

# Phosphate Metabolism and Multi-Organ Interactions

Food Science and Human Nutrition

Naoko Oda, Assistant professor  
(Department of Food Science and Human Nutrition)



E-mail [naoko.oda@setsunan.ac.jp](mailto:naoko.oda@setsunan.ac.jp)

**Key words** gut microbiome, skeletal muscle, phosphate management

## Research topics

### Backgrounds

- The widespread use of phosphate-containing compounds in processed foods as food additives and the ever-increasing demand for processed foods have made excessive phosphate intake a problem in Japan. Excessive phosphate intake has been shown to affect renal function, bone metabolism, and cardiovascular system.
- However, its effects on the gastrointestinal tract and skeletal muscles are still unknown. In this study, we examined the effects of excessive phosphate intake on gut microbiome and skeletal muscle, with the aim of developing new nutritional therapies and disease prevention methods focused on phosphate management.

### Purpose

- We examined the effects of excessive intake of phosphate on gut microbiome and skeletal muscles in mice.

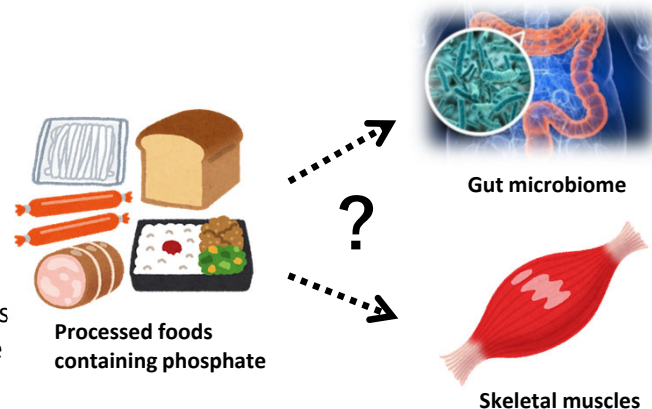
### Major achievements

- Compared with CP diet group, HP diet group significantly decreased in body weight and epididymal fat weight, skeletal muscles.
- It is significant increases in *Erysipelotrichaceae* genus and decreases in *Clostridia* genus were observed in HP diet group, and NGS analysis showed the decrease in bacterial diversity in HP diet group.
- HP diet group decreased colonic tight junction marker mRNA levels.

## Prospects of collaboration

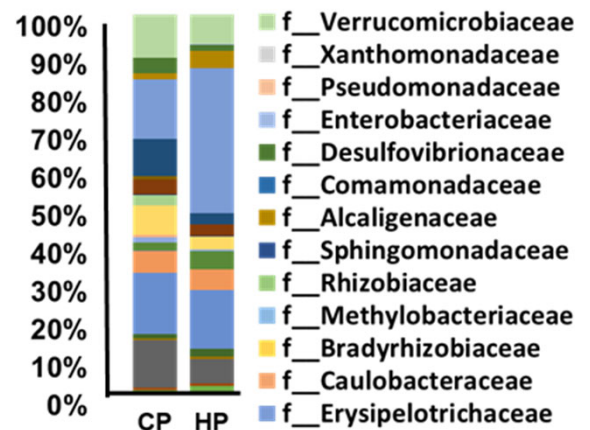
### 【Collaboration with preventive medicine】

Since excessive phosphate intake affects the gut microbiome and skeletal muscles, it is expected to help prevent gastrointestinal tract diseases and sarcopenia. In addition, we believe that this product can contribute to the establishment of new evidence for nutritional therapy for chronic kidney disease and other diseases for which phosphorus intake has been restricted.



### Research Concept

Examination of the effects of excessive phosphate intake on the gut microbiome and skeletal muscles in mice.



### Effects of dietary Pi on gut microbial composition.

C57BL/6J mice fed 0.4% Pi (CP) or 1.2% Pi (HP) diet for 8 weeks. Relative abundance microbial on the basis of the average number of subfamily at class (n = 5).



## Selling point

By studying the effects of excessive phosphate intake on various organs, we expect to contribute to the establishment of new nutritional therapies and preventive medicine in the future.