

Effects of three-times daily diet soda consumption for one week on gut microbiome composition in healthy young adults



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OBJECTIVE AND HYPOTHESIS

Objective: To study effects of repeated low-calorie sweetener (LCS) exposure on gut microbiome composition in healthy, young participants

Hypothesis: Participants randomized to diet soda would have lower microbial diversity following consumption of diet soda, while microbial composition in the control group would be similar before and after intervention.



BACKGROUND

- LCS are used to sweeten foods and beverages without calories
 - Examples: sucralose (Splenda™), aspartame (Equal™), saccharin (Sweet'N Low™).
- Consumption is common but has been linked to metabolic abnormalities
 - May influence metabolic risk via alteration of gut microbiota.
- Suez et al. demonstrated mice exposed to saccharin developed glucose intolerance via LCS-mediated alterations of the intestinal microbiota (see below).

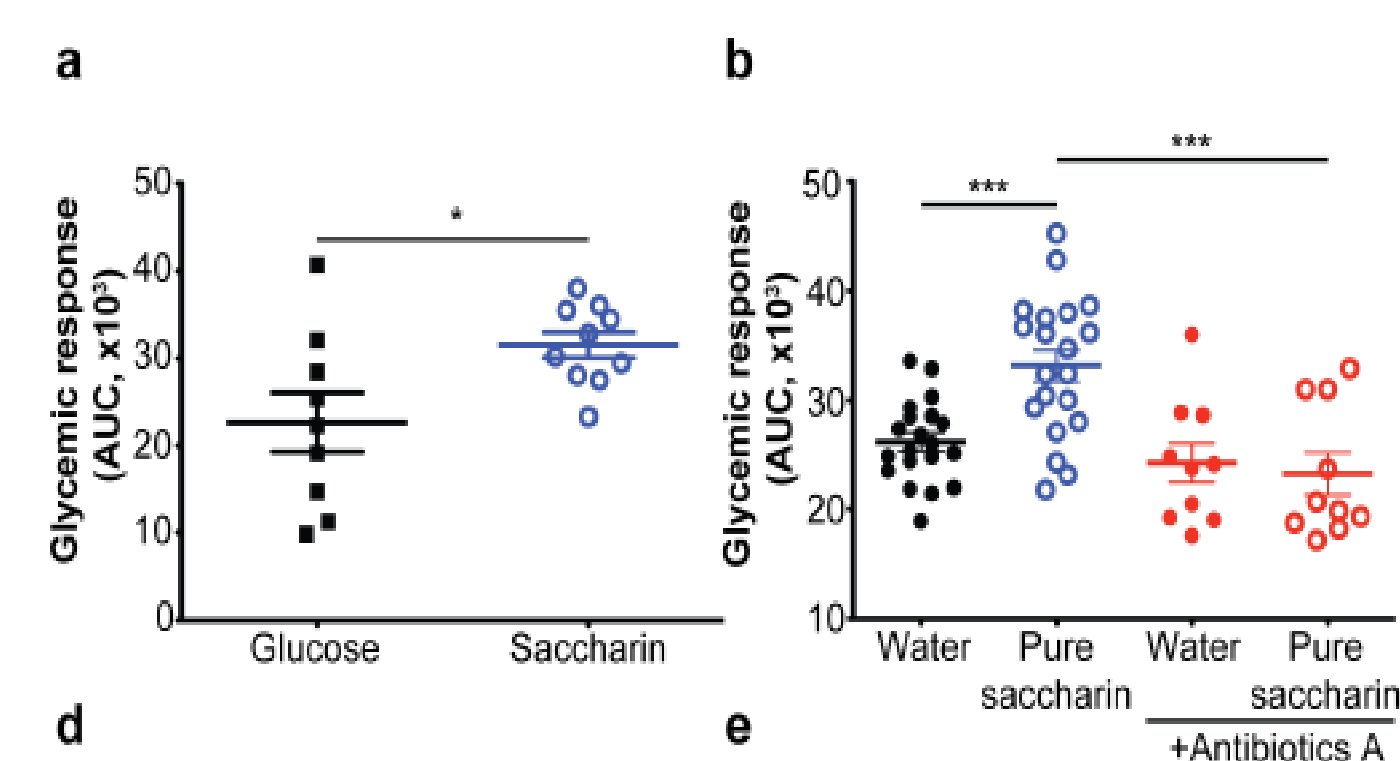
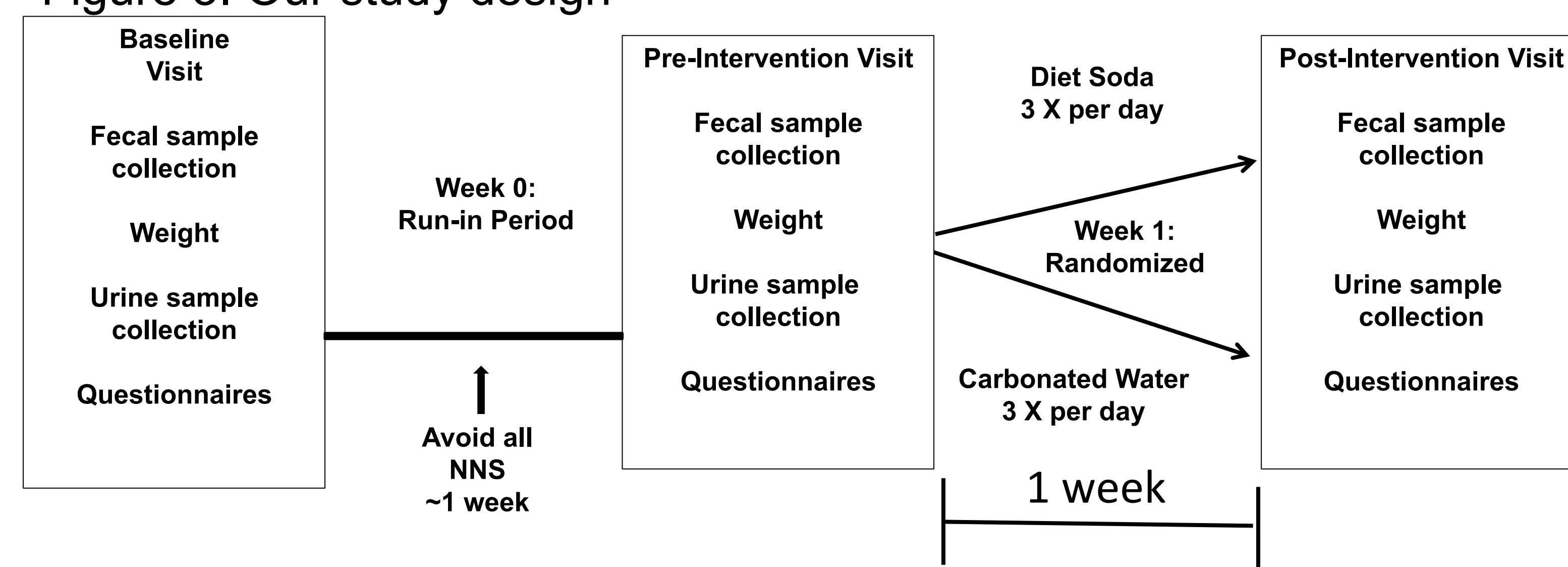


Figure 1. Mice fed high fat diet supplemented with saccharin (for 11 weeks) developed glucose intolerance

METHODS

Figure 3. Our study design



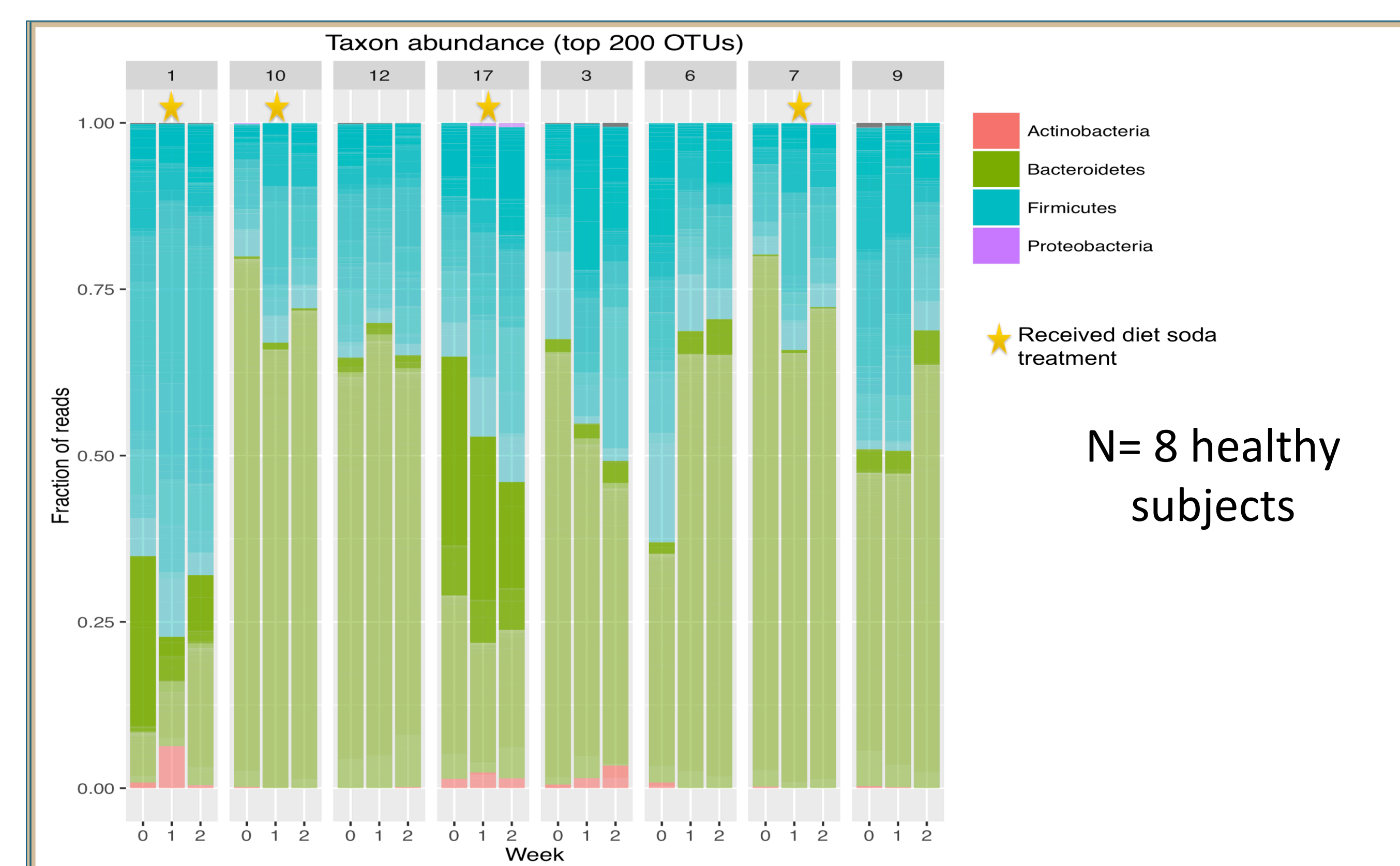
RESULTS

Table 1: Participant characteristics

	Diet Soda (n=11)	Carbonated Water (n=9)
Age (years)	21.9 ± 3.2	21.5 ± 2.7
Gender		
Male (%)	45%	33%
Female (%)	55%	67%
Race/Ethnicity		
Non-Hispanic White	45%	56%
Non-Hispanic Black	9%	11%
Other	46%	33%
Height (cm)	168.2 ± 7.8	171.4 ± 8.5
Weight (kg)	66.8 ± 12.8	75.7 ± 20.8
Body Mass Index (kg/m²)	23.5 ± 3.2	27.5 ± 9.5
Waist circumference (cm)	77.6 ± 9.3	78.9 ± 21.7
Physically Active (%)	72.7 %	77.8%

No statistically significant differences between the groups.

Figure 3. Changes in taxon abundance at baseline, pre-intervention, and post-intervention in 8 participants



Diet soda consumers showed an increase in Bacteroidetes and a relative decrease in Firmicutes and Actinobacteria following exposure (Week 2) compared to before the intervention (Week 1).

RESULTS (cont'd)

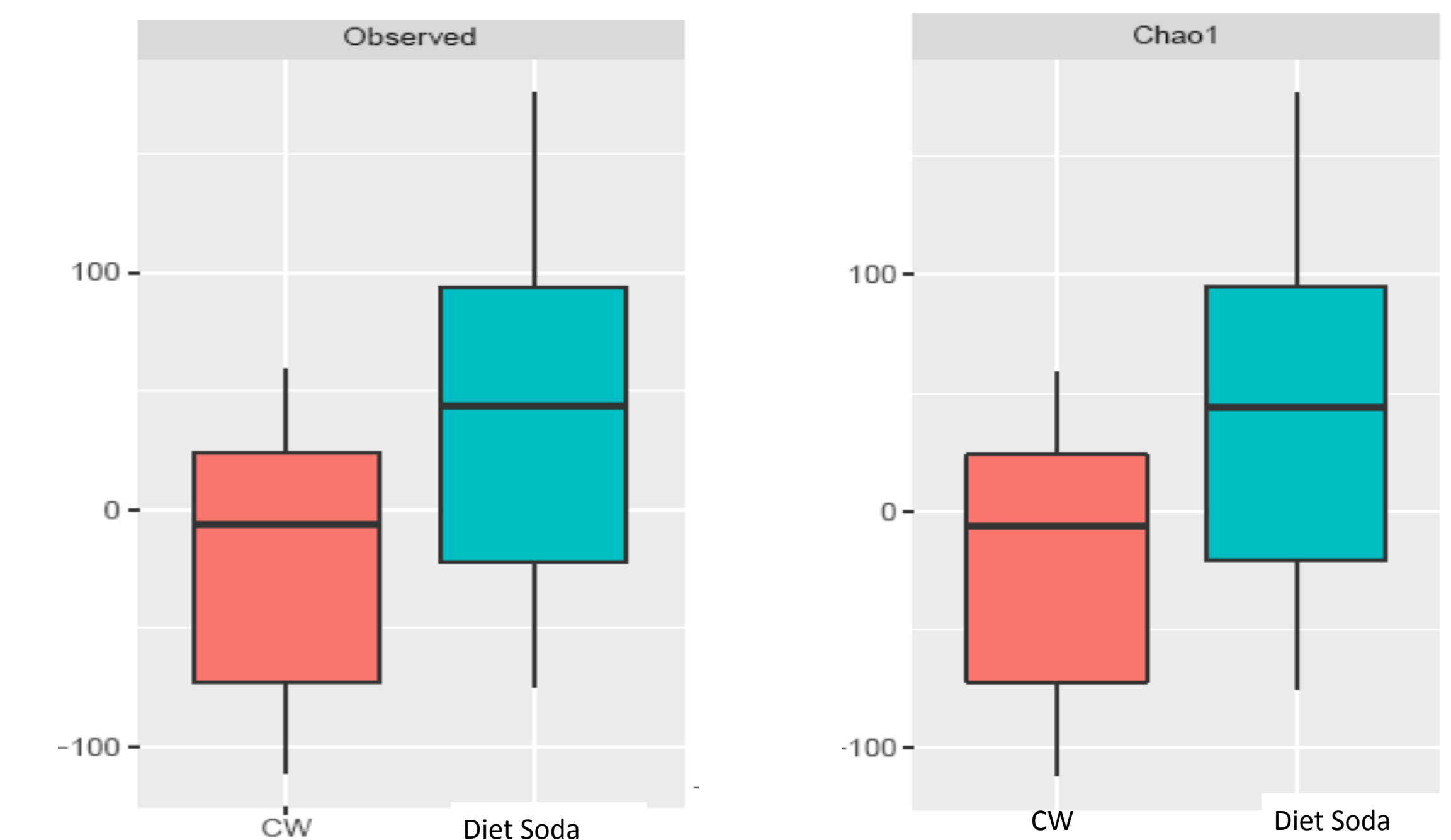


Figure 4. Preliminary data suggest that species diversity may be higher following diet soda exposure compared to carbonated water control.

CONCLUSIONS

- Suez et al., reported an increased in Bacteroidetes following saccharin exposure, consistent with our data following diet soda
- Contrary to our hypothesis, our data suggest that microbial diversity increases following LCS
 - Whether this is clinically relevant is not clear
 - Higher diversity is typically linked to improved health
- Larger sample sizes and longer-term studies are needed to confirm these findings and to determine role of LCS in health

REFERENCES

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