



油酰乙醇胺通过PPAR α 信号通路调控 肠道干细胞活性与绒毛尺寸

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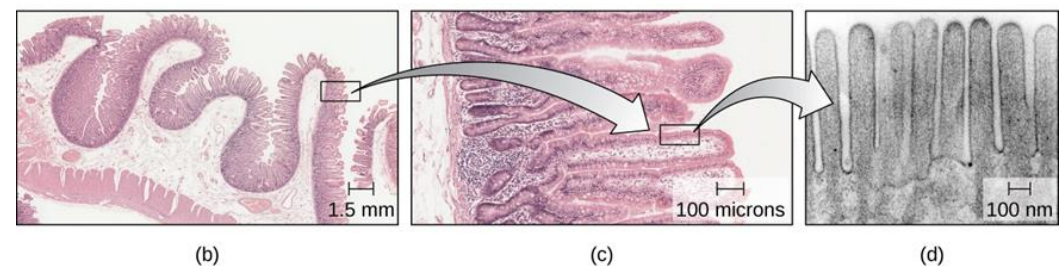
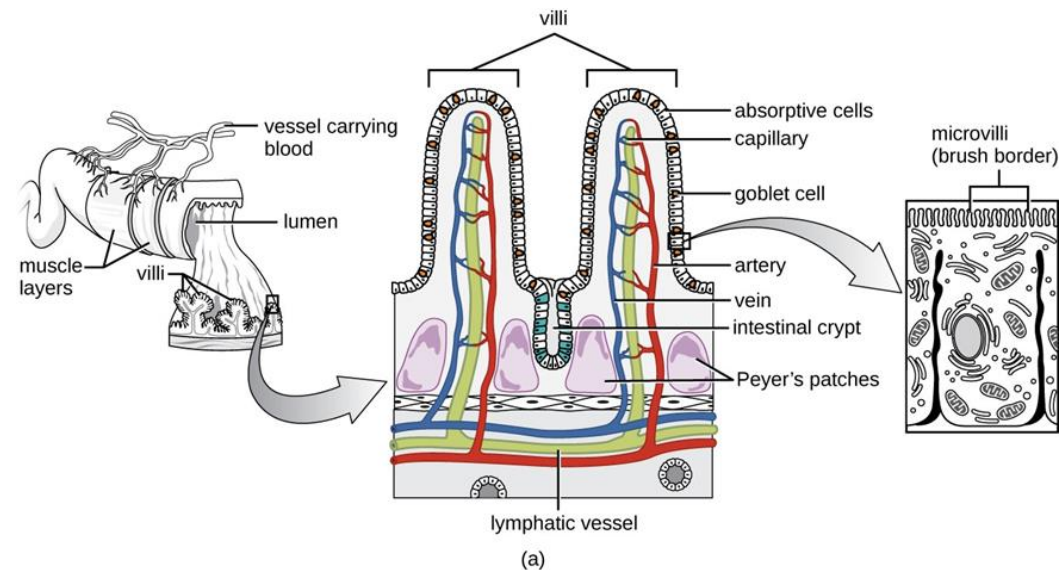
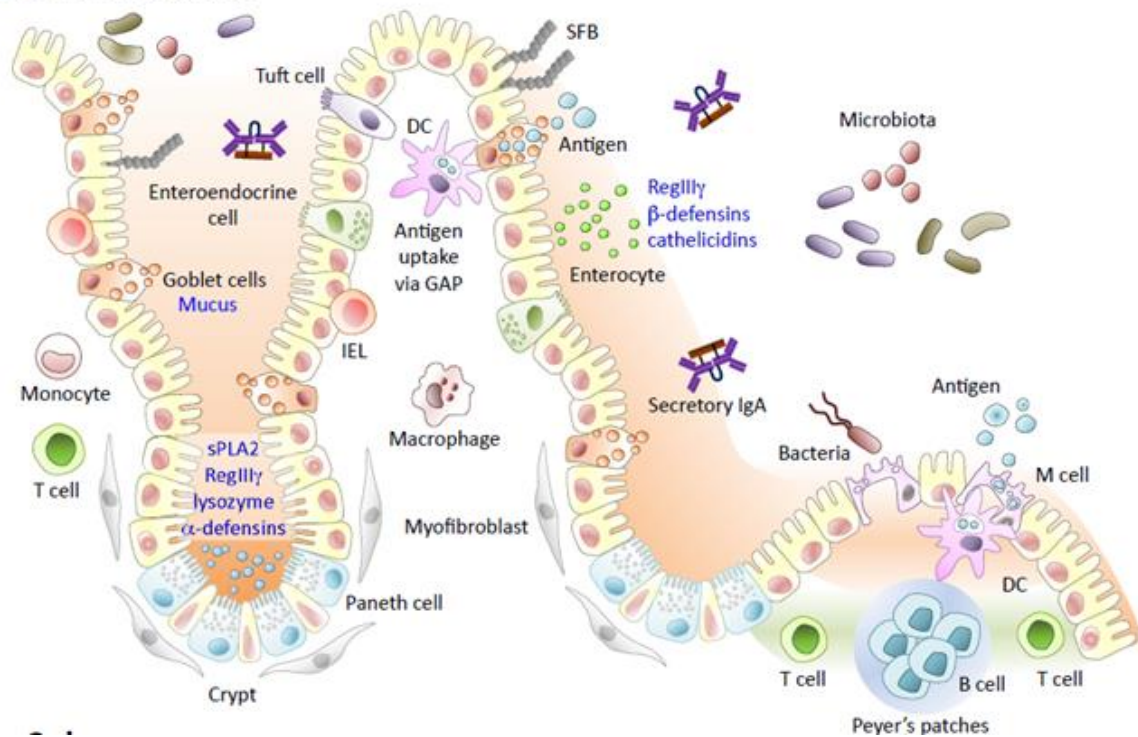
Qianqian Wang, Lanmei Yin, Zhaobin Wang, Jun Li, Xianglin Zeng, Qiye Wang, Jianzhong Li, et al. 2026.
Oleoylethanolamide regulates intestinal stem cell activity and villus size via PPAR α signaling pathway.
iMetaOmics 3: e70078. <https://doi.org/10.1002/imo2.70078>



简介

肠道绒毛尺寸对动物的消化吸收功能具有决定性影响，直接关系到养分消化率和饲料利用效率。

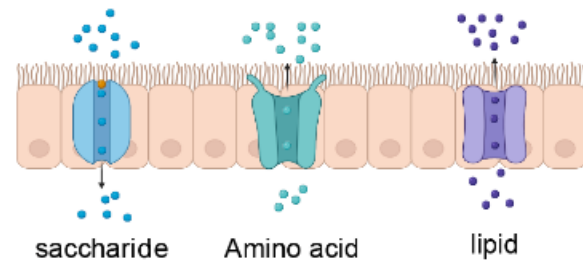
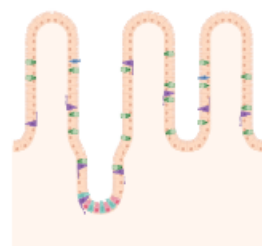
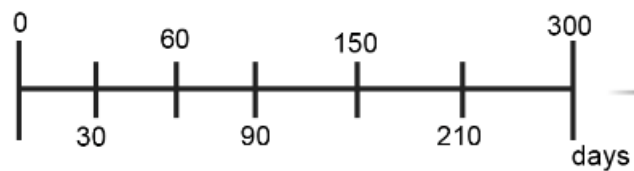
(A) Small intestine



Shaziling



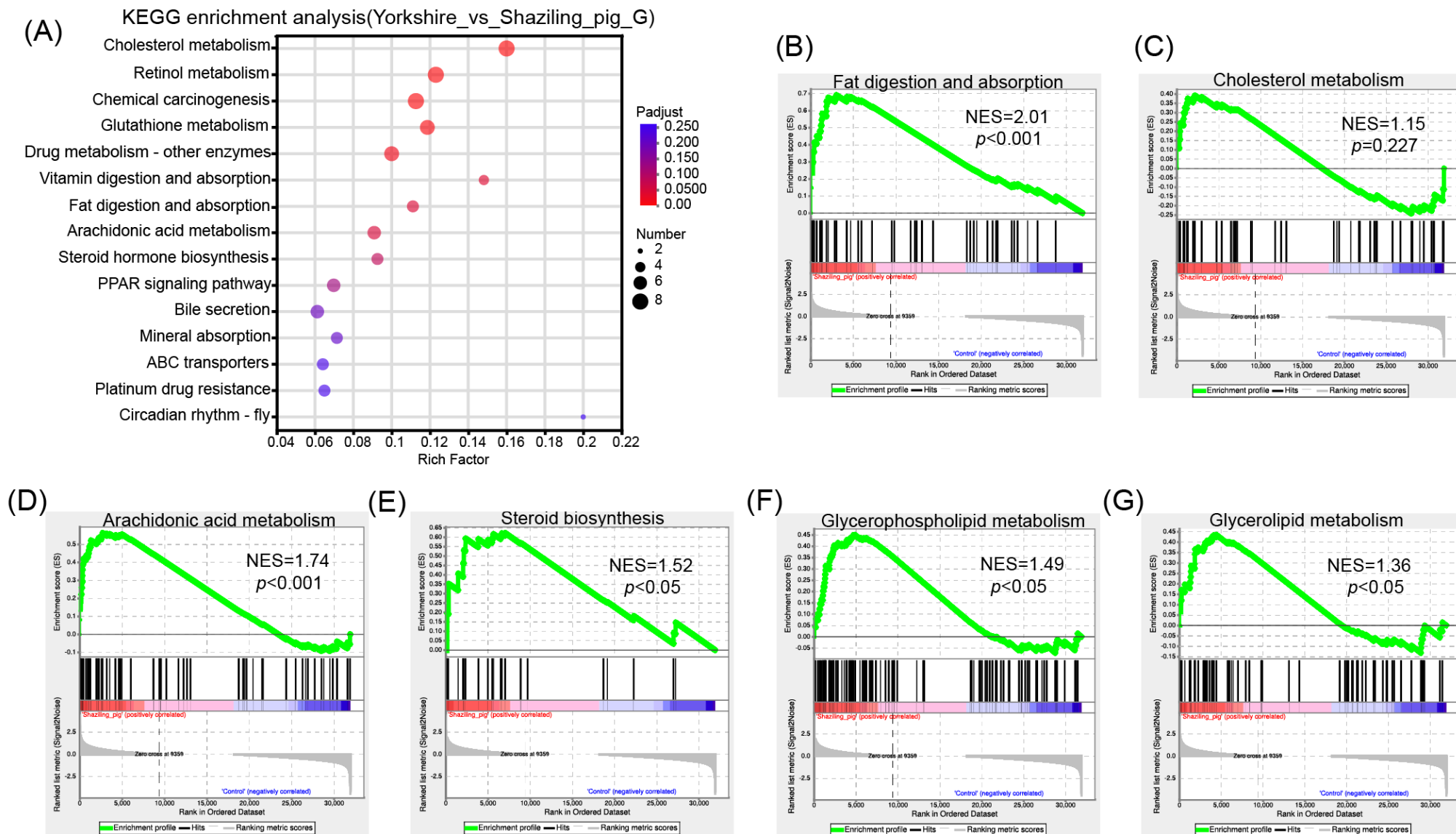
Yorkshire





结果

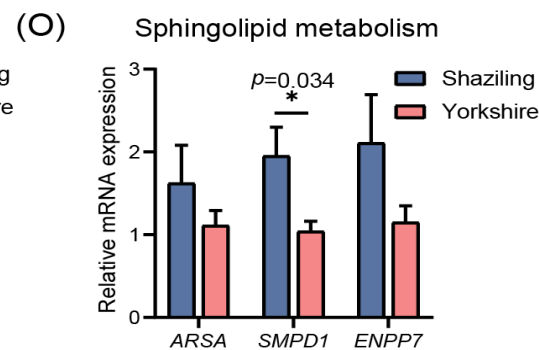
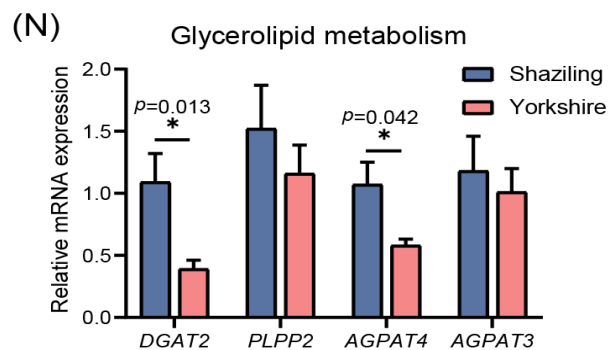
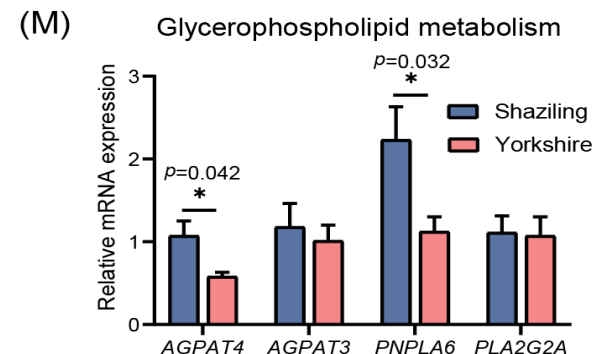
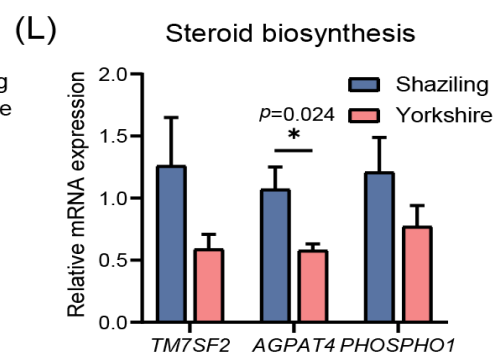
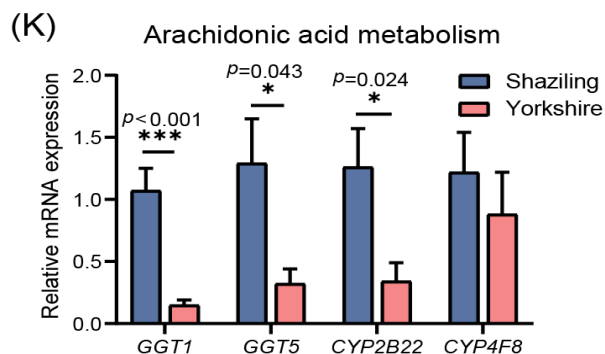
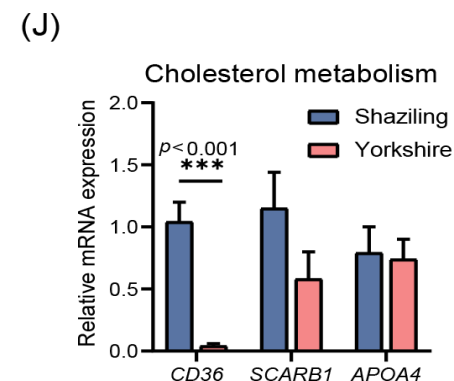
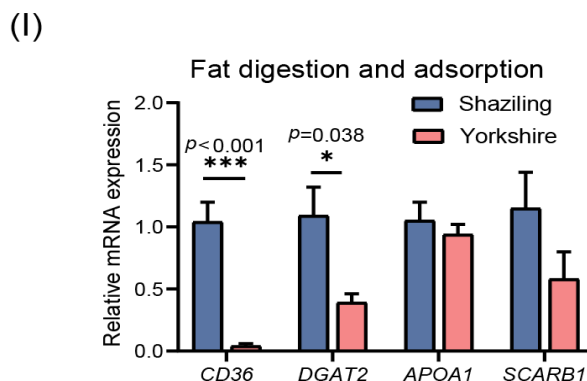
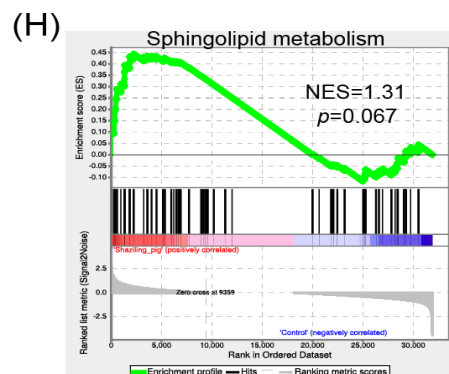
沙子岭猪和大白猪在脂质代谢上存在显著差异





结果

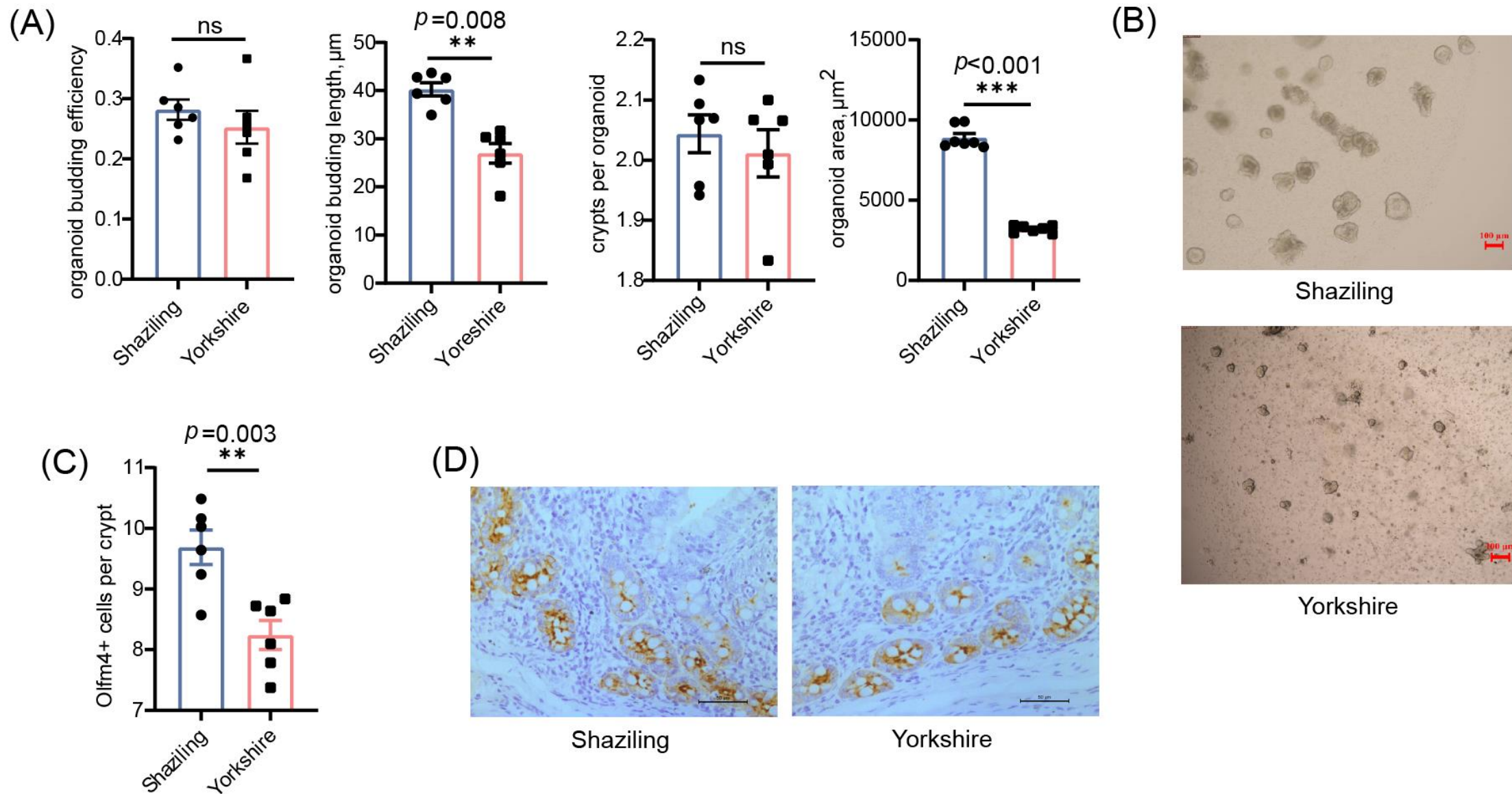
脂肪代谢通路相关基因在沙子岭猪中表达更高





结果

源自沙子岭猪的类器官相比大白猪来源的类器官表现出更大的出芽长度和生长面积

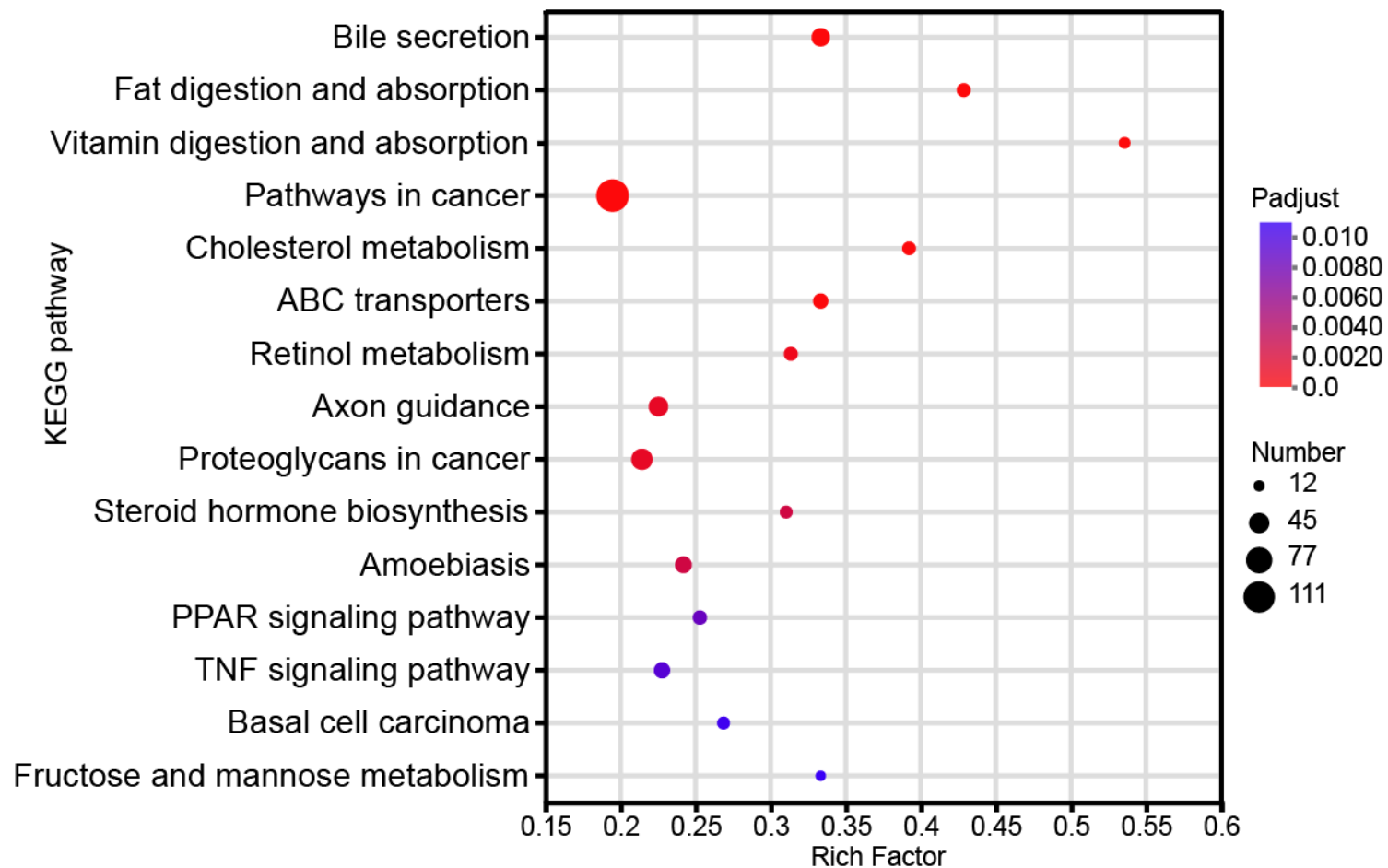




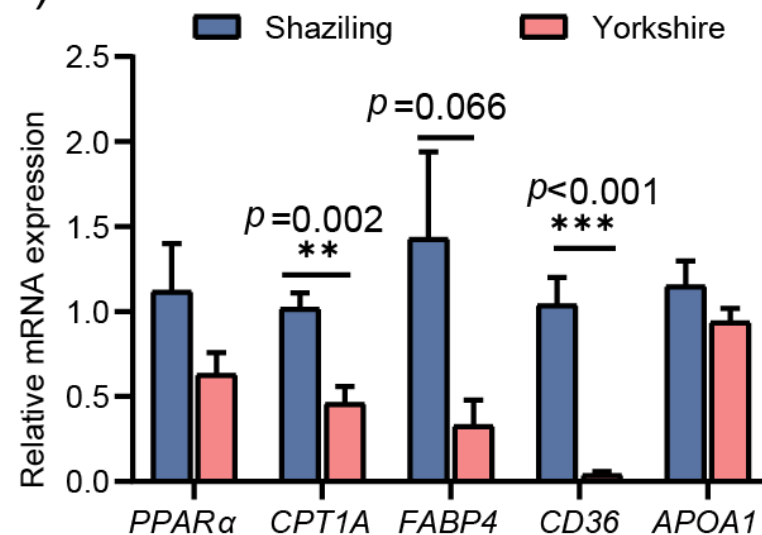
结果

PPAR α 信号通路在沙子岭猪中表达更高

(E) KEGG enrichment analysis(Yorkshire_organoids_vs_Shaziling_organoids)



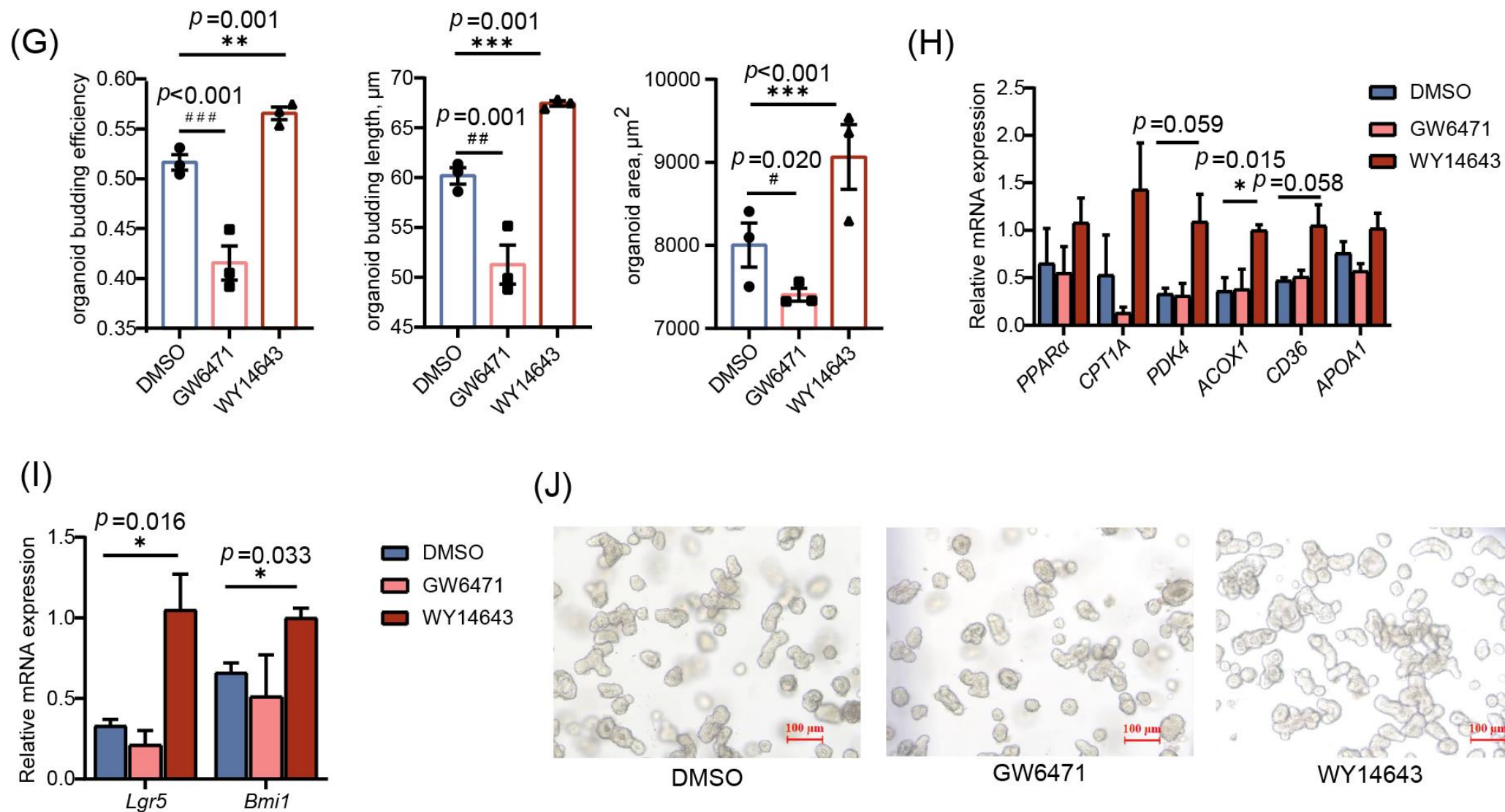
(F)





结果

PPAR α 在肠道发育中具有重要作用

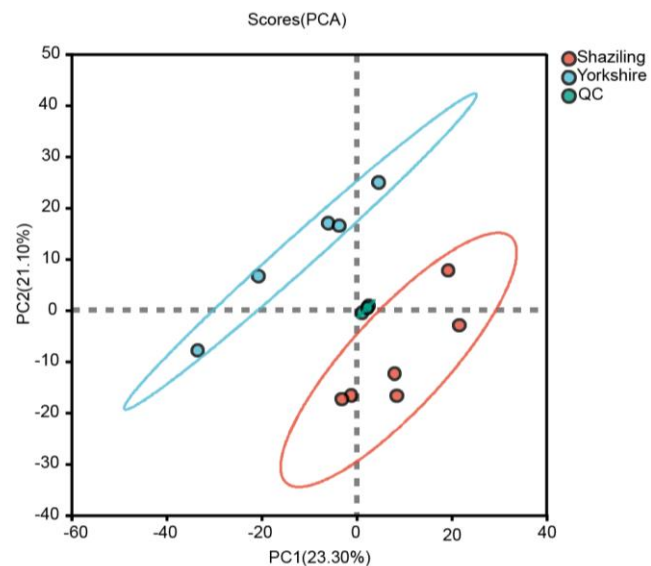




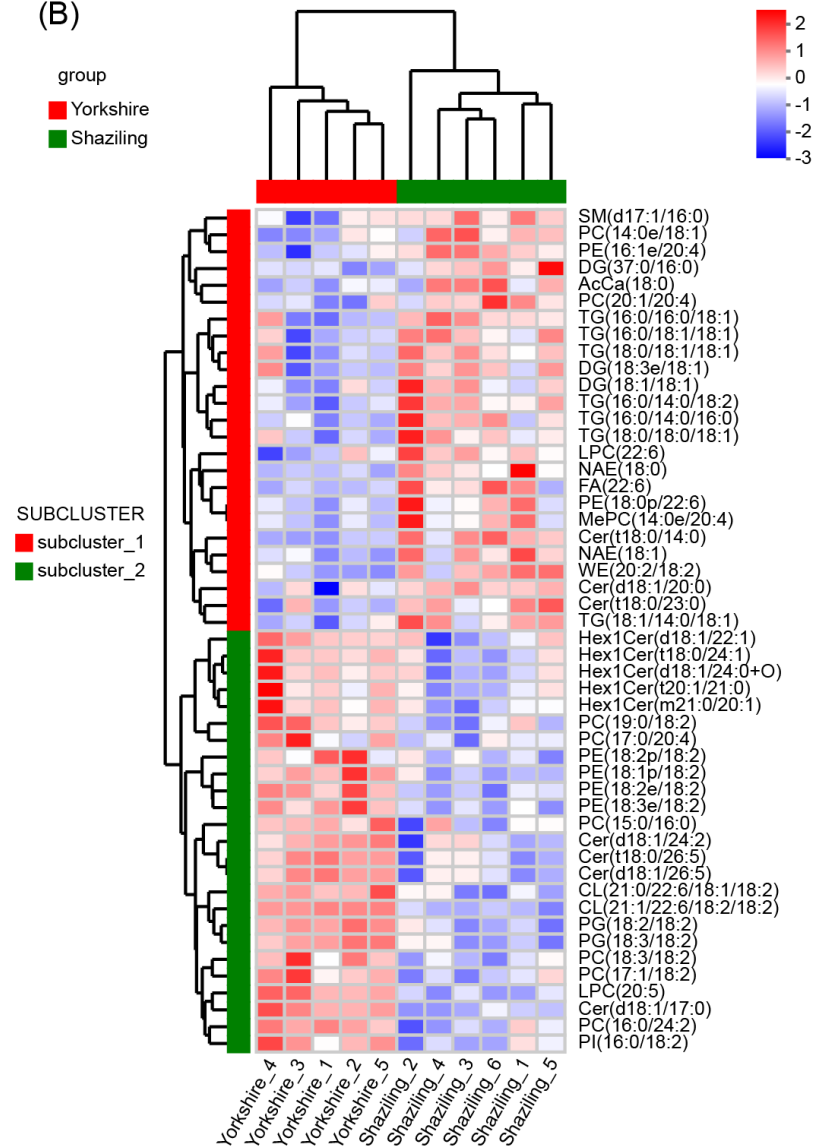
结果

差异代谢物主要富集在甘油磷脂代谢

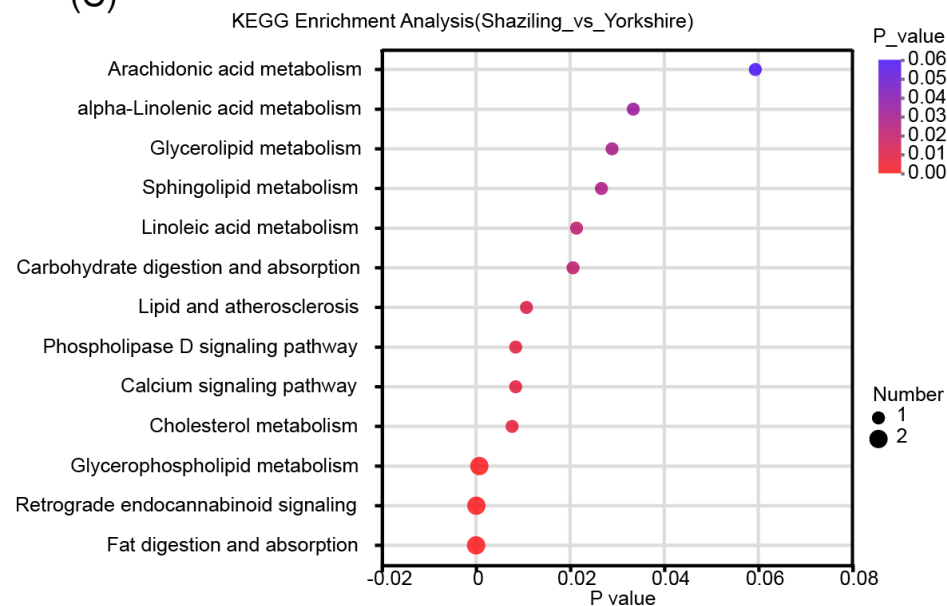
(A)



(B)



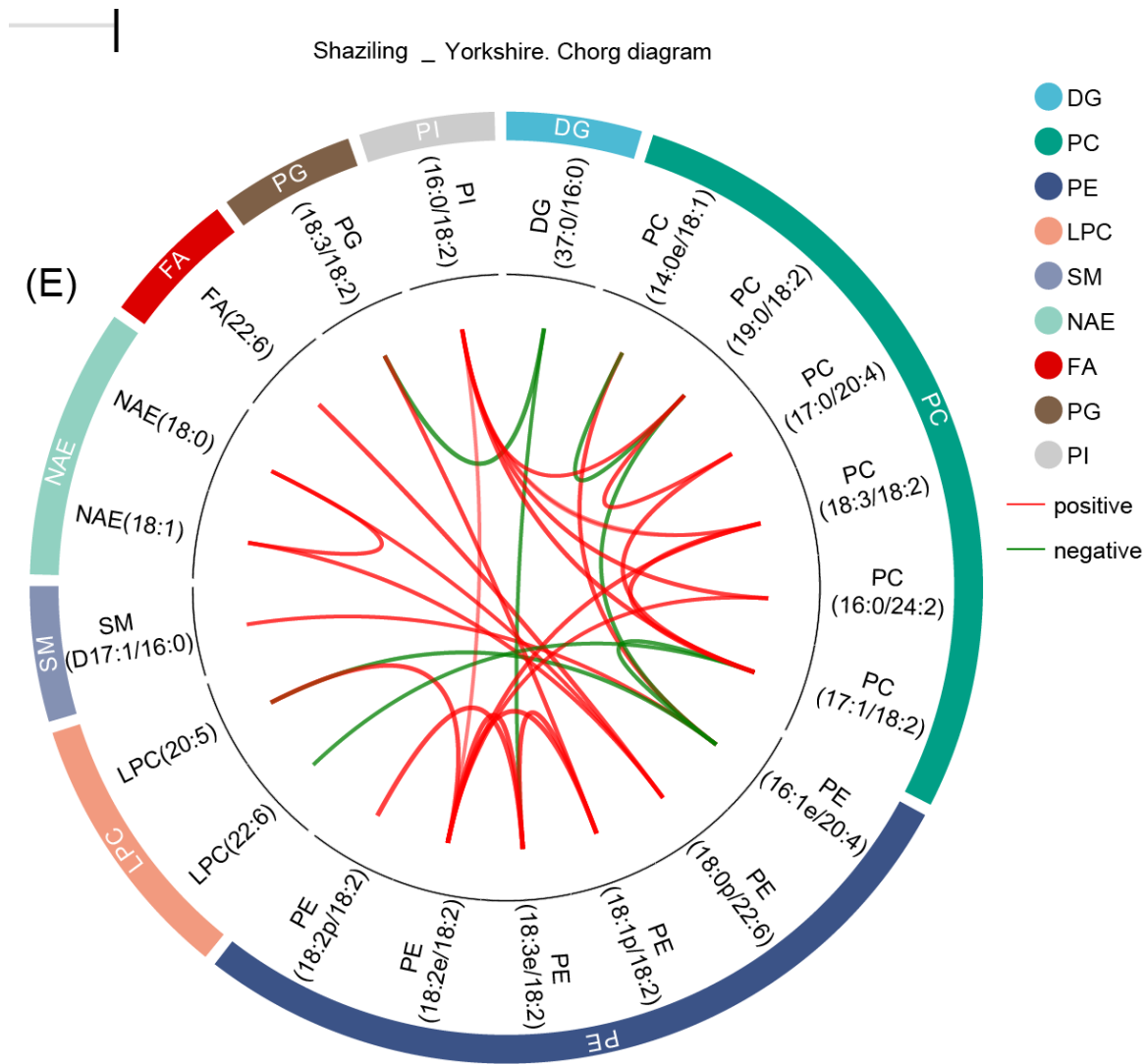
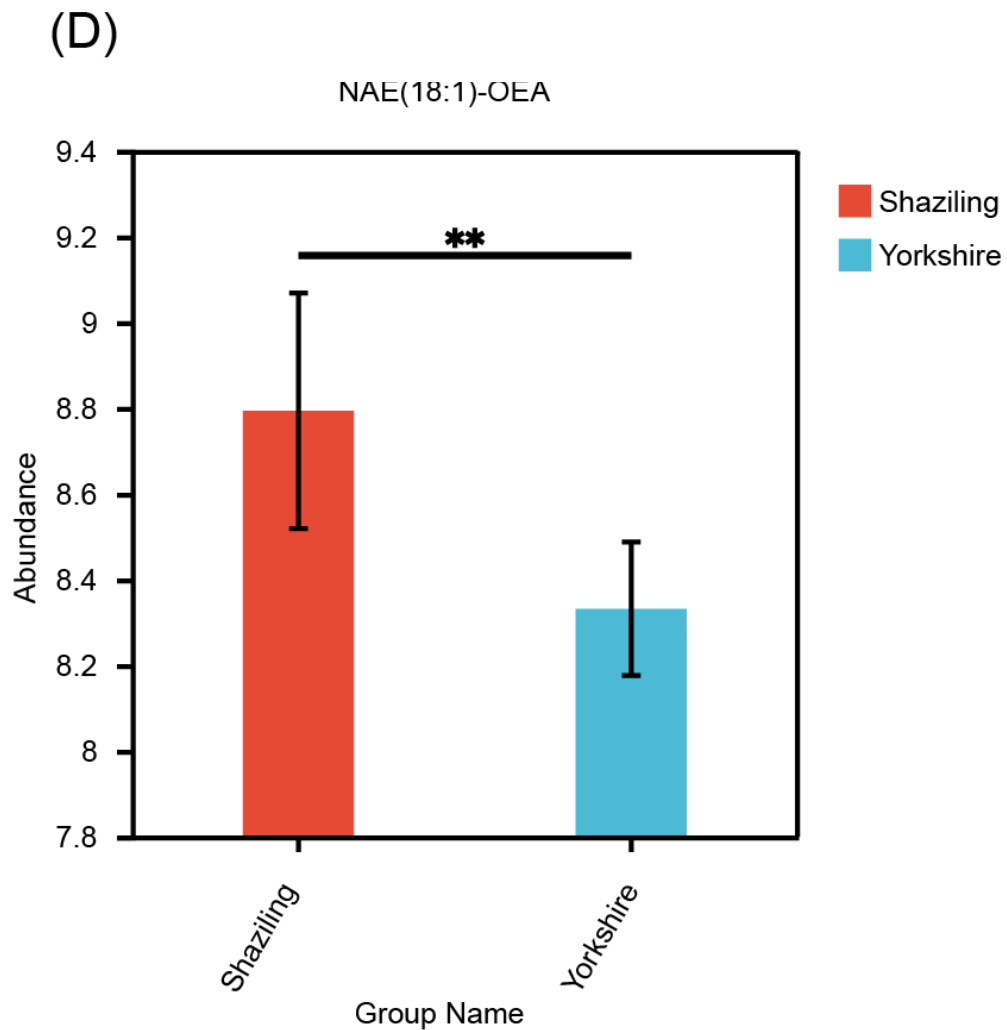
(C)





结果

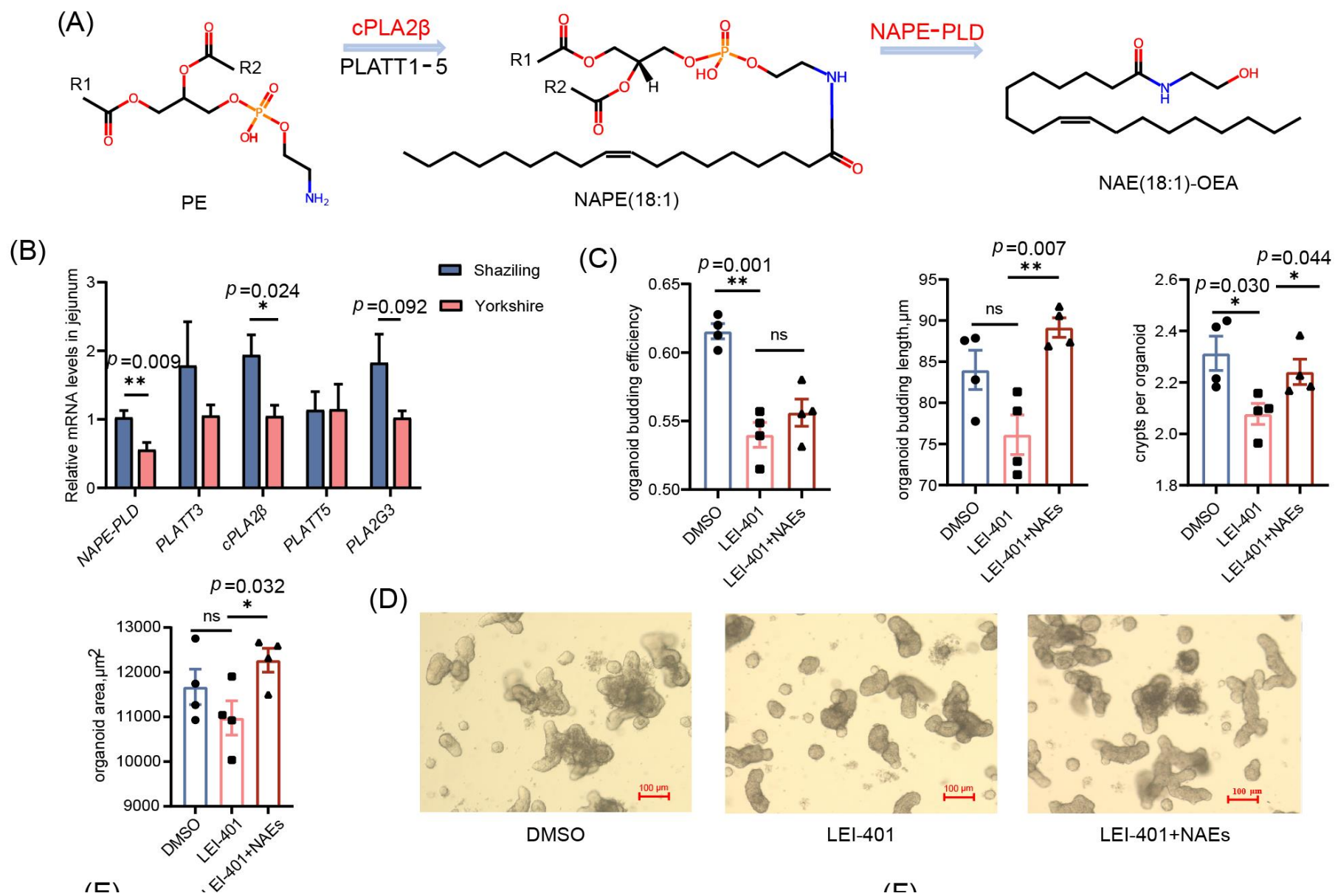
脂质代谢产生的油酰乙醇胺（OEA）在沙子岭猪中呈现更高富集度





结果

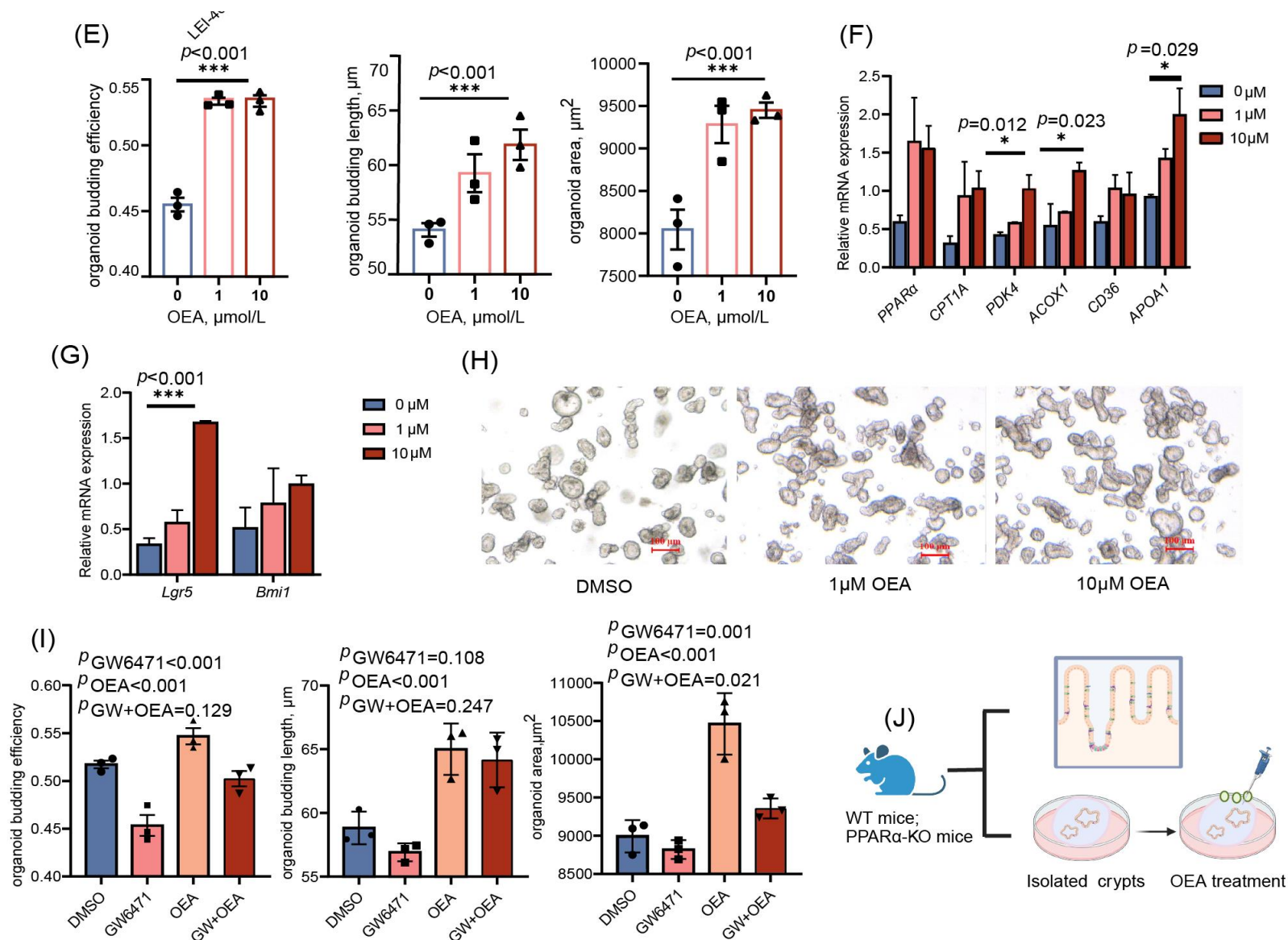
NAE对肠道发育具有重要作用





结果

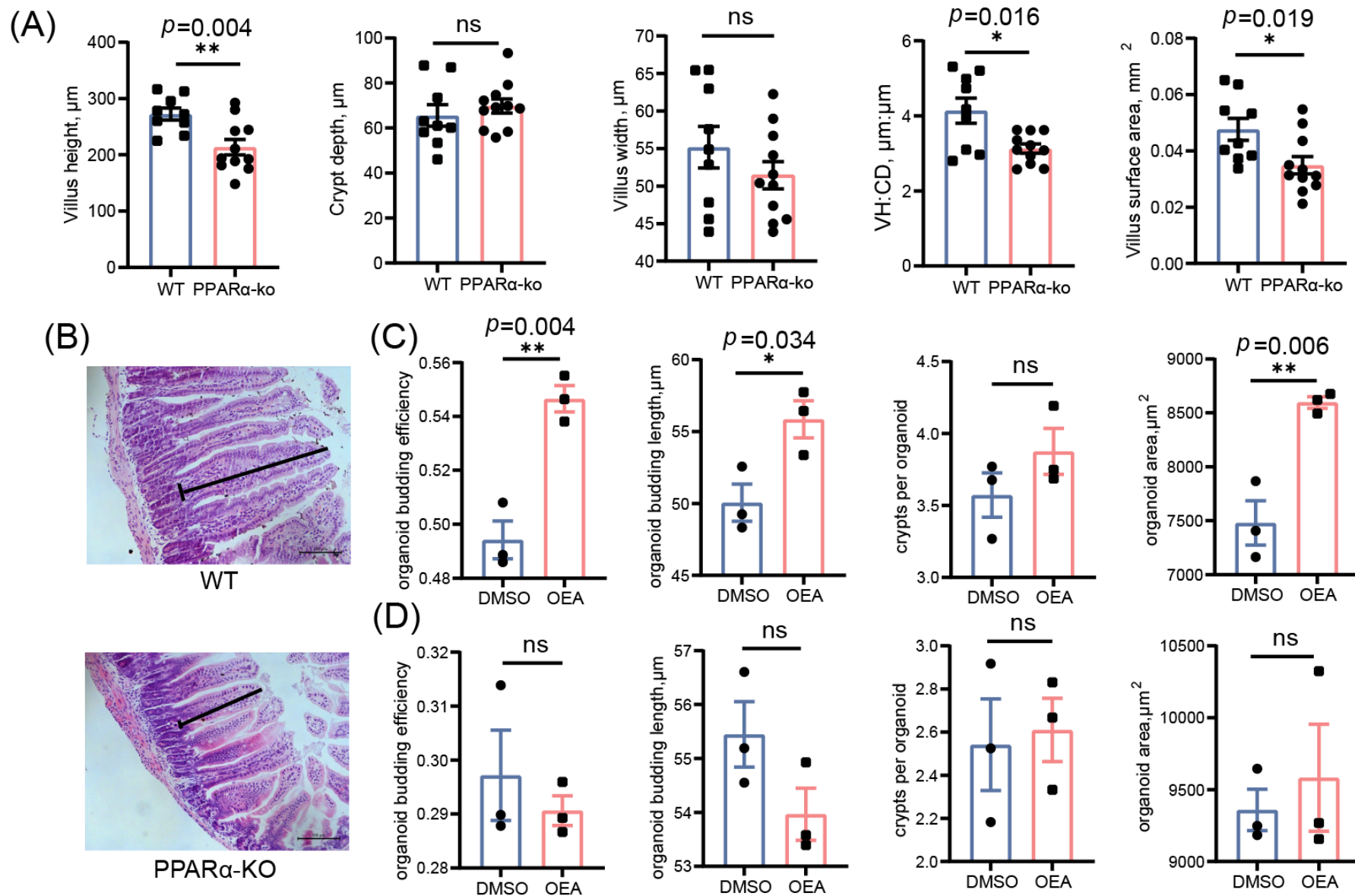
OEA通过PPAR α 信号通路调节肠道干细胞活性和类器官出芽





结果

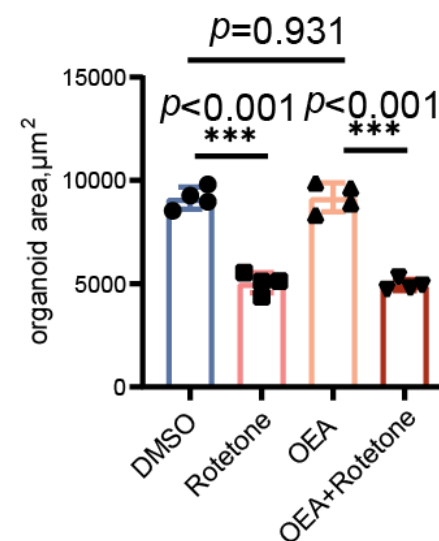
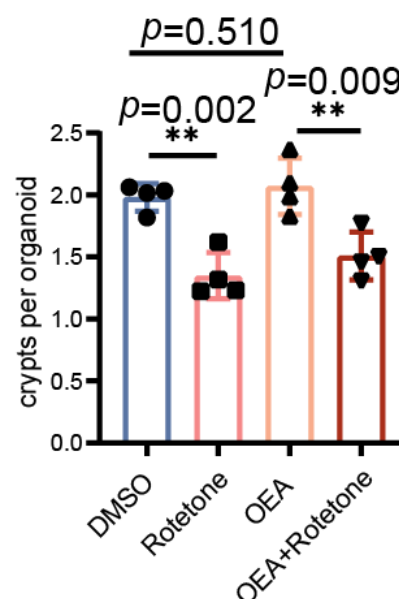
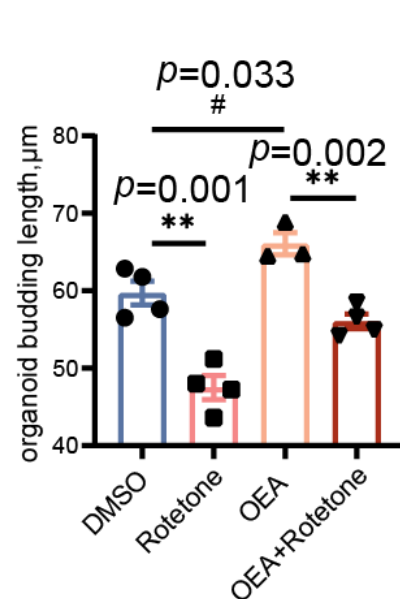
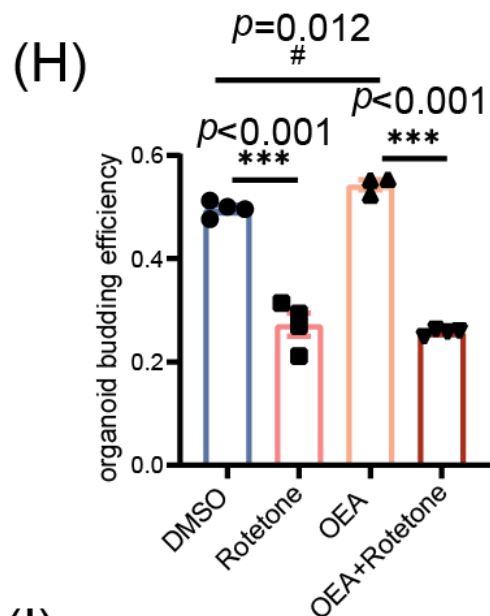
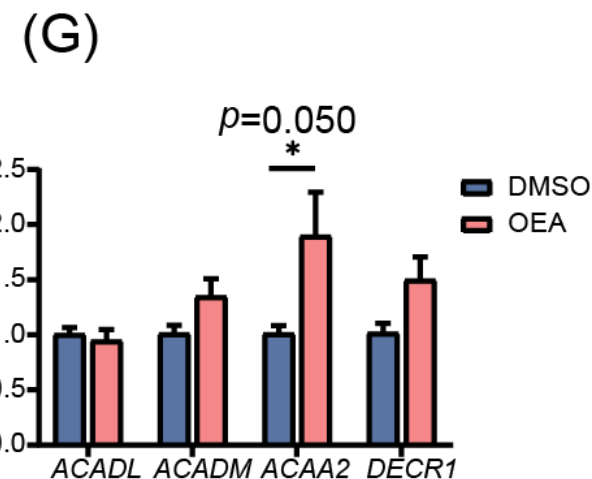
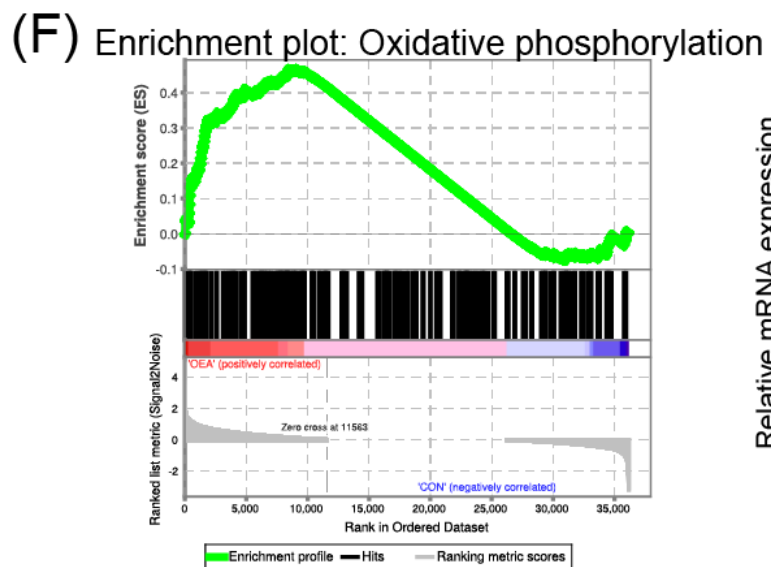
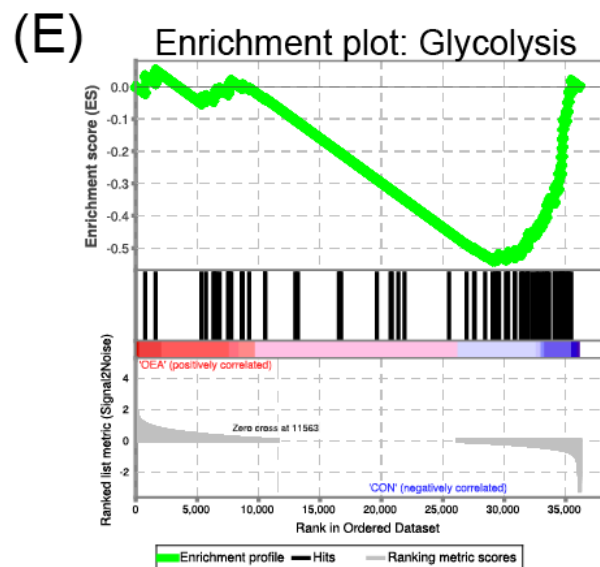
OEA通过激活PPAR α 靶点发挥作用





结果

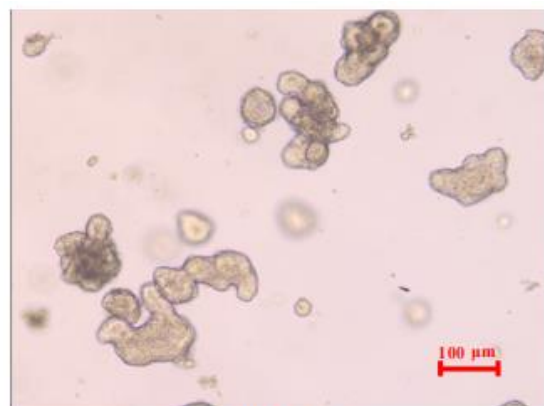
经OEA处理的类器官糖酵解途径表达下调，而氧化磷酸化活性显著上调





结果

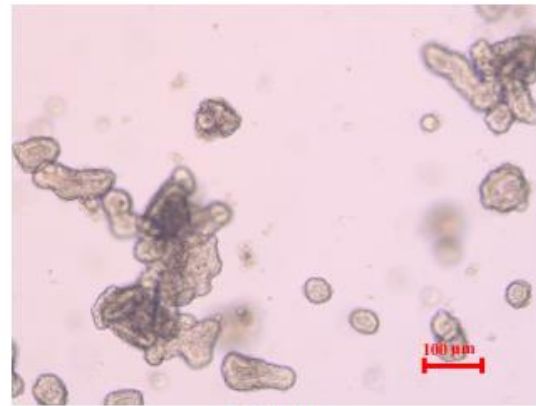
OEA对肠道干细胞活性的调节可能由氧化磷酸化介导



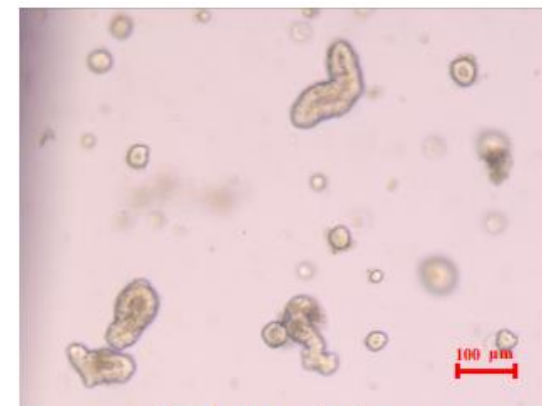
DMSO



Rotetone

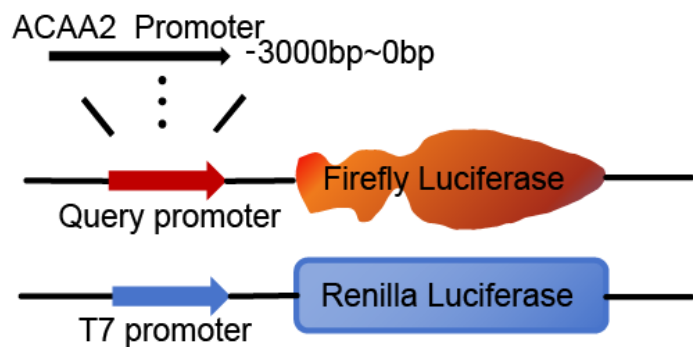


OEA

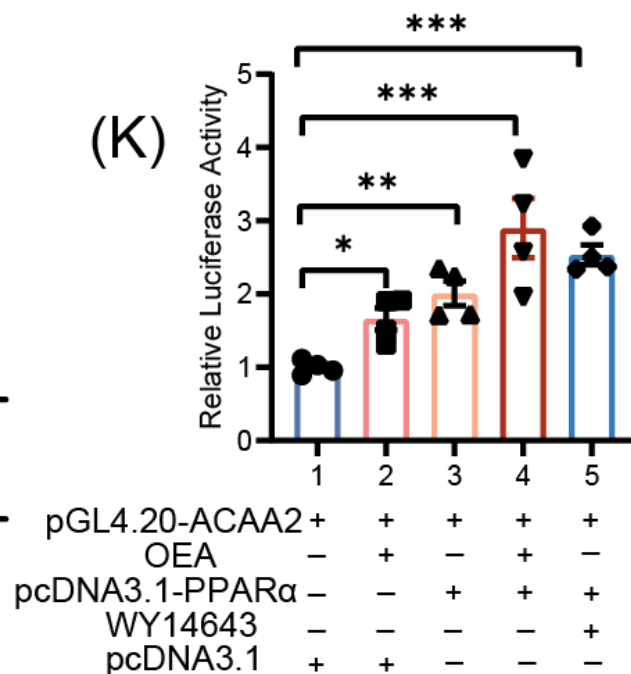


OEA+Rotetone

(J)

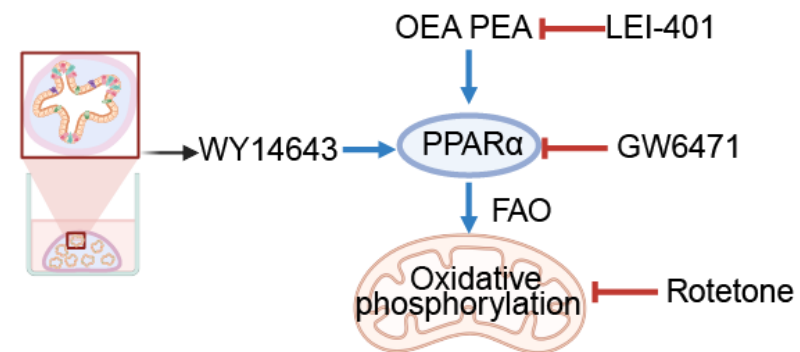


(K)



pGL4.20-ACAA2	+	+	+	+	+
OEA	-	+	-	+	-
pcDNA3.1-PPARα	-	-	+	+	+
WY14643	-	-	-	-	+
pcDNA3.1	+	+	-	-	-

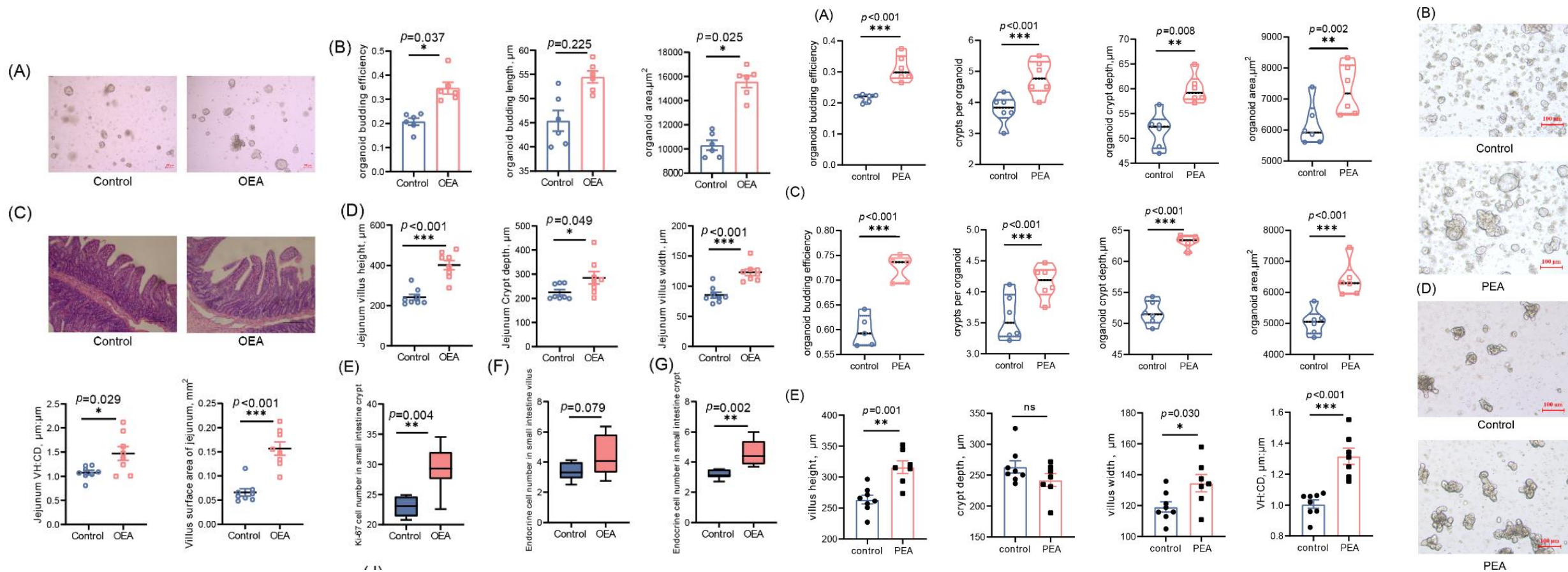
(L)





结果

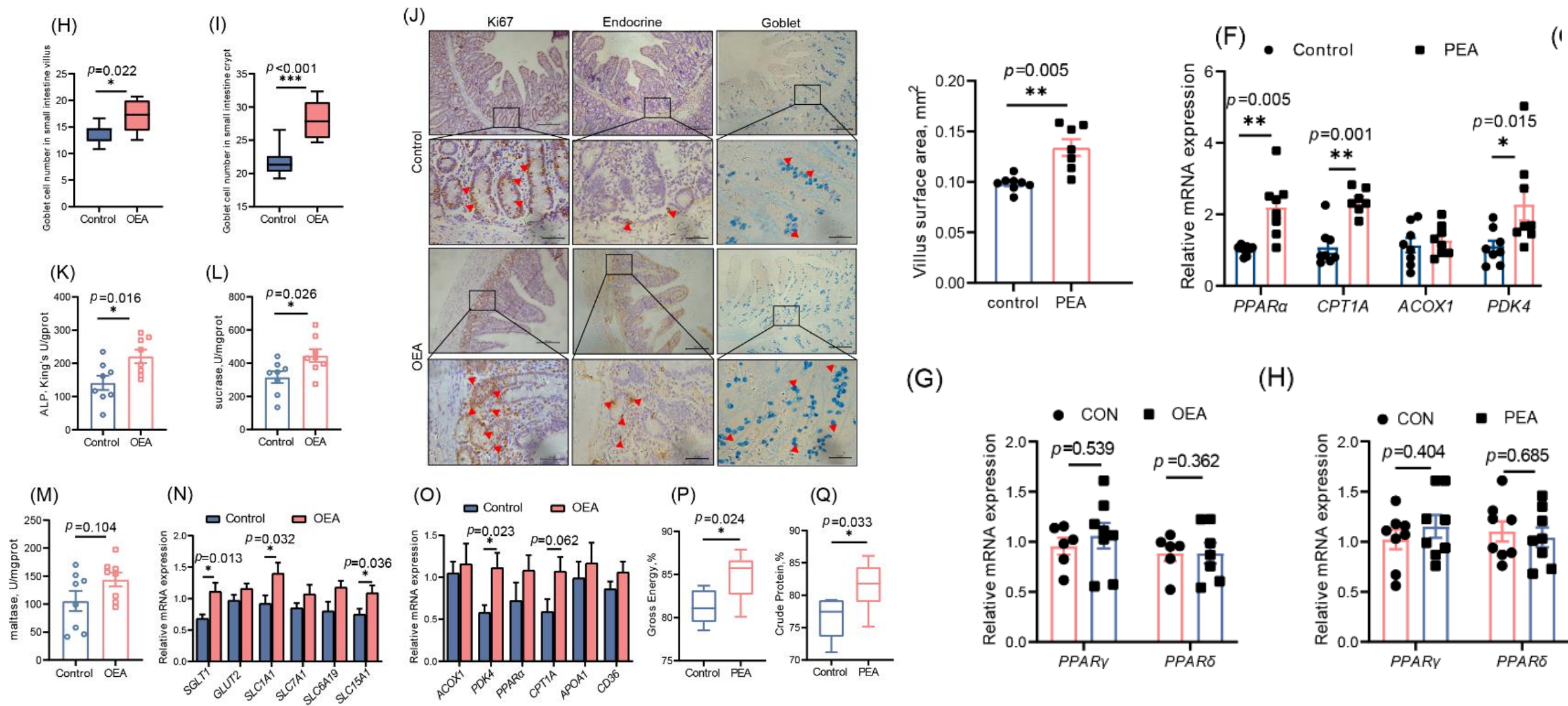
膳食补充OEA及PEA显著促进原代类器官出芽及绒毛尺寸增加





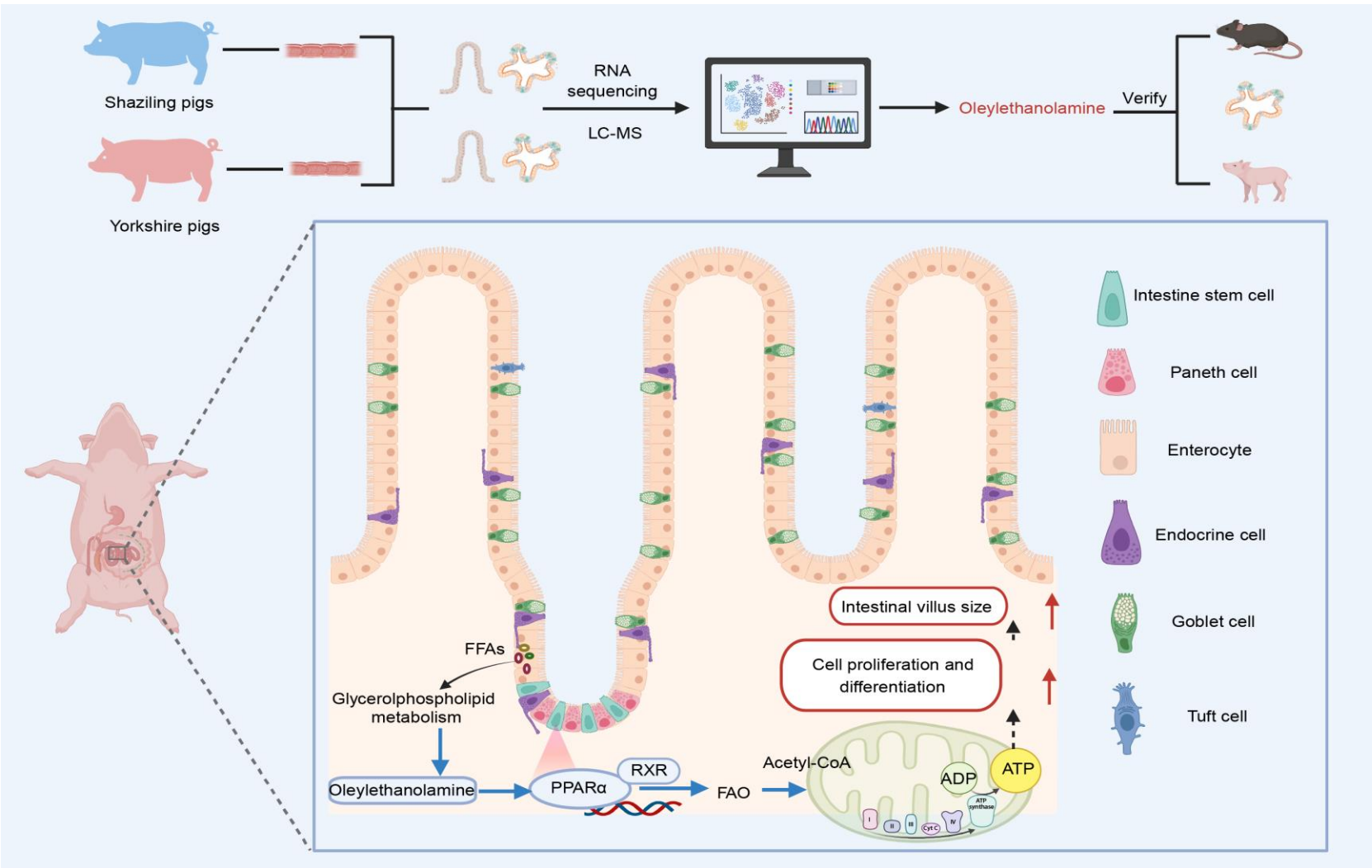
结果

膳食补充OEA及PEA显著改善营养吸收



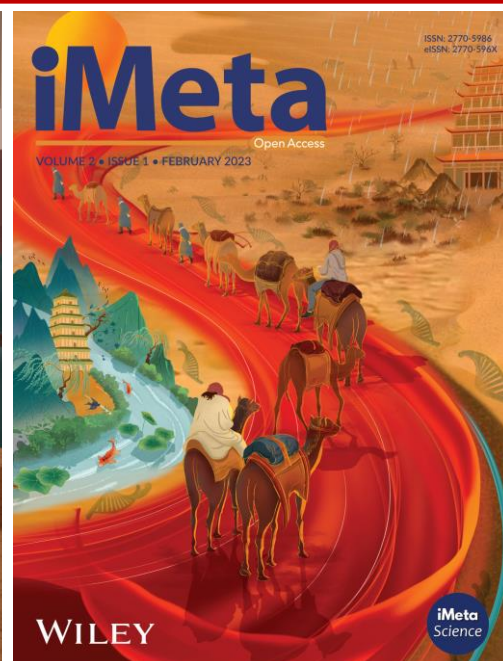


总结



- 物种特异性脂质代谢差异与肠道绒毛发育相关；
- 油酰乙醇胺通过PPAR α -氧化磷酸化信号轴调控肠道干细胞活性及绒毛尺寸；
- 膳食补充N-酰基乙醇胺可作为潜在的饲料添加剂，增加肠道绒毛尺寸与养分消化率。

Qianqian Wang, Lanmei Yin, Zhaobin Wang, Jun Li, Xianglin Zeng, Qiye Wang, Jianzhong Li, et al. 2026.
Oleoylethanolamide regulates intestinal stem cell activity and villus size via PPAR α signaling pathway.
iMetaOmics 3: e70078. <https://doi.org/10.1002/imo2.70078>



iMeta(宏)期刊是由宏科学、千名华人科学家和威立共同出版，对标**Cell**的生物/医学类综合期刊，主编刘双江和傅静远教授，欢迎高影响力的研究、方法和综述投稿，重点关注生物技术、大数据和组学等前沿交叉学科。已被**SCIE**、**PubMed**等收录，最新IF 33.2，位列全球SCI期刊第65位(前千分之三)，中国第5位，微生物学研究类全球第一，中科院生物学双1区Top。外审平均21天，投稿至发表中位数87天。

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