



# Tolerable upper intake level of iron damages the intestine and alters the intestinal flora in weaned piglets

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## Introduction

- Iron is one of the essential trace elements in animal life activities and plays essential functions in animal growth, such as oxygen transport, energy metabolism, and enzyme synthesis.
- NRC has set recommended nutrient intake (RNI) and tolerable upper intake levels (UL).
- The purpose of this study was to investigate the potential harm of UL iron to the gut and microbes of weaned piglets.

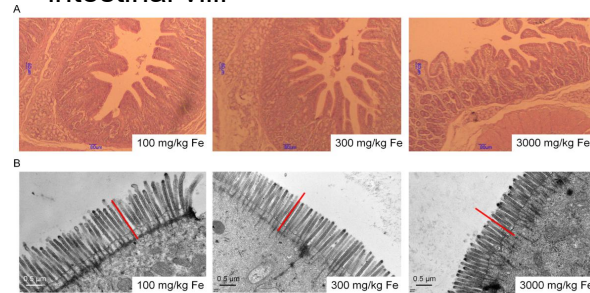
## Materials and Methods

- Animal Experimental Design: Thirty 23-day old weaned piglets assigned to three dietary treatments: a basal diet supplemented with 100 (RNI), 300, or 3000 (UL) mg FeSO<sub>4</sub>/kg diet for 28 days.
- Duodenal and cell morphology analysis
- Evaluation of ROS in duodenal mucosa
- WB detection of iron metabolism proteins
- ELISA detection of tight junction protein
- Commercial kit for detecting oxidative stress
- DNA extraction and 16S rRNA gene sequencing

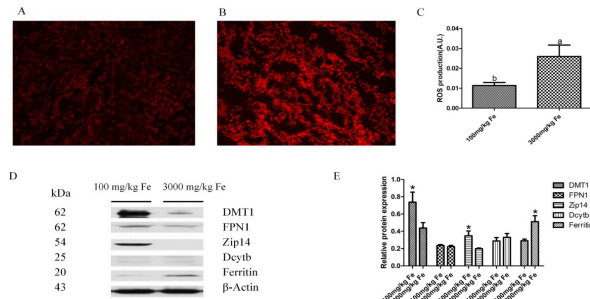


## Results

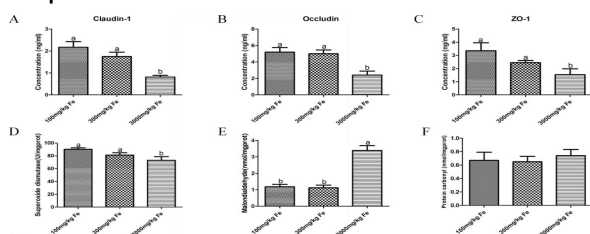
- UL iron reduced the height of piglet intestinal villi



- UL iron induced ROS and affected iron metabolism

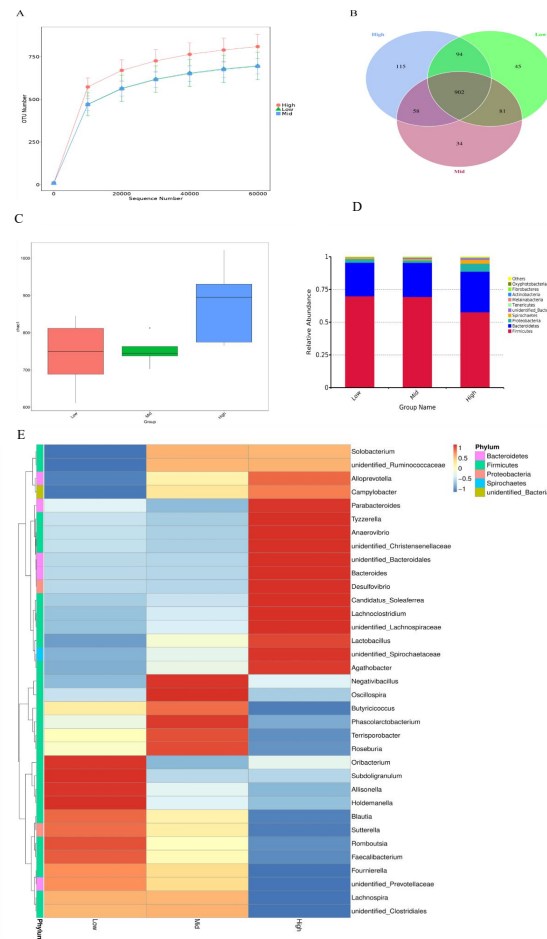


- UL iron damaged tight junction and produced oxidative stress

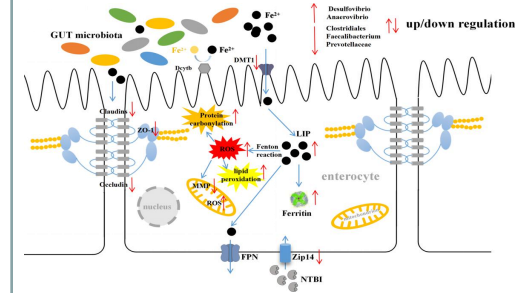


## Results

- UL iron changed cecum microflora and posed a potential threat to piglets



## Conclusion



UL iron caused damage to the intestinal villi, damaged the intestinal barrier, reduced iron absorption, induced oxidative stress, appeared histopathological changes, and modified the intestinal microbial structure in weaned piglets

## Acknowledgement

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