

UC Davis

Ophthalmology and Vision Science

Title

Impact of Diet and Gut Microbiome on Nonhuman Primate Models of Age-Related Macular Degeneration

Permalink

<https://escholarship.org/uc/item/6bm0009h>

Authors

Siegman, Aaron

Jin, Yanshan

Zivkovic, Angela

et al.

Publication Date

2025-03-05

Data Availability

The data associated with this publication are not available for this reason: n/a

Introduction

- Age-related macular degeneration (AMD) is the leading cause of vision loss in older adults of developed countries.
- AMD pathology is impacted by diet. High fat diet exacerbates AMD-like pathologies in rodent models.
- Gut microbiome dysbiosis could influence retinal inflammation and metabolism, contributing to AMD development and progression.
- However, the relationship of AMD pathology/dietary intervention and gut microbiome remain understudied.

Study Subject:

- Rhesus macaques
- Age range 17 – 27 yrs

Study Groups:

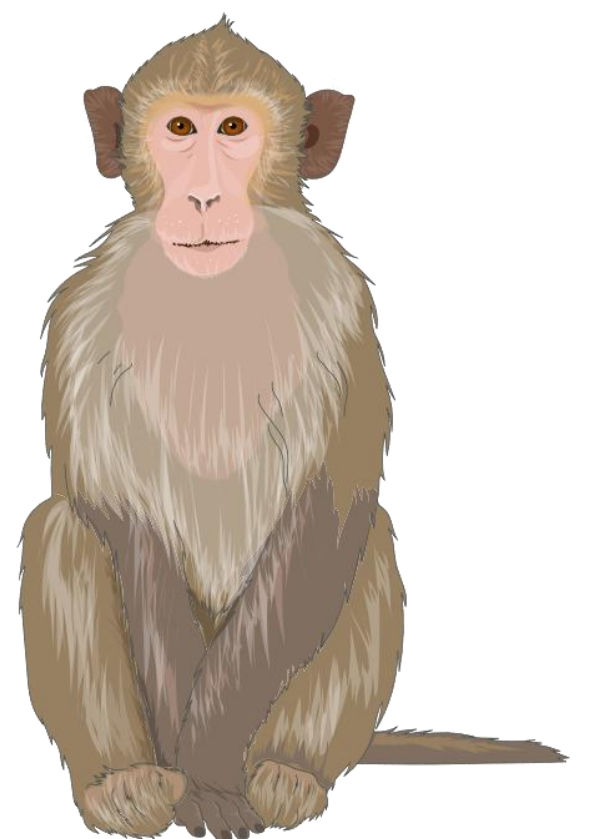
- Normal phenotype on control diet (n = 7)
- Punctate lesions on control diet (n = 8)
- Drusen on control diet (n = 8)
- Drusen on high-fat/sugar diet (HFSD) (n = 7)

Study Duration:

- 2 yrs (6-mon interval eye examinations)

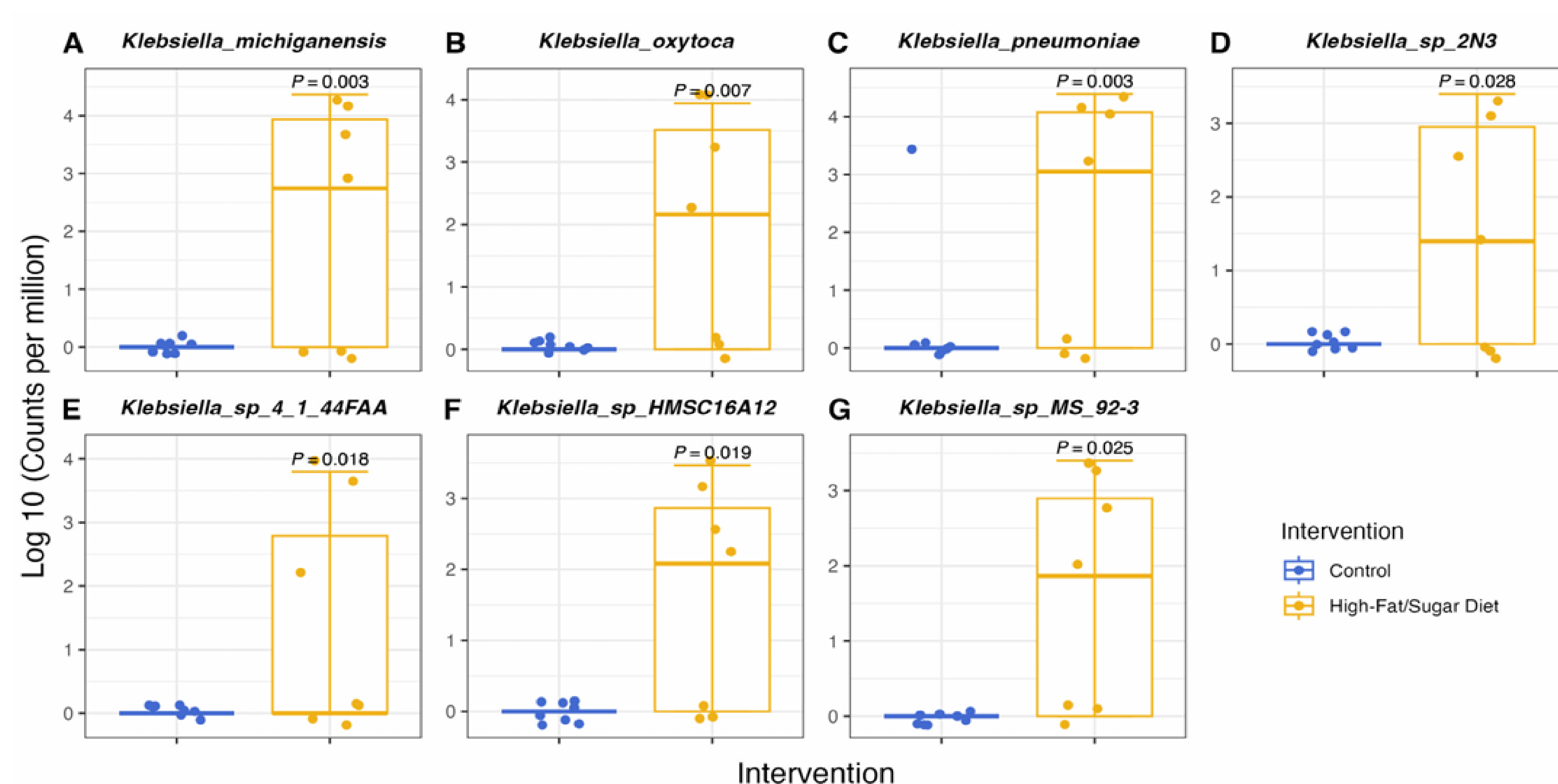
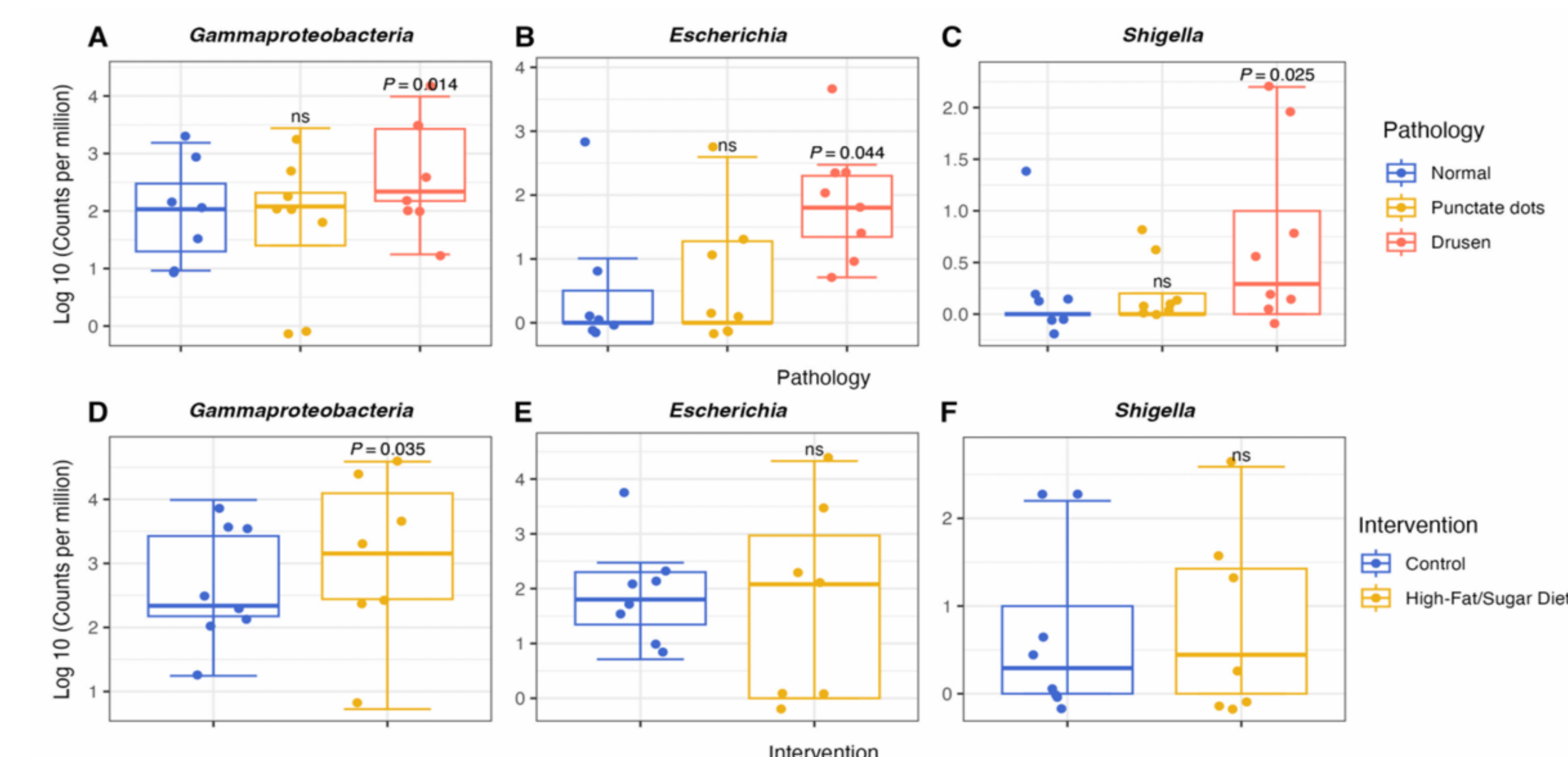
Study Diet:

- Control diet: High protein monkey diet jumbo (LabDiet 5047)
- HFSD: New world primate diet (LabDiet 5040) supplemented with 15% fructose

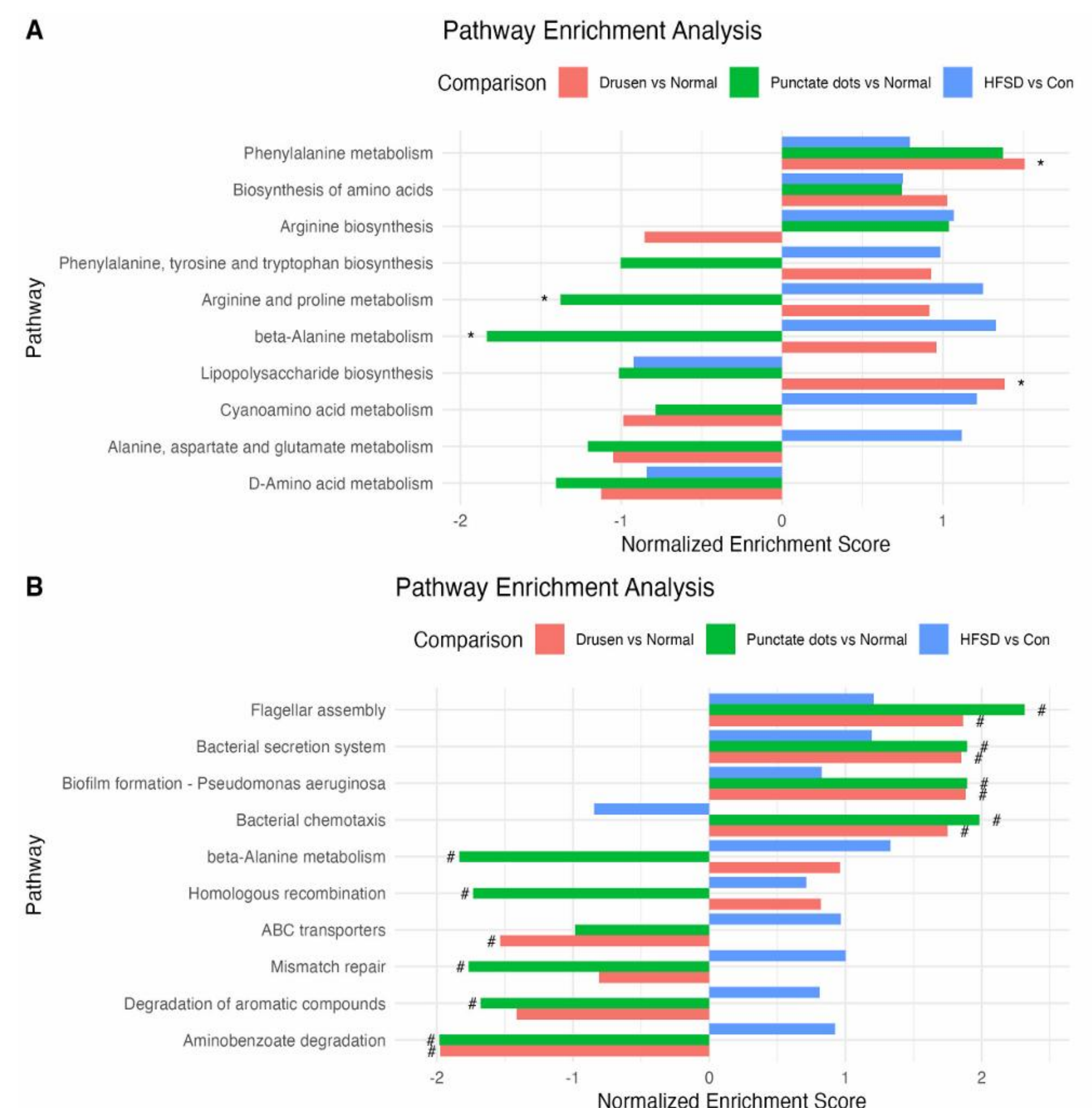


Results

Increased Pro-inflammatory Bacteria in Drusen-affected Rhesus Macaques.



Altered Pathways in Punctate dots and Drusen-affected Rhesus Macaques.



Conclusion

- Increased pro-inflammatory bacteria abundance in Drusen-affected and HFSD feed animals;
- Increased abundance of E. coli and S. dysenteriae in Drusen-affected animals;
- Klebsiella might be a potential therapeutic target for dietary intervention;
- Upregulated pathogen adaptation pathways and lipopolysaccharide biosynthesis pathways in Drusen-affected animals