

➤ Food and Gut Microbiome modelizations to sustain health

Julien Tap – NutrEvent 2023 Rennes



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➤ Gut microbiome crisis: rise of non-communicable diseases



Healthy state



Resistance



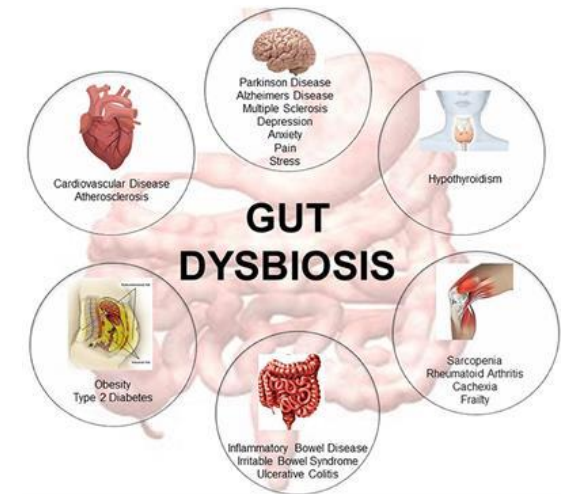
Recovery

Resilience

Healthy state

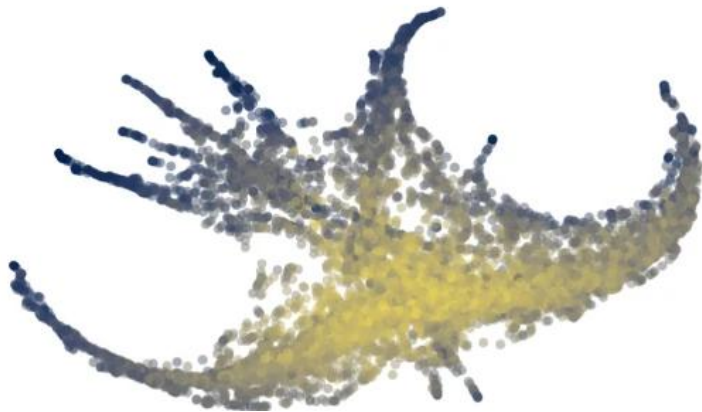


Degraded state

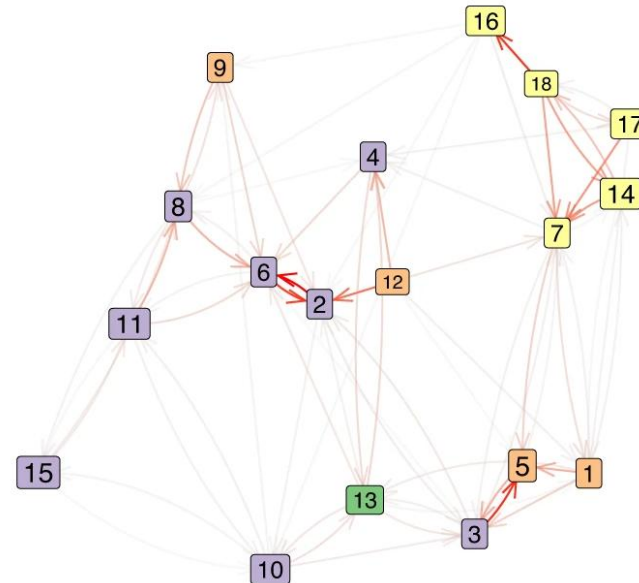


➤ Gut Microbiome modeling from > 35,000 public deposited samples

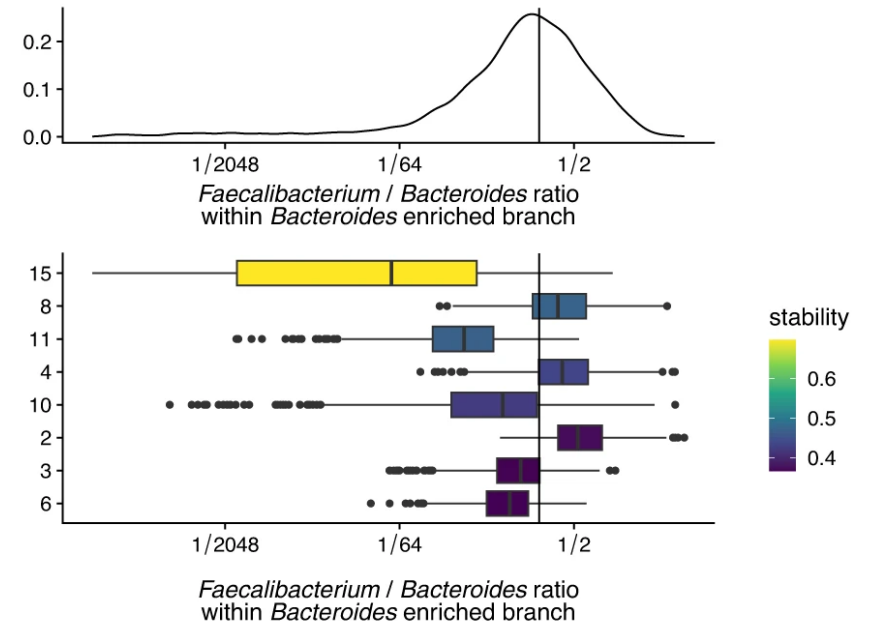
Gut branches structures



Gut stable states

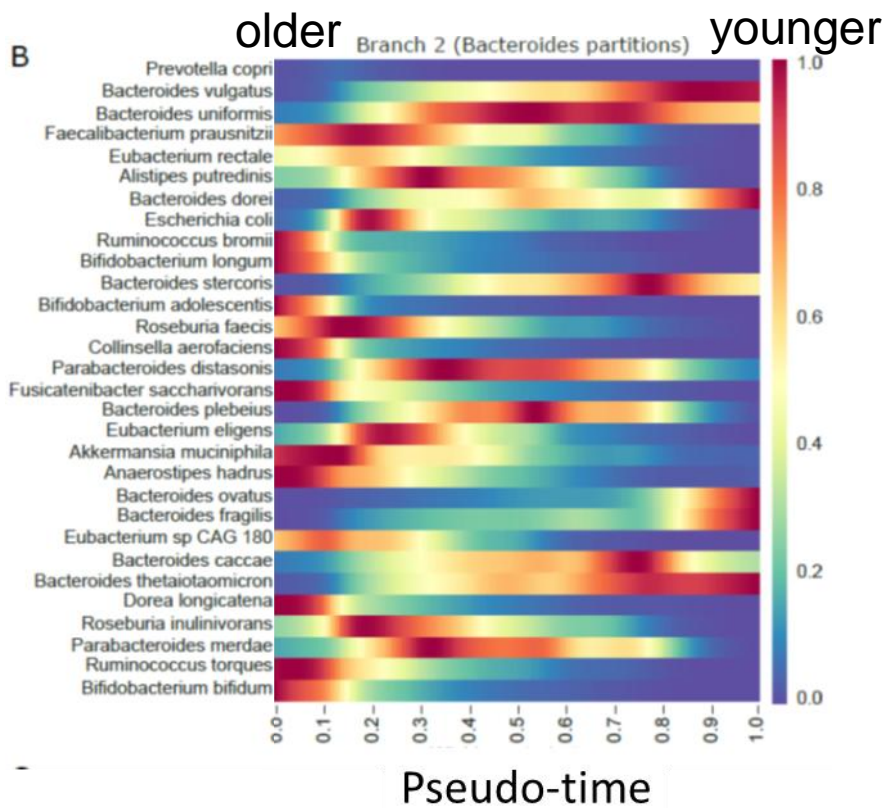


Gut tipping elements



➤ Gut microbiome crisis: intergenerational diversity extinction?

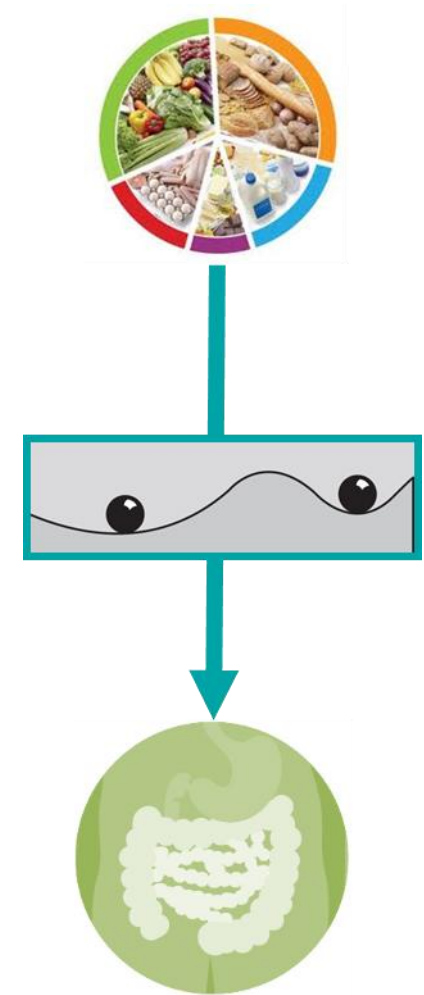
Pseudo-time analysis



Avoid point of no return



Personalized nutrition



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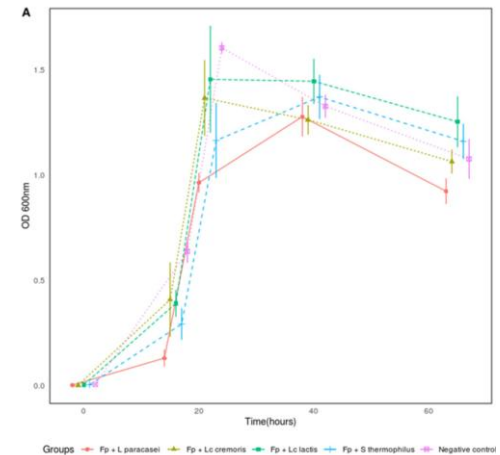
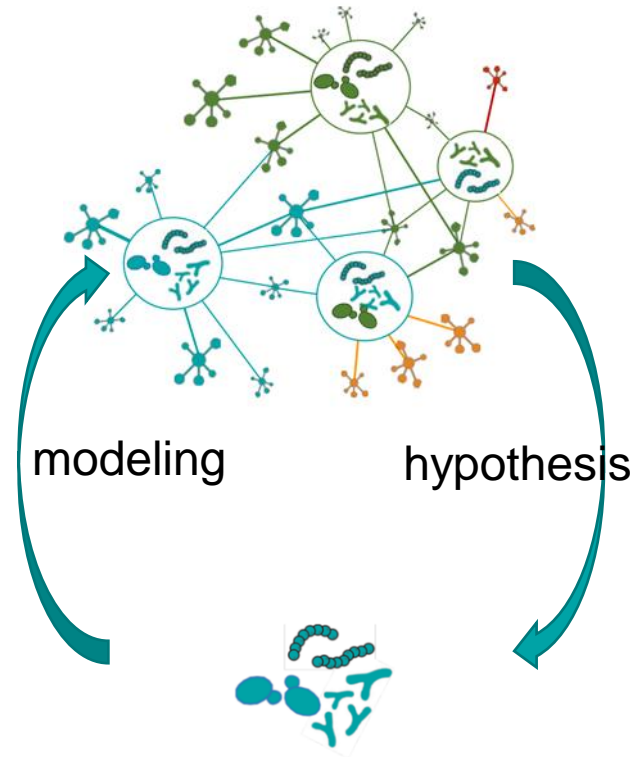
➤ Fermented food as helpers?

Fermented foods
omics mapping

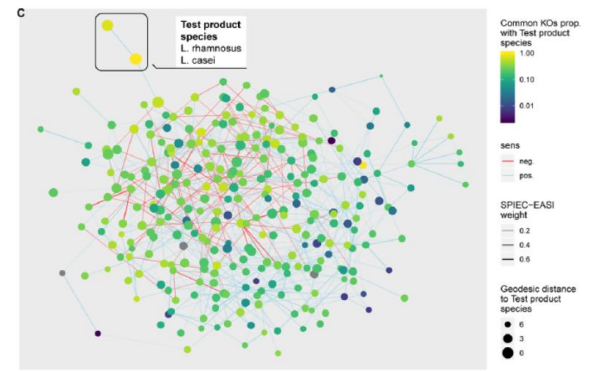
Synthetic and
computational ecology

New prototypes that
sustains gut tipping elements

Functional interactions
with gut ecosystems



Lebas M, Garault P, Carrillo D, Codoñer FM, Derrien M. Metabolic Response of *Faecalibacterium prausnitzii* to Cell-Free Supernatants from Lactic Acid Bacteria. *Microorganisms*. 2020;8(10):1528. doi:10.3390/microorganisms8101528

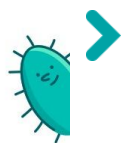


Alvarez AS, Tap J, Chambaud I, et al. Safety and functional enrichment of gut microbiome in healthy subjects consuming a multi-strain fermented milk product: a randomised controlled trial. *Sci Rep*. 2020;10(1):15974. doi:10.1038/s41598-020-72161-w

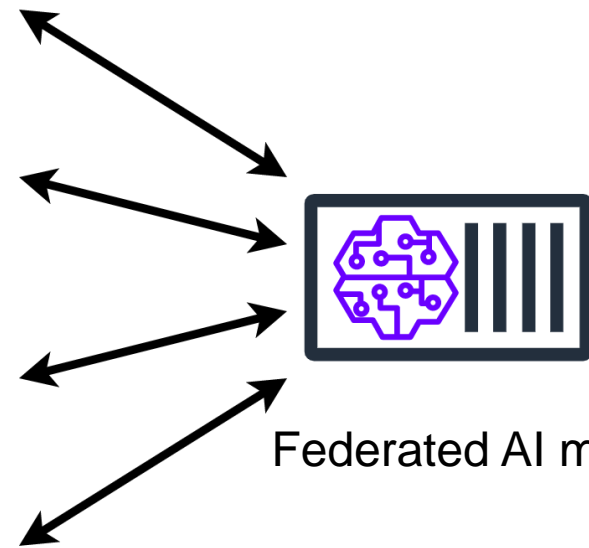
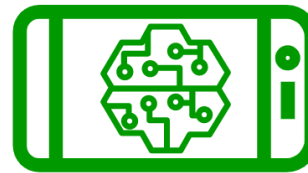
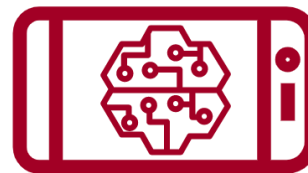
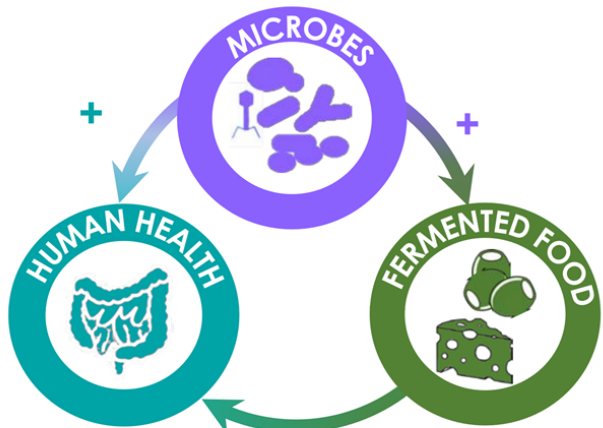


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From large data to federated AI learning



Federated AI mo

Studies AI models

Microb-AI-ome project (M. Almeida)

Toward tailored next-gen fermented food

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