Causal Discovery on Gut Microbial Data for Disease Risk Prediction

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Background

- Association vs. Causation
- **Causal Discovery Algorithms in Gut Microbiome Studies** Previous research has explored causal discovery in gut microbiome studies, notably using algorithms like PC-stable to construct causal networks
  and implement do-calculus for estimating microbe-microbe and microbe-outcome causal effects. More recent advancements include CD-NOD,
  specifically designed for heterogeneous data, which is particularly valuable for gut microbiome research where samples often come from different studies.
  These algorithms aim to identify true causal relationships by performing conditional independence tests and orienting edges using established rules, while accounting for the unique challenges of microbiome data analysis.

Research Questions

1. **microbe-microbe** How do the microbe-microbe interaction networks between the healthy and diseased participants differ?
2. **microbe-disease** What microbes have a causal relationship to disease status?
3. **prediction** Is it possible to predict disease status with the current composition of the dataset given causal representation learning techniques?
   How do they differ with the microbes learned in question 2?

Data Collection

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Methods

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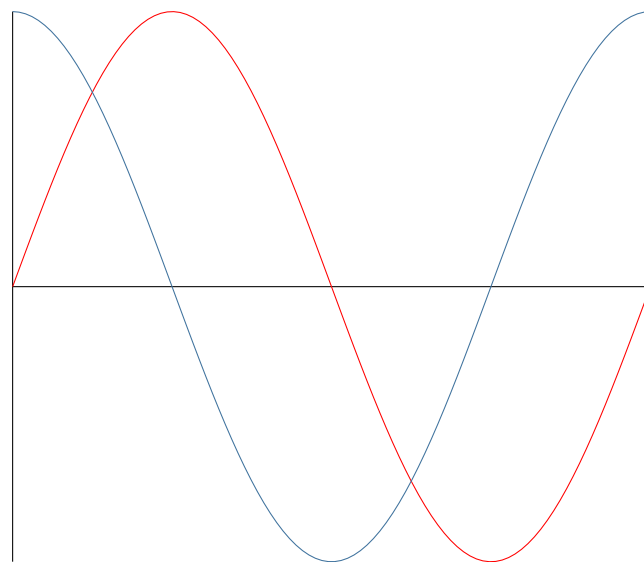

Figure 1. Another figure caption.

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Results

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Conclusion/Future Work

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Foo	13.37	384,394	α
Bar	2.17	1,392	β
Baz	3.14	83,742	δ
Qux	7.59	974	γ

Table 1. A table caption.

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References