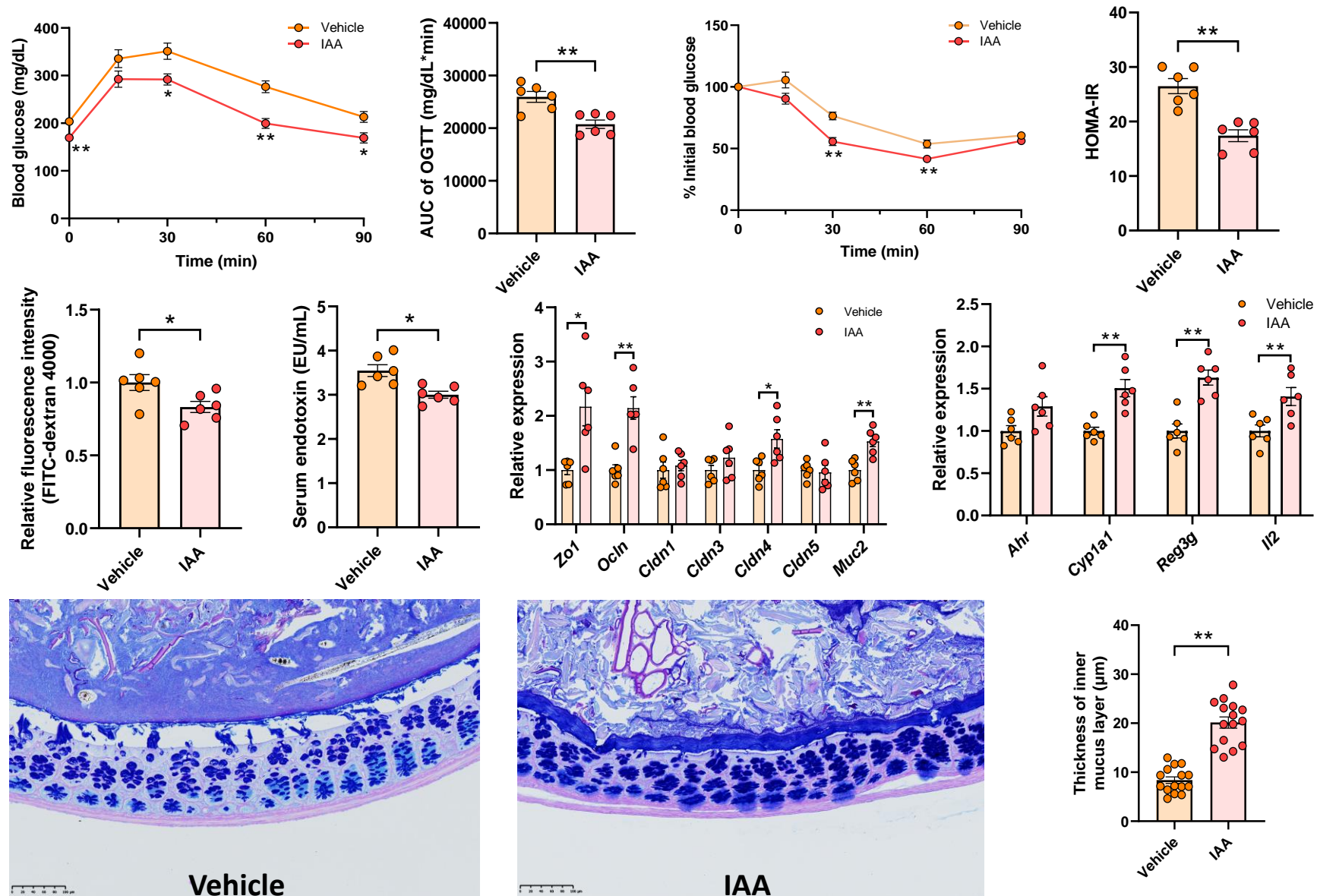


Quantification of tryptophan metabolites

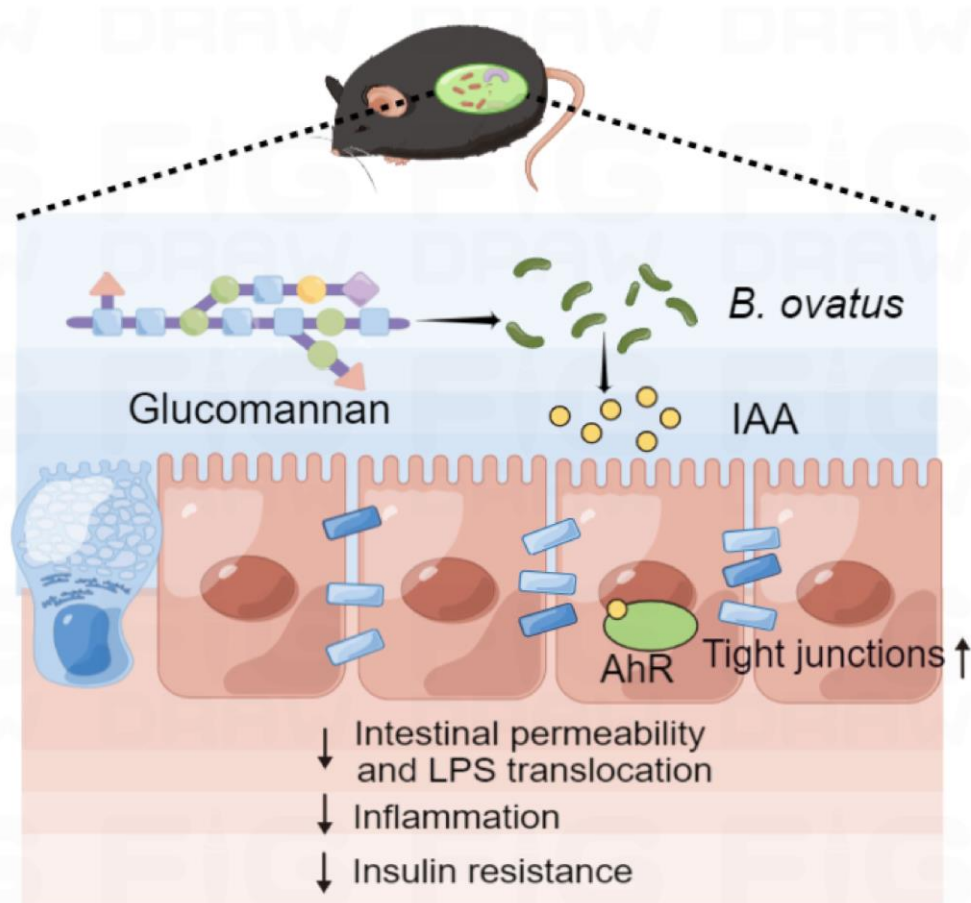


Results

IAA alleviates IR by activating AhR



Summary



1. Supplementation with glucomannan alleviates insulin resistance.
2. Glucomannan promotes the growth of *B. ovatus*, accompanied by improved intestinal barrier integrity and reduced systemic inflammation.
3. *B. ovatus*-derived indoleacetic acid is a key bioactive metabolite that fortifies intestinal barrier function via the activation of intestinal aryl hydrocarbon receptor.

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