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# REPRODUCING ORAL-INTESTINAL COLONIZATION IN A NEW *IN VITRO* MODEL OF THE HUMAN SMALL INTESTINAL MICROBIOME INCREASES ITS PHYSIOLOGICAL RELEVANCE







INRA

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# INTRODUCTION

### Small intestinal microbiota 🥁

Scarce *in vivo* data on the ileal microbiota in both luminal and mucosal environments

#### Human health

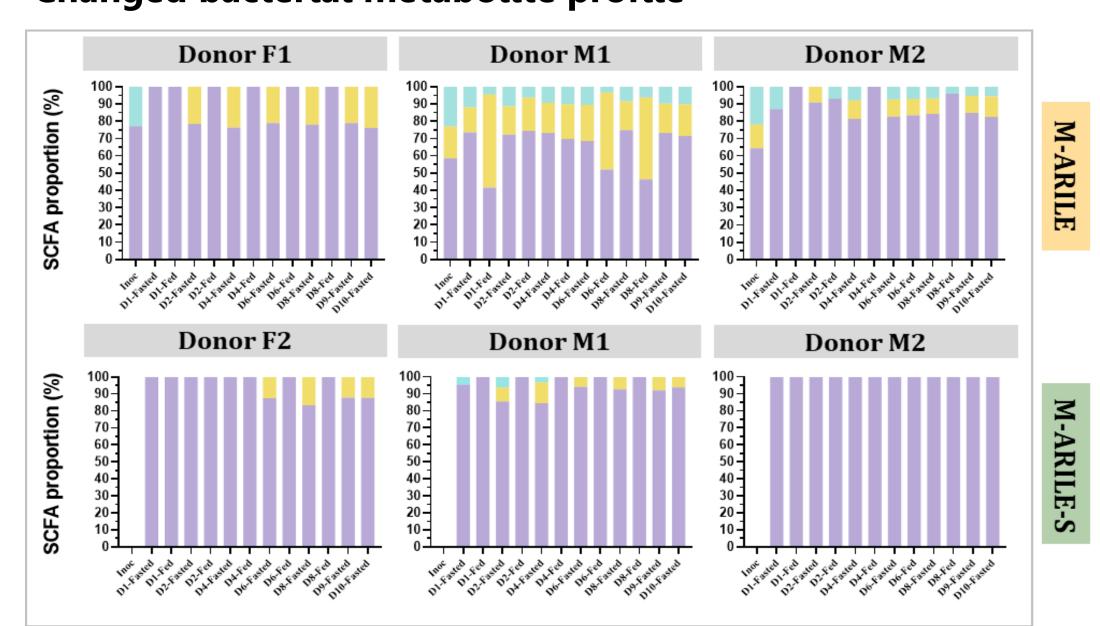
Digestion and nutrient absorption, immune system development, small intestinal diseases, enteroendocrine system, ...



A new *in vitro* model of the healthy human ileum and its associated microbiota, the **Mucosal Artificial Ileum (M-ARILE)** developed and validated with *in vivo* data.

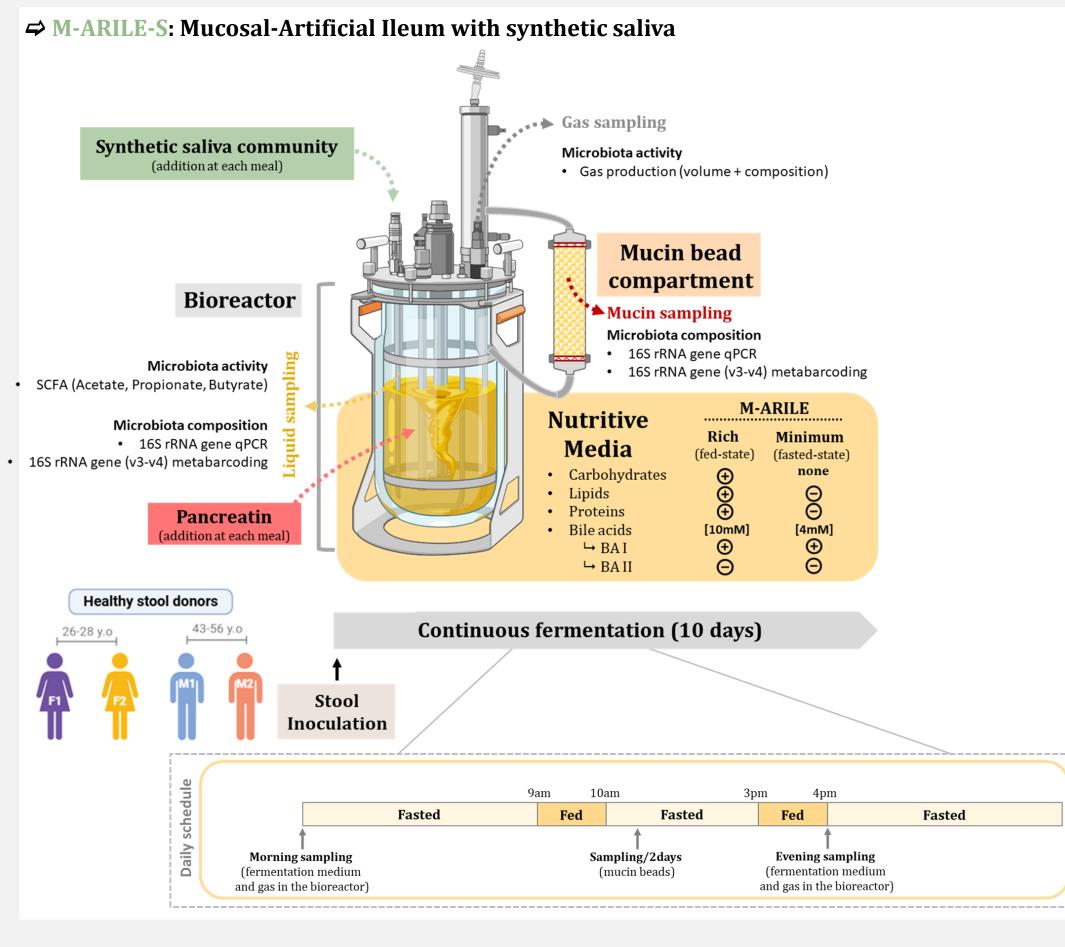
<u>OBJECTIVE</u>: Enhancing the bacterial communities in the newly-developed M-ARILE model with the addition of a synthetic bacterial caliva community

## RESULTS



### Changed bacterial metabolite profile

### **MATERIALS & METHODS**



### **CONCLUSION & PERSPECTIVES**

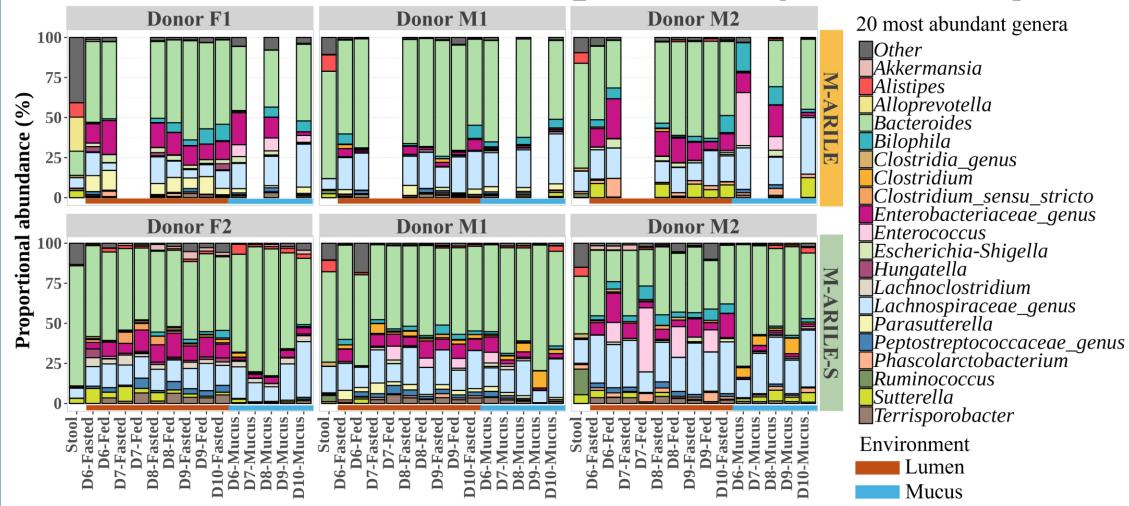
La Région 🗠

Auvergne-Rhône-Alpes

 $\rightarrow$  SCFA composition stable at day 6 (D6) in both experiments, with variations between fasted and fed states for all donors.

→ Overall reduced butyrate and propionate proportions in M-ARILE-S compared to M-ARILE

#### **Microenvironments and feeding status shape community**



→ Synthetic saliva addition in the lumen tends to lower *Bacteroides* and increase *Bacillota* genera (*Clostridium, Enterococcus, Lachnospiraceae...*) abundances, in both fasted and fed states.

#### Increased oral taxa *Fusobacterium* and *Peptostreptococcaceae*

Lumen

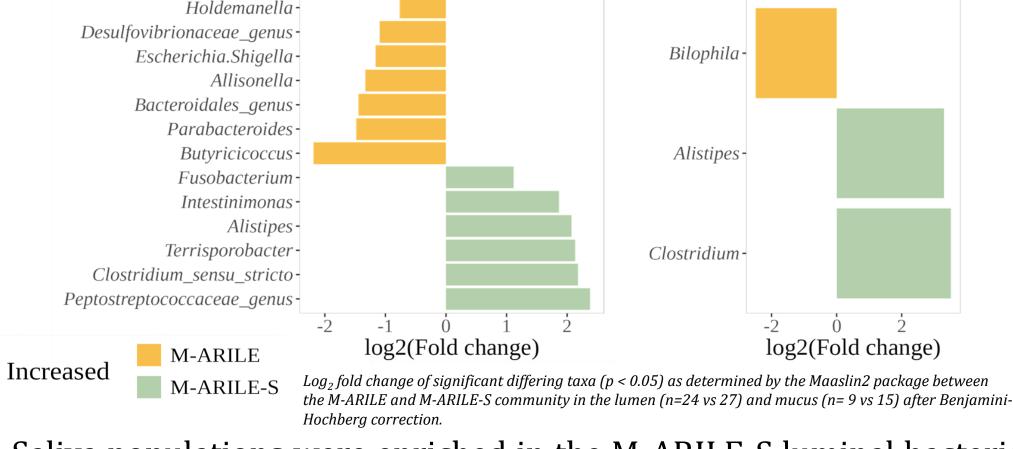
Mucus

- The addition of a synthetic saliva community to the M-ARILE community resulted in:
- → Changed microbial activity with reshaped donor dependent SCFA proportions (lower propionate ad no butyrate).
- → Enhanced bacterial profiles and abundances, in both luminal and mucosal environments in M-ARILE-S with increased oral taxa.

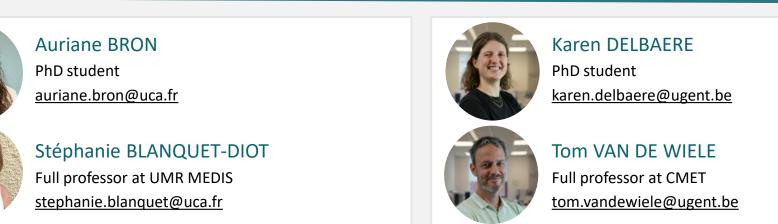
Saliva bacterial community appeared to be an essential factor to better mimic *in vitro* the healthy human ileum and its associated microbiota

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Saliva populations were enriched in the M-ARILE-S luminal bacterial community.





<sup>📕</sup> Acetate 📒 Propionate 📰 Butyrate