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### Do Lactic Acid Bacteria in fermented foods persist in the gastrointestinal tract: an in vitro investigation

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# Do Lactic Acid Bacteria in fermented foods persist in the gastrointestinal tract: an *in vitro* investigation

## BACKGROUND

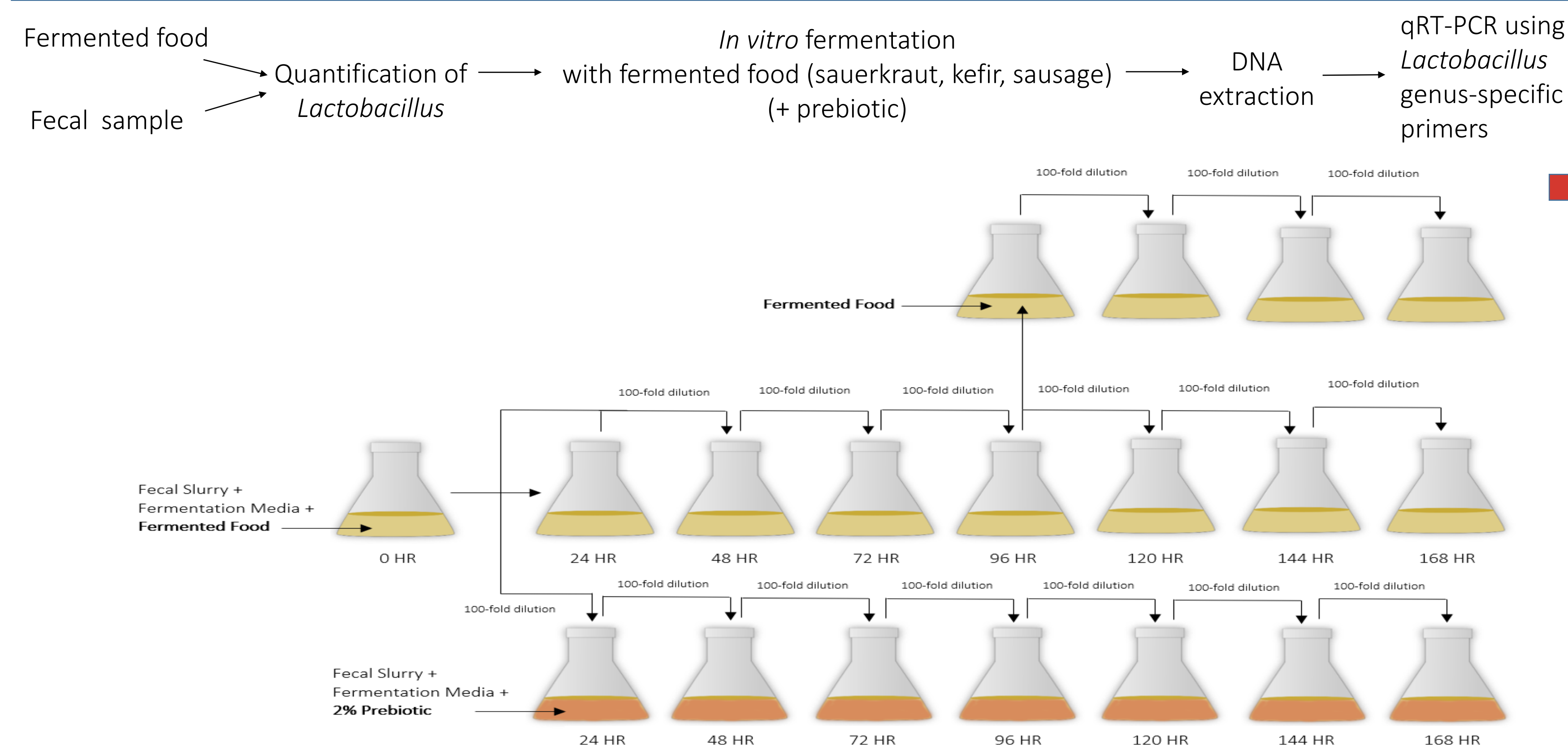
It is now well established that the composition of the gastrointestinal (GI) microbiota has a profound influence on intestinal and overall health. Many contemporary diseases such as type two diabetes, IBS and obesity are associated with a dysbiotic microbiota. Therefore, researchers are interested in how diet and specific dietary components can modulate the gastrointestinal microbiota and possibly repair a dysbiotic state. One approach to improve gastrointestinal health is by consuming probiotics and prebiotics or a diet rich in fermented foods containing live microbes. Fermented foods are popular because of their enhanced preservation, safety, organoleptic, functionality, and nutritional properties. These fermented foods can also contain live microorganisms that may play a role in improving gastrointestinal health. One of the challenges, however, is that the GI environment is very stable and resistant to change. This is mainly due to barriers along the GI tract (pH, bile, enzymes). Persistence of allochthonous microorganisms within the GI tract is also limited by host response such as absence of ecological niches and colonization resistance. In addition, the microbiota composition varies in every individual, making it difficult to formulate a single therapeutic solution. It may be possible to overcome these barriers and regulate a dysbiotic system through a diet rich in fermented foods and supplemented with prebiotics.

## GOALS & HYPOTHESIS

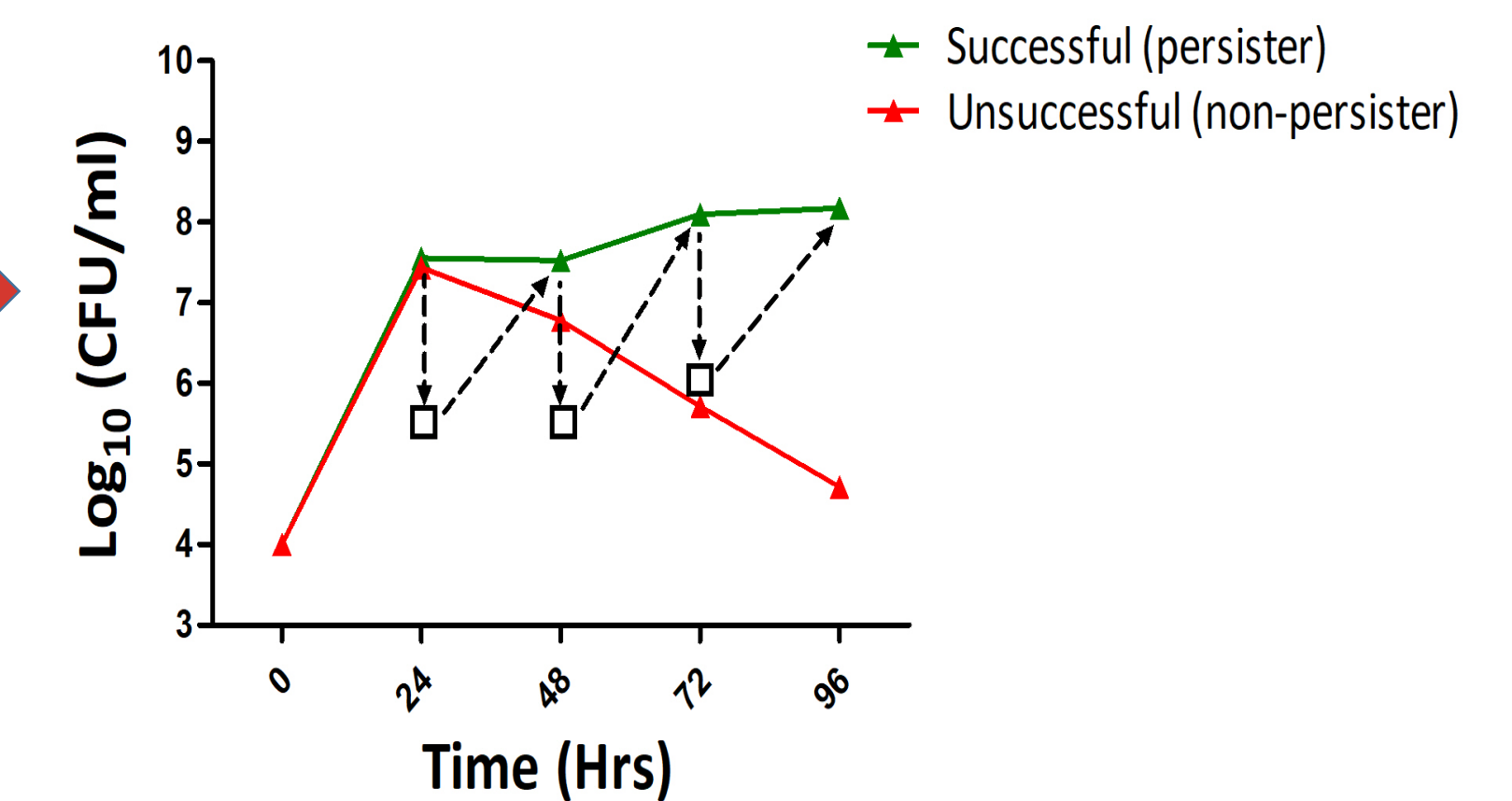
- Our primary goal of this study was to examine whether lactic acid bacteria that are present in fermented foods can persist in a simulated gastrointestinal environment.
  - To do this, we specifically focused on *Lactobacillus* as a proxy for fermented food microbes.
- Our second goal was to examine if this persistence could be altered by the addition of a prebiotic.
- Our tertiary goal was to determine if re inoculation of food microbes would persist in a diminish community.

**We hypothesize that like in humans, these microbes will not persist within the *in vitro* system and will be washed out by the end of the fermentation.**

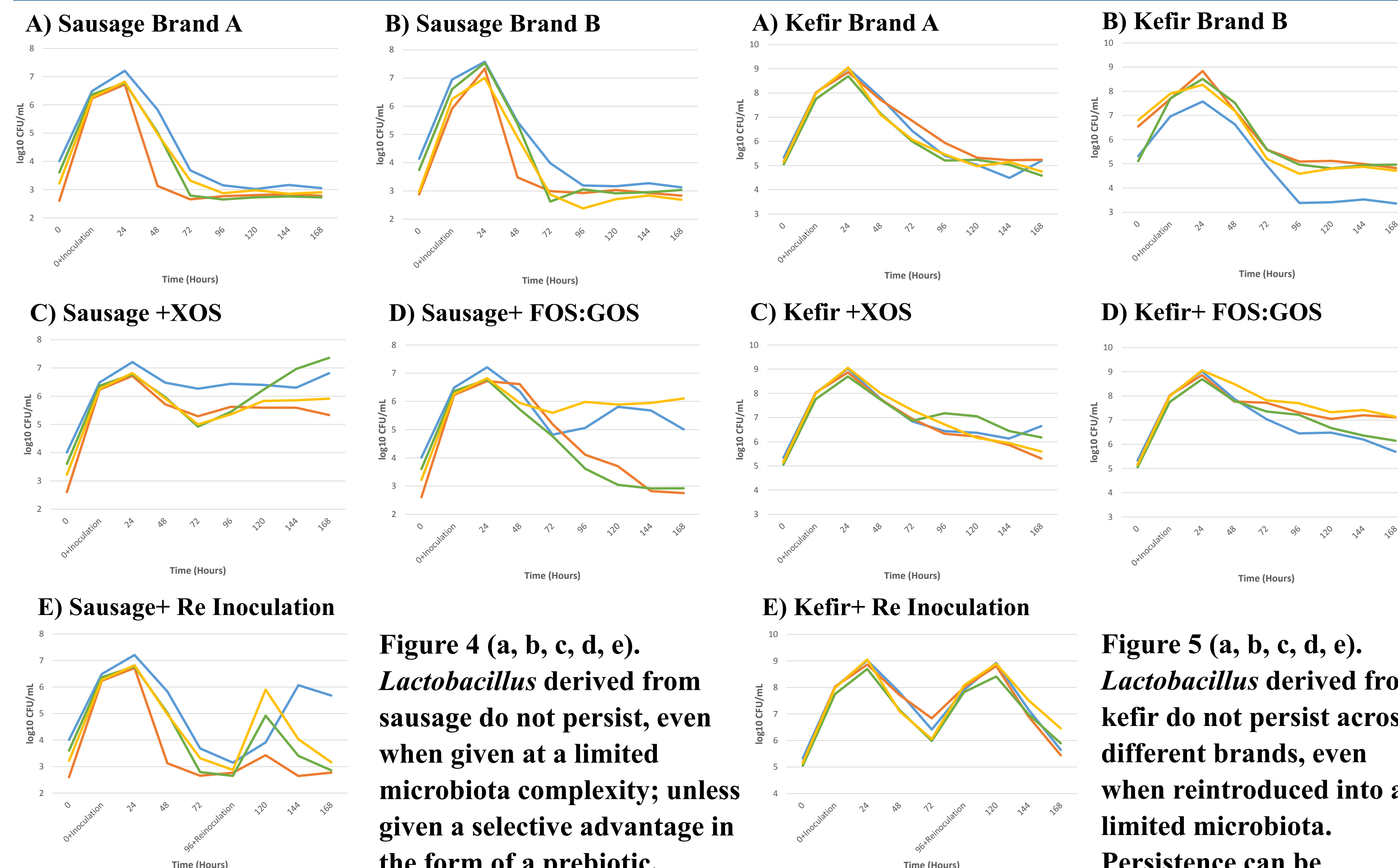
## METHODS



## TWO POSSIBLE OUTCOMES



## RESULTS & DISCUSSION



**Figure 4 (a, b, c, d, e).** *Lactobacillus* derived from sausage do not persist, even when given at a limited microbiota complexity; unless given a selective advantage in the form of a prebiotic.

**Figure 5 (a, b, c, d, e).** *Lactobacillus* derived from kefir do not persist across different brands, even when reintroduced into a limited microbiota. Persistence can be accomplished through the introduction of a prebiotic.

## CONCLUSIONS

- The *in vitro* system is a viable method to analyze persistence.
- We demonstrated that *Lactobacillus* derived from fermented foods were unable to persist in an *in vitro* fecal environment and washed out after the initial 24- hour fermentation period. Re Inoculation of these microbes leads to the same fate.
- The persistence of *Lactobacillus* originating from the fermented food sausage can be increased by supplementation with a prebiotic, XOS, in all 4 samples. Persistence of sausage microbes is dependent on subject when enriched with the prebiotic mixture FOS:GOS.
- The persistence of *Lactobacillus* originating from kefir can be increased by prebiotic enrichment.

## FUTURE WORK

- Isolate and identify specific fermented food and fecal microbes and evaluate them for the persistence in presence of prebiotic.

## ACKNOWLEDGEMENTS

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