

### Introduction

- The human gut microbiome is an essential determinant of human health.
- *Bifidobacterium* decline is associated with inflammatory bowel disease, obesity, neurological disorders, *C. difficile* infection and severe COVID-19 (1-3).
- Long-term effect of messenger RNA vaccines for SARS-CoV-2 on the human gut microbiome is unknown.
- The purpose of this study was to explore longitudinal changes in the Relative Abundance of *Bifidobacterium* after mRNA SARS-CoV-2 vaccination.

### Methods

We longitudinally recorded the Relative Abundance of *Bifidobacterium* in four subjects before receiving a mRNA vaccine (Pfizer or Moderna) for SARS-CoV-2, approximately one post-vaccination, as well as 6-9 months post-vaccination. Additional SARS-CoV-2 vaccines were given during that period, totaling 2 to 3 doses. Samples were collected at the time points mentioned. No dietary changes or new medications were introduced throughout the study period. Metagenomic next generation sequencing-based methods were applied to samples obtained from fecal collection. DNA was extracted, and the library prepped, enriched and sequenced on an Illumina Nextseq 550 system. This study was IRB approved.

### Results

Subject	Change in Relative Abundance of <i>Bifidobacterium</i> (% of pre-vaccine level)	
	1 month post-vaccine	6-9 months post-vaccine
1	38%	15%
2	258%	0%
3	49%	35%
4	90%	60%

### Discussion

- At 1 month post-vaccination, 3 of 4 subjects experienced a decrease in Relative Abundance of *Bifidobacterium* below pre-vaccination levels.
- At 6-9 months post-vaccination, all subjects experienced a decrease in Relative Abundance of *Bifidobacterium* below pre-vaccination levels.
- No subjects exhibited significant post-vaccine complications.
- The lasting decrease in *Bifidobacterium* levels may contribute to SARS-CoV-2 infection post vaccination.
- Gut dysbiosis after mRNA SARS-CoV-2 vaccination may be a future indication for restoration of *Bifidobacterium* via oral or fecal transplant routes.

#### References

1. Ruiz L, et al. *Front Microbiol.* 2017;8:2345.
2. Suganya K, Koo BS. *Int J Mol Sci.* 2020;21(20):7551.
3. Hazan S, et al. *BMJ Open Gastro.* 2022;9(1):e000871.

Table 1. Change in Relative Abundance of *Bifidobacterium* after SARS-CoV-2 mRNA vaccination.

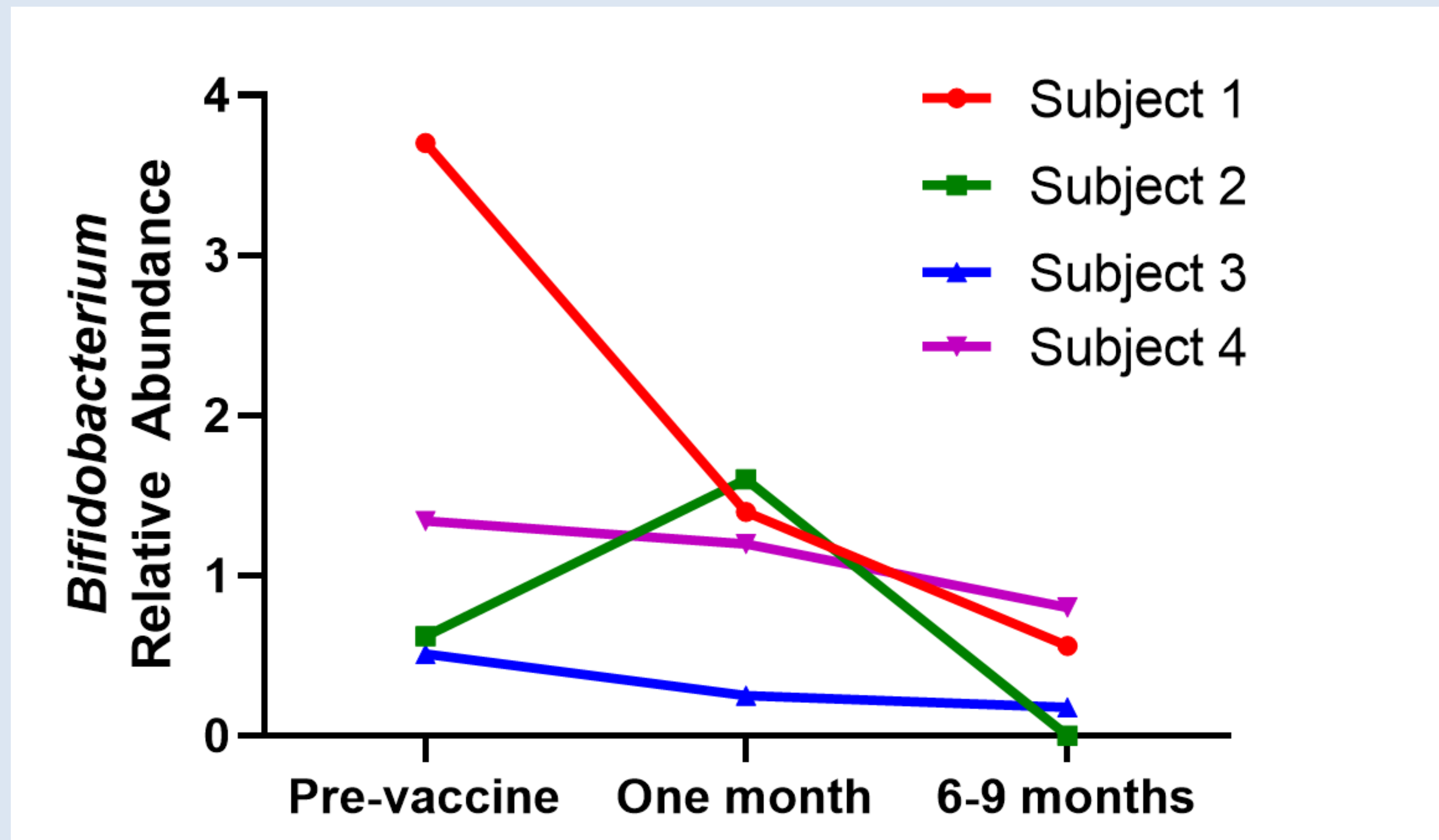


Figure 1. Decline in Relative Abundance of *Bifidobacterium* after SARS-CoV-2 mRNA vaccination.