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# An enriched fiber and polyphenol diet modules gut microbiota composition in healthy rats.

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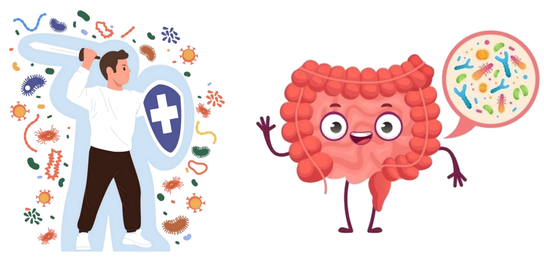
## INTRODUCTION

The **exposome** encompasses all the elements to which an individual is exposed throughout their life. These include lifestyle, social environment and, the focus of this study, the **diet.**

**Fiber**

Gut-health
Anti-inflammatory
Immune-boosting



**Polyphenols**

Antioxidant
Anti-inflammatory
Gut-protective

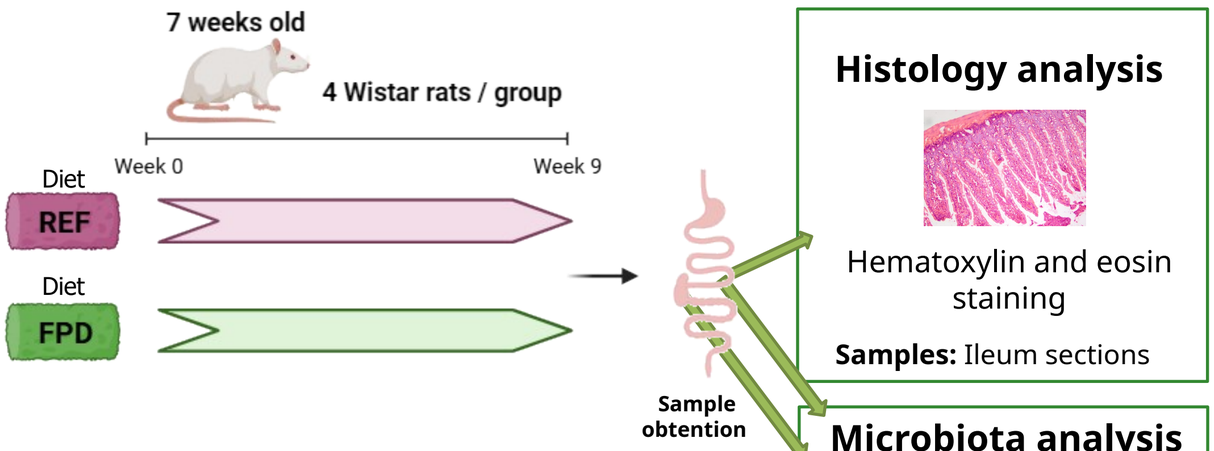
**Beneficial improvements in the immune system and gut microbiota**

**The Mediterranean diet (MD)** is rich in bioactive components such as **fiber and polyphenols**. Some of these components have shown their ability to modulate the immune system and microbiota composition (1,2).

## OBJECTIVE

The aim of this study was to examine the effects of a polyphenol- and fiber-rich diet on the **intestinal barrier** and **gut microbiota.**

## MATERIAL AND METHODS




**Control diet (REF):** derived from the AIN-93G diet.

**Experimental Diet (FPD)**
A diet enriched with fiber and flavonoids, adapted from the AIN-93G diet, includes flavonoid compounds such as catechin, epicatechin, hesperidin, naringenin, and quercetin, alongside dietary fibers like inulin and pectin.

## REFERENCES

1. Pérez-Cano, F. J. & Castell, M (2016). Flavonoids, Inflammation and Immune System. Nutrients.
2. Del Chierico, F.; Vernocchi, P.; Dallapiccola, B.; Putignani, L. Mediterranean Diet and Health: Food Effects on Gut Microbiota and Disease Control. Int. J. Mol. Sci. 2014, 15, 11678-11699.

## ACKNOWLEDGEMENTS

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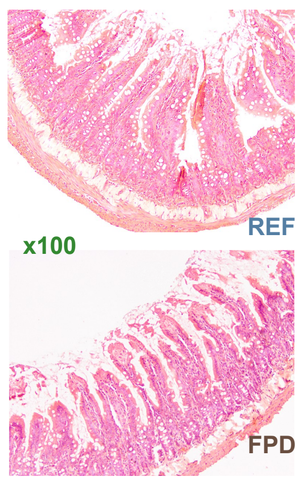
## RESULTS & DISCUSSION

### HISTOLOGY



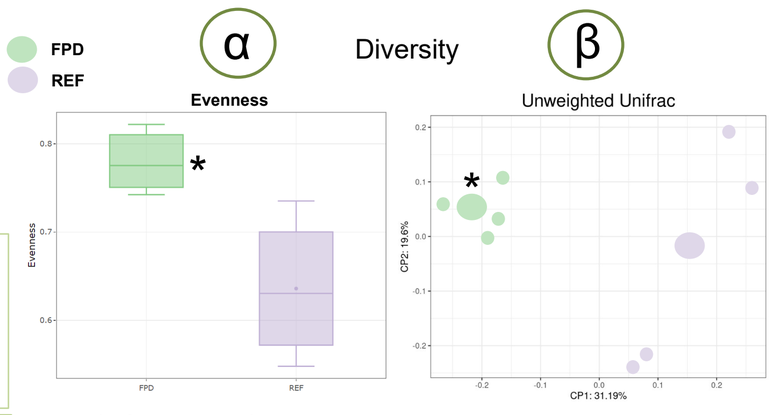

| | REF | FPD | *p*-value |
|---|---|---|---|
| **Length (µm)** | 220.29 ± 25.04 | 220.98 ± 15.22 | 0.981 |
| **Width (µm)** | 61.41 ± 6.67 | 50.58 ± 3.70 | 0.245 |
| **Area (µm²)** | 13981.84 ± 3077.64 | 11008.9 ± 482.96 | 0.433 |
| **Crypt depth (µm)** | 80.33 ± 1.95 | 87.75 ± 5.41 | 0.314 |
| **Villi height/crypt depth ratio** | 2.73 ± 0.24 | 2.53 ± 0.16 | 0.536 |

No statistical differences were found at the histological level in the ileum section.

### MICROBIOTA

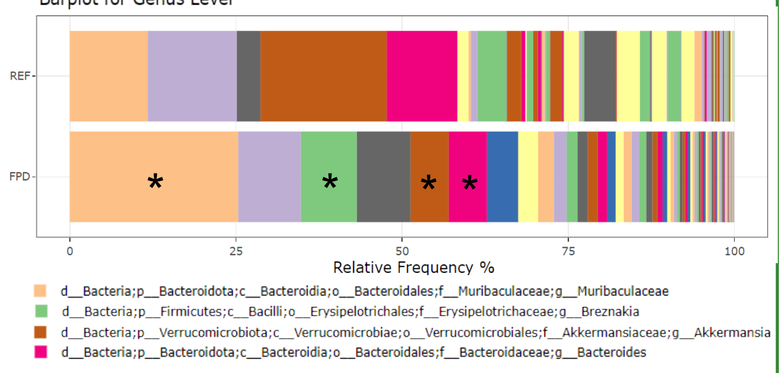
**Caecal content**

The experimental diet modified ceacal microbiota, showing significant differences in both Alpha and Beta diversity.




The FPD diet had the ability to **positively** regulate host health such as *g_Muribaculaceae and Breznakia.*

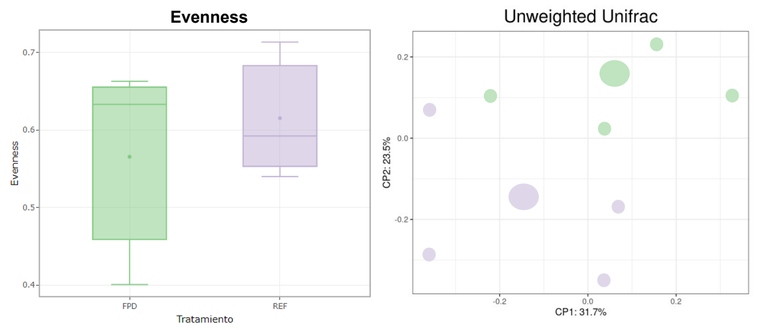
Other genera, such as *Akkermansia* or *Bacteroides,* decreased due to the experimental diet.




*= *p- value* ≤ 0.05

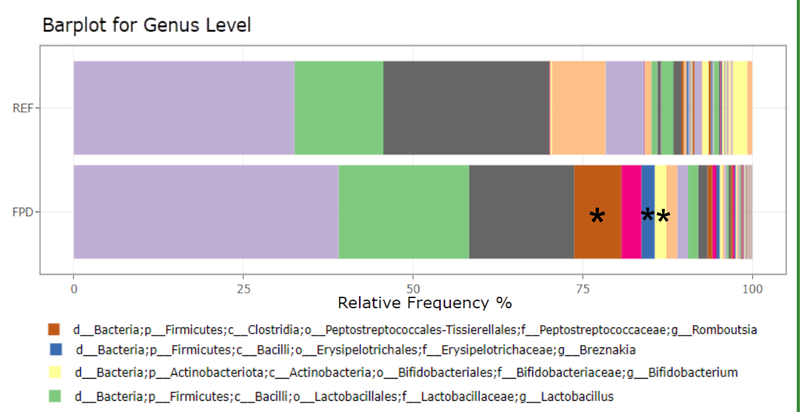
**Small intestinal content**

Either Alpha or Beta diversity was not modified by the diet.




The microbiota of the animals that consumed the FPD diet showed an increase in the *Romboutsia, Breznakia* and *Bifidobacterium* genera proportion.

Other genus such as *Lactobacillus* showed a positive tendency toward a healthier microbiota due to the experimental diet.




## CONCLUSION

While a **fiber- and polyphenol-enriched diet** does **not alter the structure** of the small intestine, it **beneficially modulates the composition** of the gut microbiota. Future research will focus on the function of the intestinal microbiota and its implications for health.