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Early life solid food ingestion remodels the gut microbiota composition and increases the production of protective bacterial metabolites

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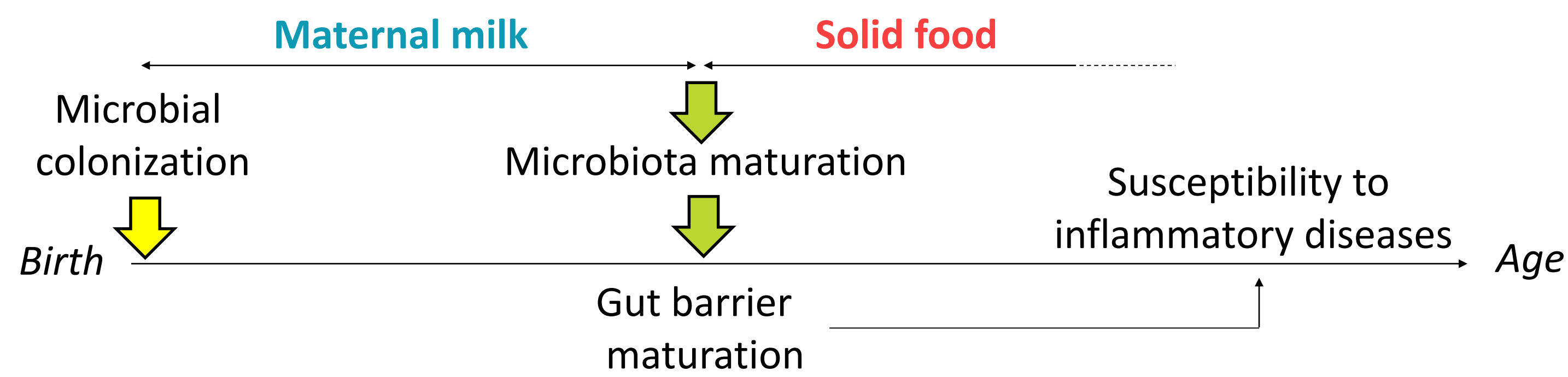


HAL Authorization

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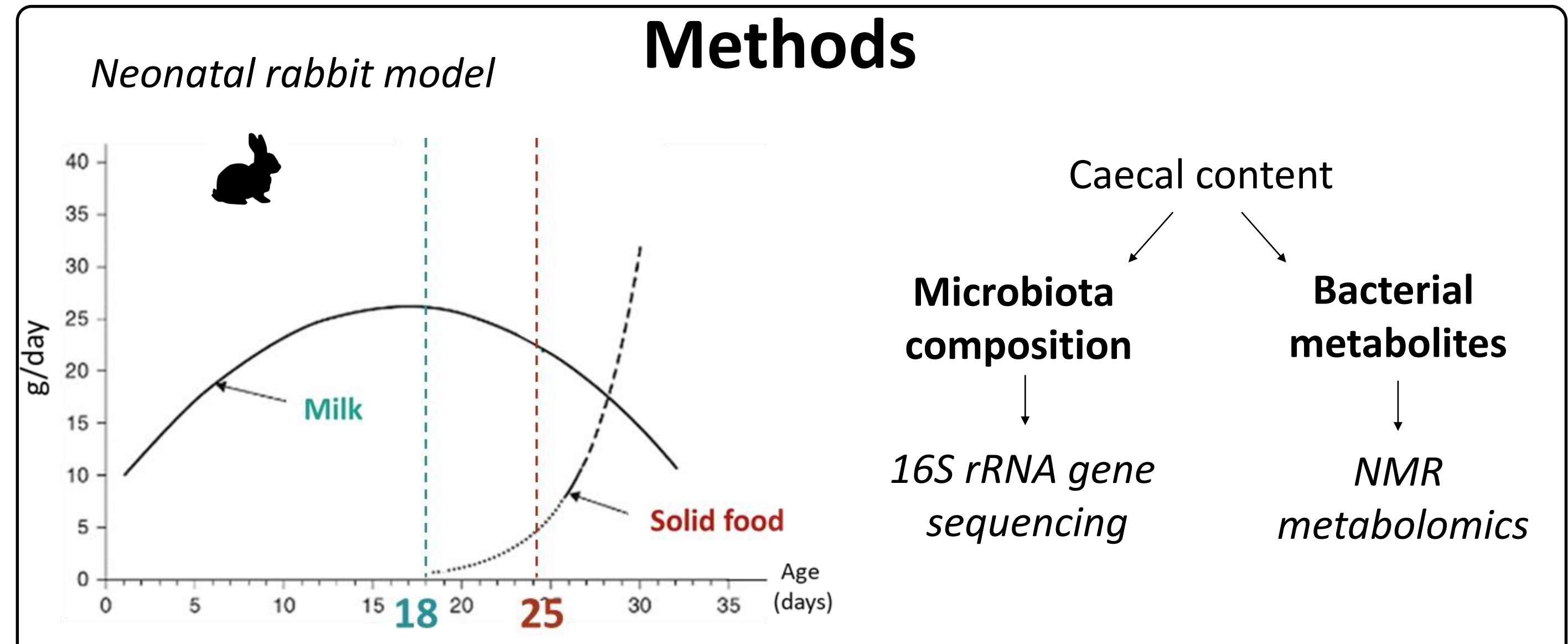
1 - GenPhySE, Université de Toulouse, INRA, INPT, ENVT, Castanet-Tolosan, France; 2 - GEC consortium CCPA, Evialis, Inzo, MixScience, Techna; 3 - GeT-PlaGe, Genotoul, INRA, Castanet-Tolosan, France; 4 - Toxalim (Research Centre in Food Toxicology), Université de Toulouse, INRA, ENVT, INP-Purpan, UPS, Toulouse, France.

Background

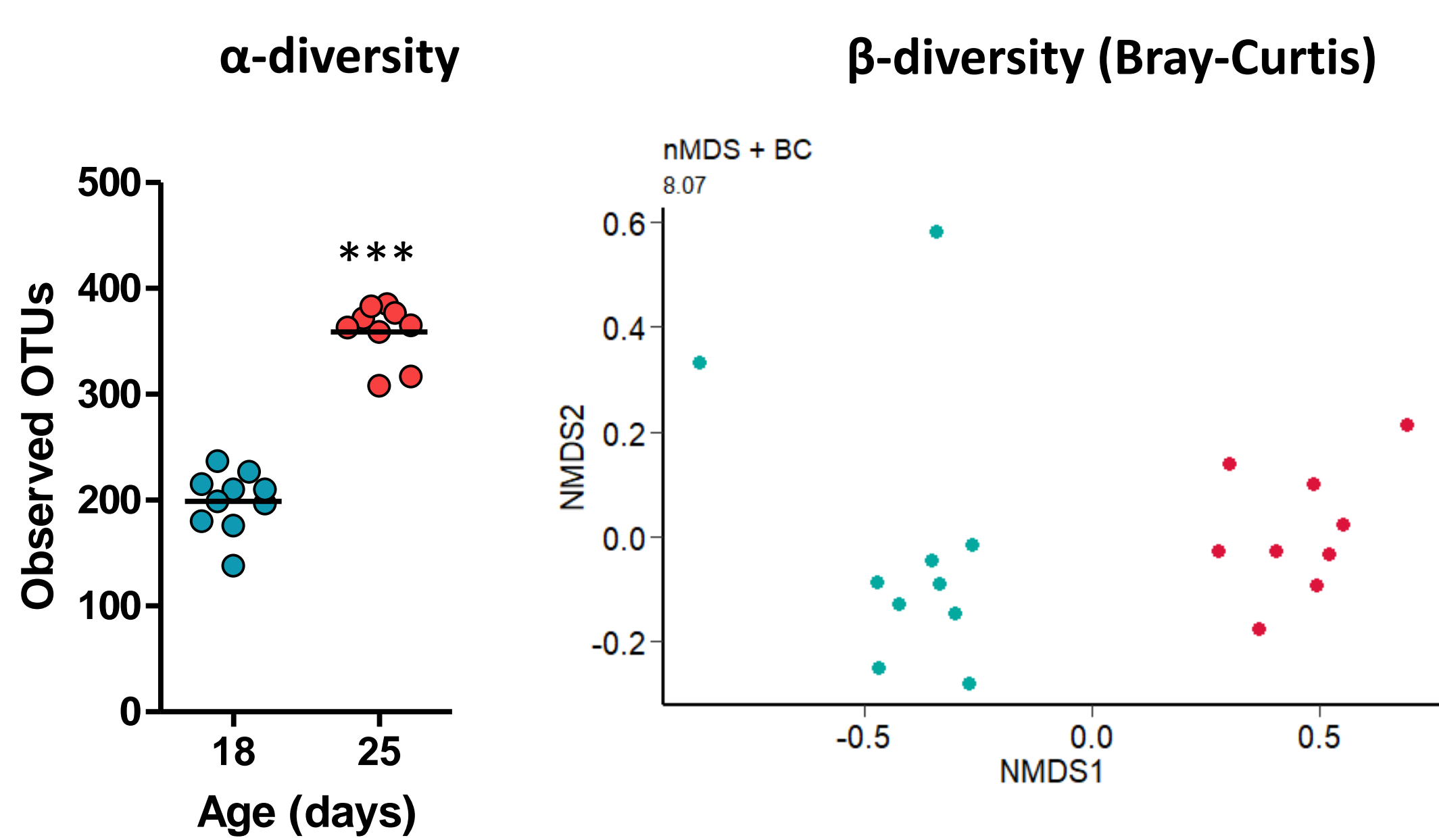


Aim: DETERMINE HOW THE ONSET OF SOLID FOOD INGESTION SHAPES THE MICROBIOTA COMPOSITION AND ITS METABOLIC ACTIVITY IN RELATION WITH THE EPIHELIAL BARRIER MATURATION

Methods

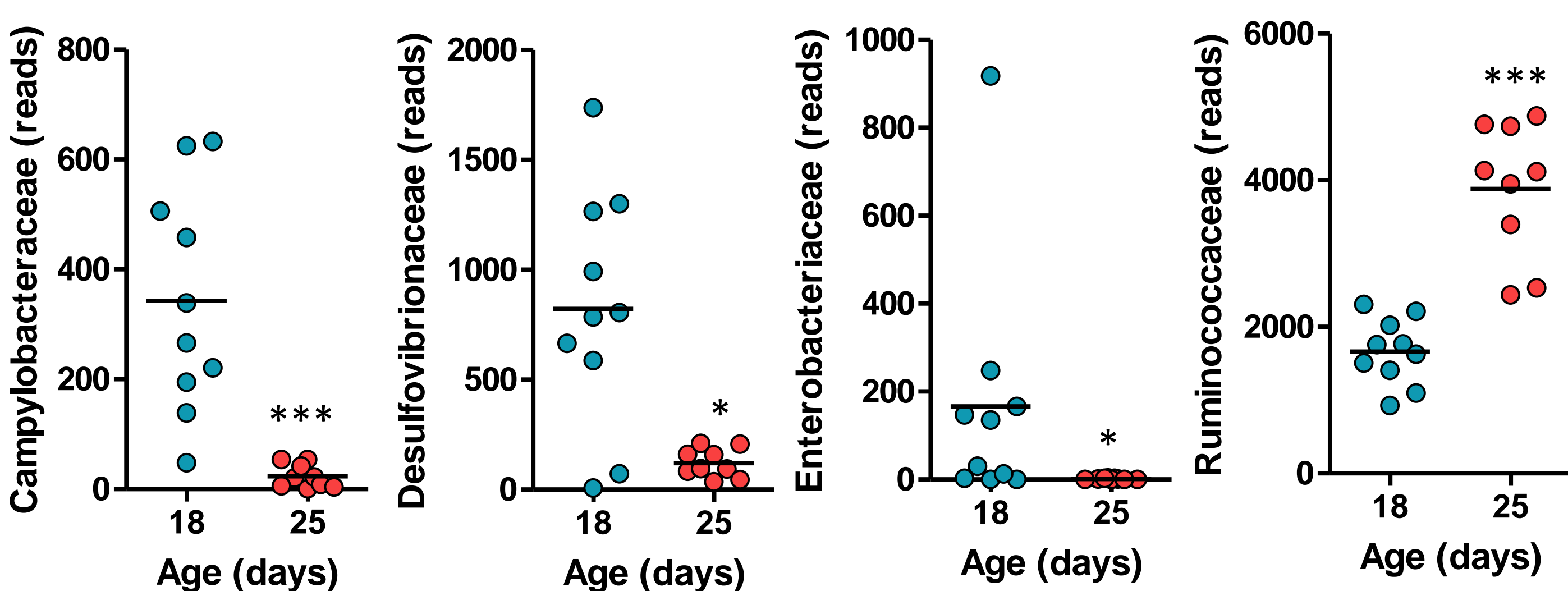


1- Microbiota composition



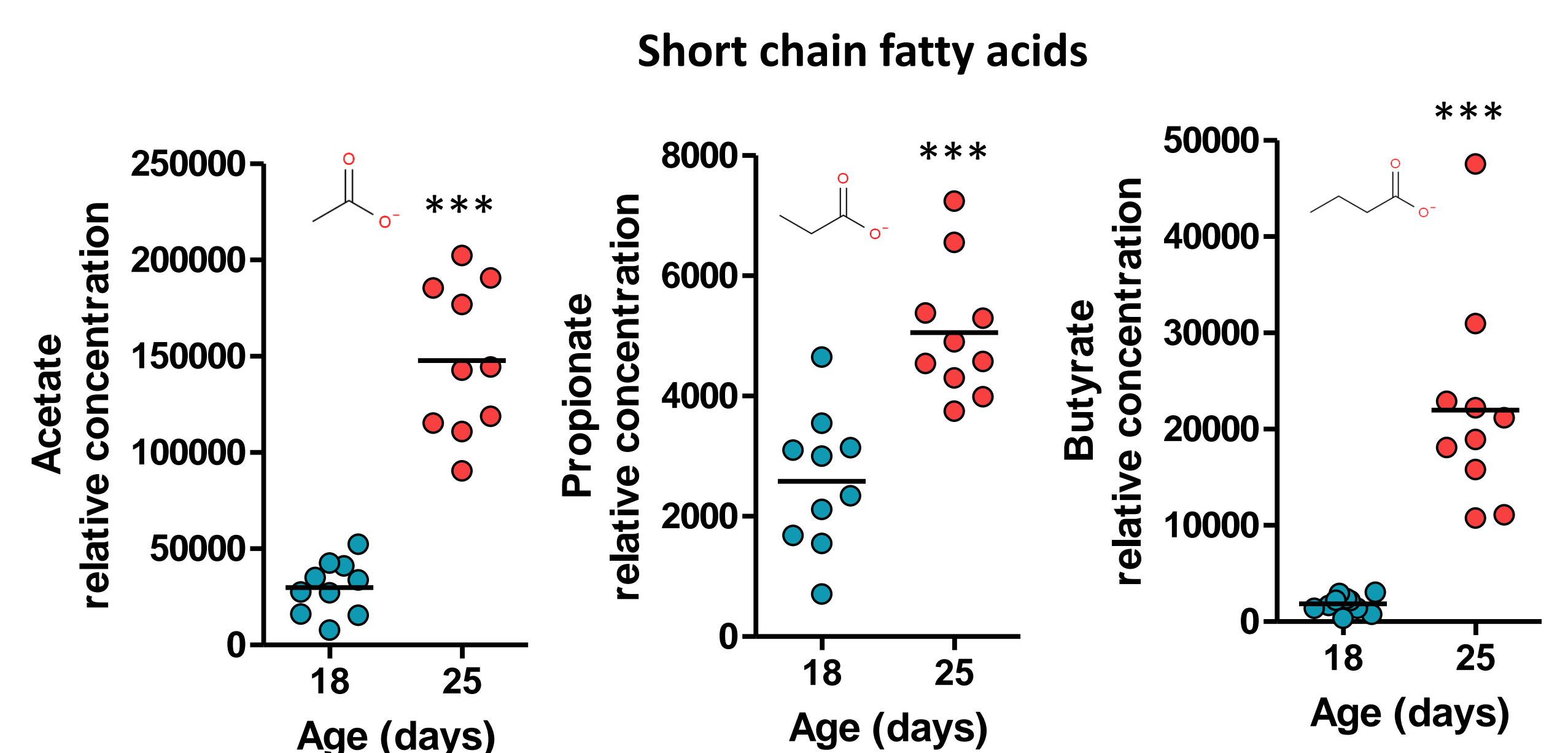
The microbiota composition shifted after the onset of solid food ingestion

Bacterial families relative abundances



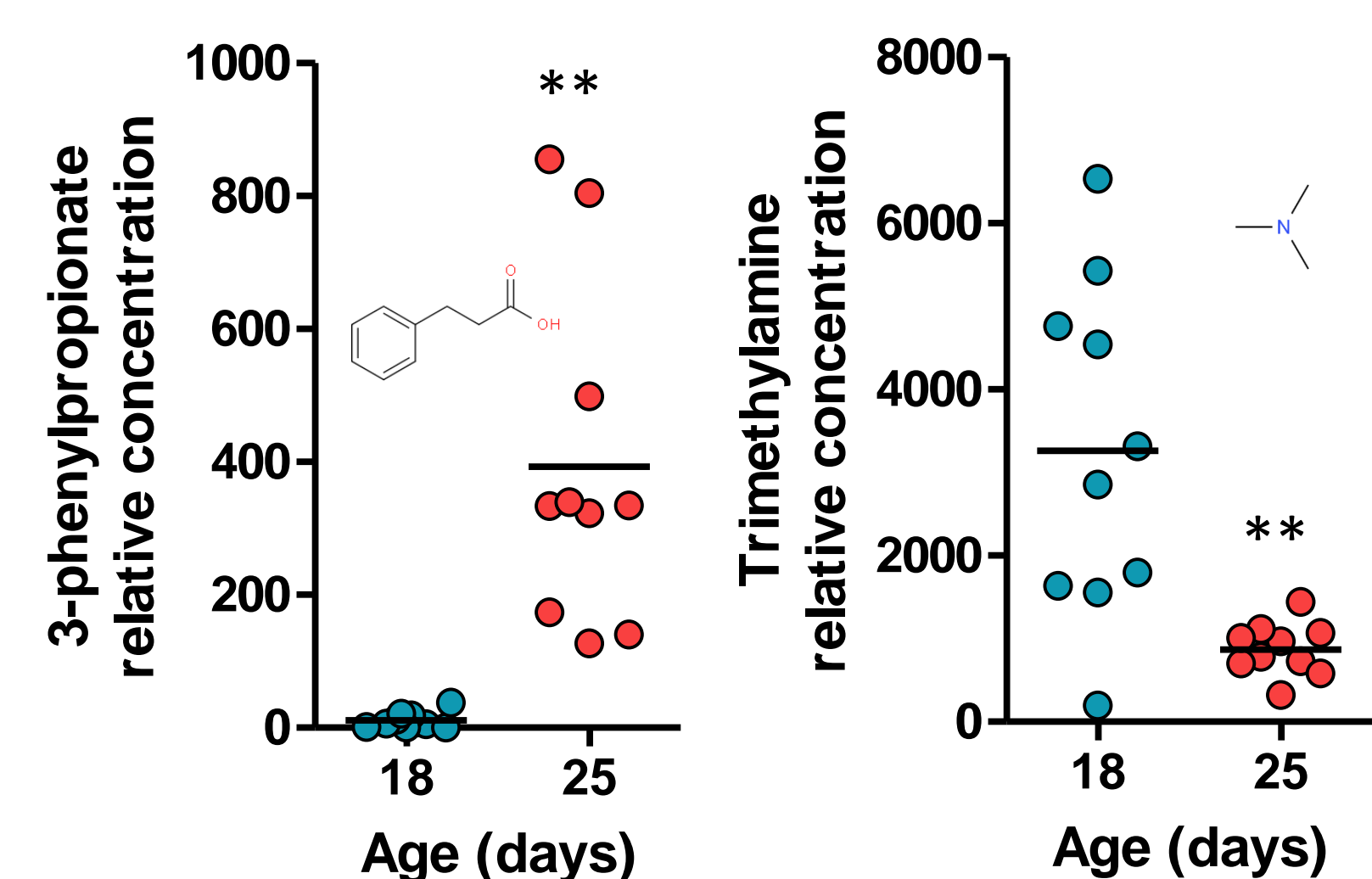
The relative abundance of families including pathobionts decreased after the onset of solid food ingestion while the abundance of a butyrate producing family increased

2- Bacterial metabolites



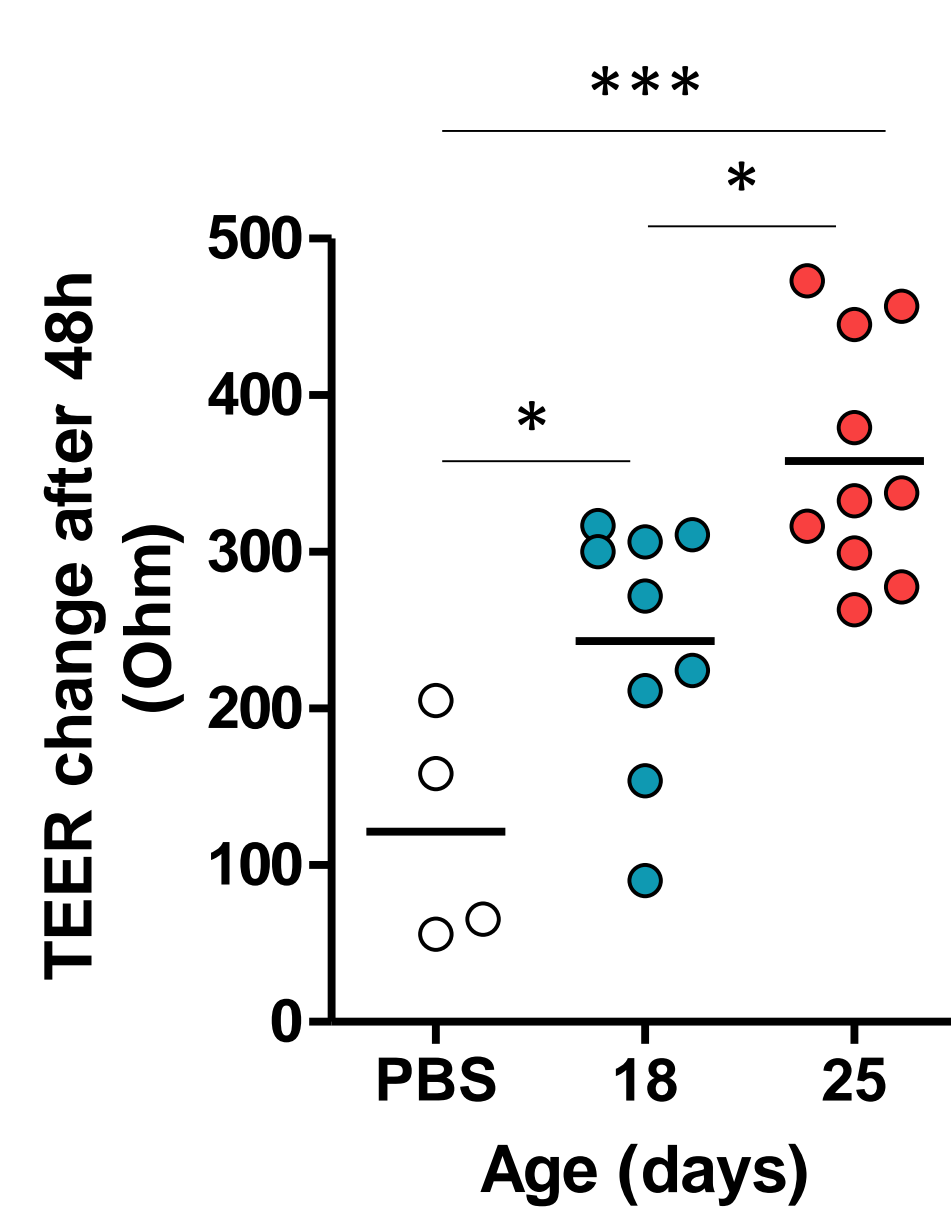
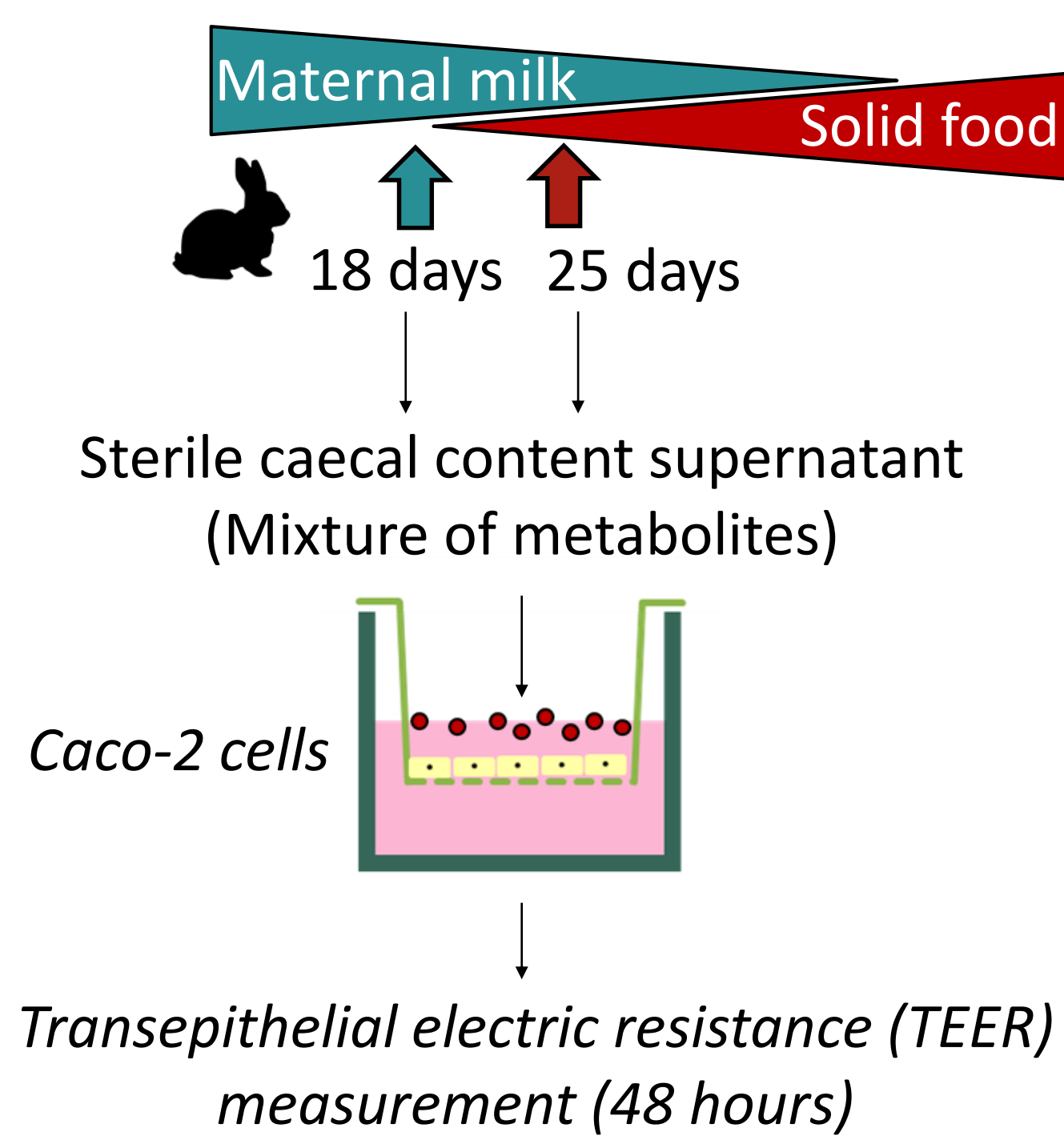
Short chain fatty acids concentrations increased after the onset of solid food

Nitrogenous compounds derived metabolites

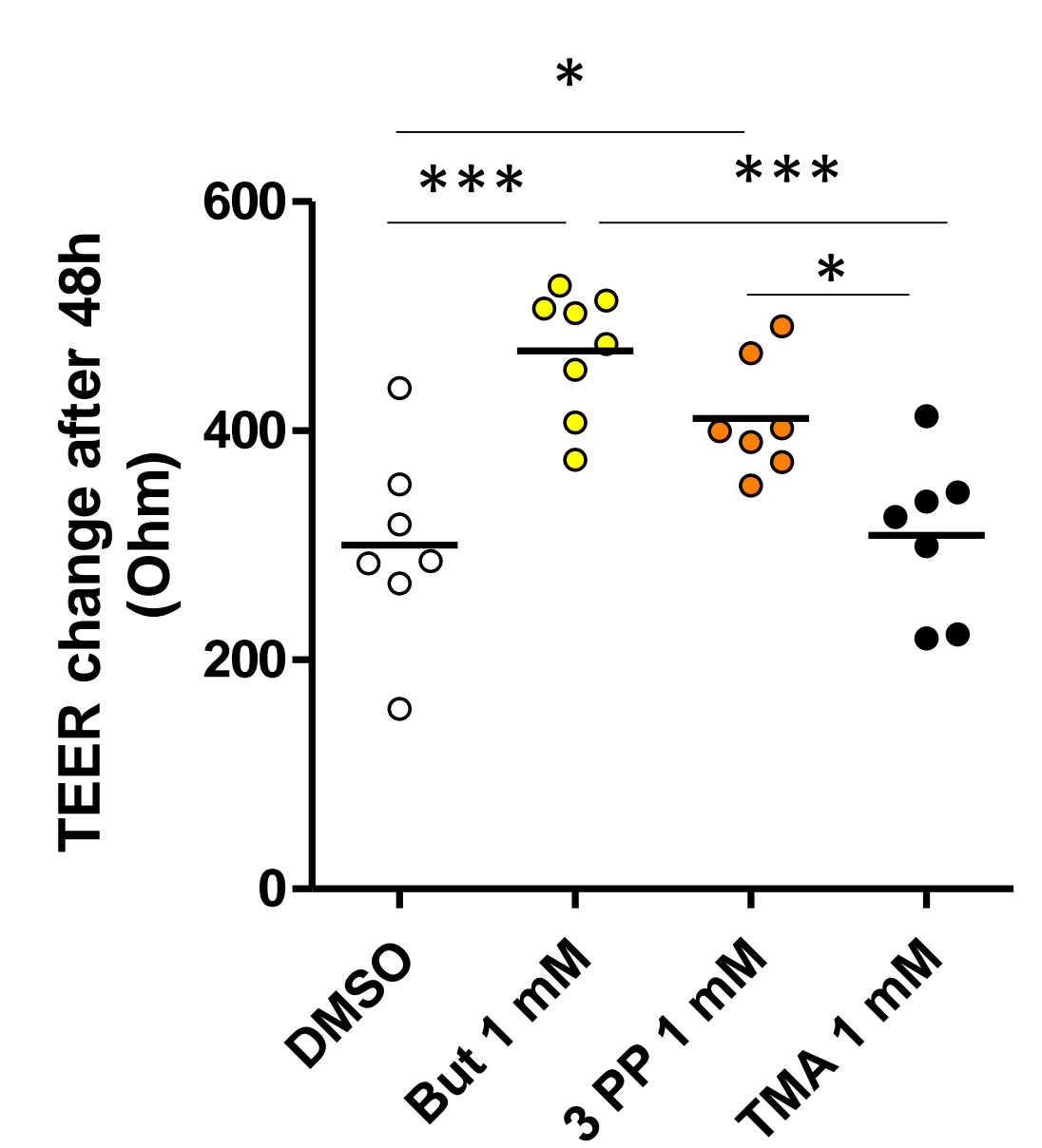
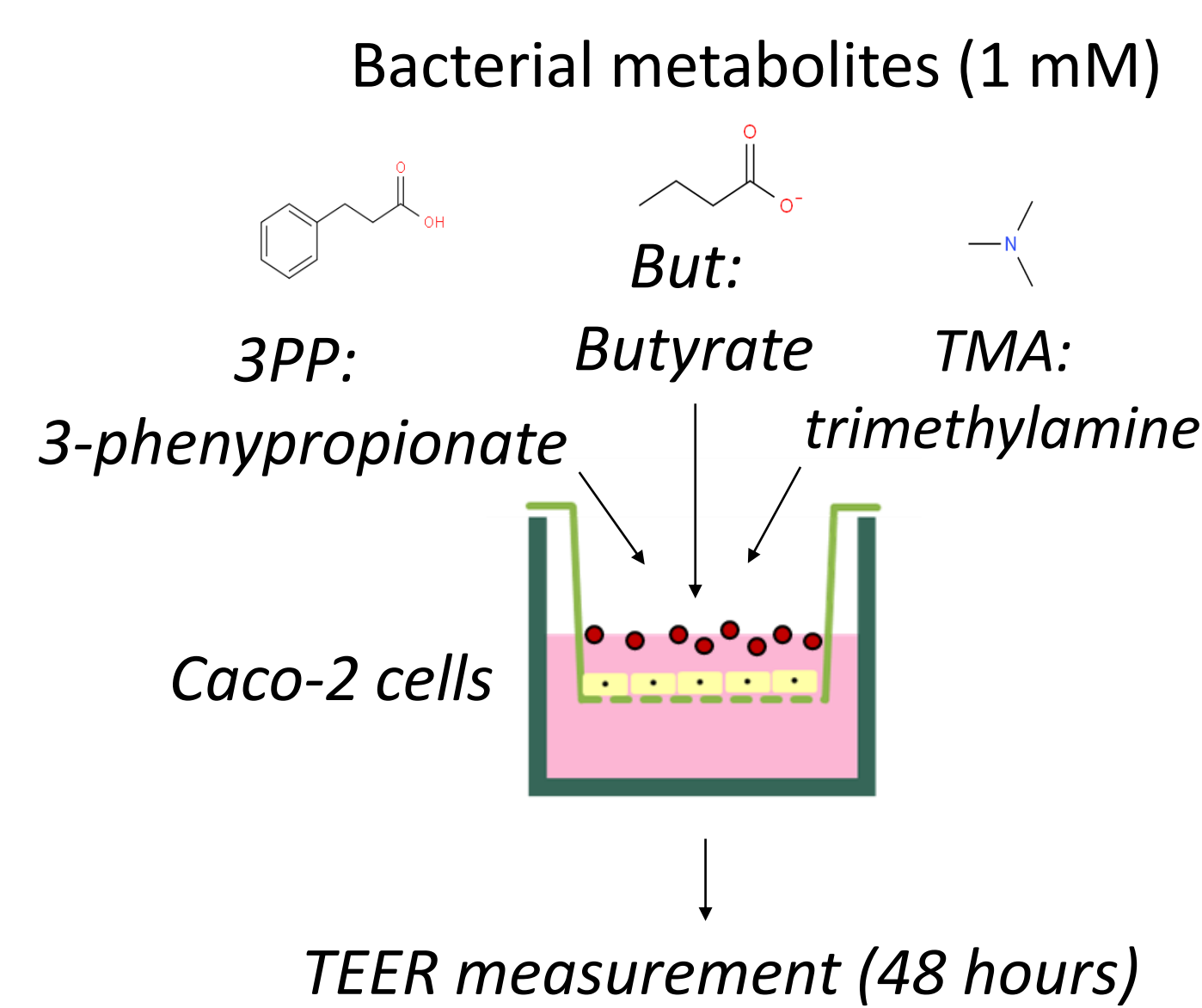


3-phenylpropionate concentration increased after the onset of solid food while trimethylamine concentration decreased

3- Epithelial barrier *in vitro*



The mixture of metabolites produced by the microbiota after the onset of solid food promoted epithelial barrier formation



Butyrate and 3-phenylpropionate promoted epithelial barrier formation while trimethylamine had no effect

Conclusion

- The microbiota composition and its metabolic activity shifted after the onset of solid food ingestion
- Since milk intake ingestion was still predominant at 25 days, our results suggest that the introduction of solid food (*versus* weaning) is sufficient to induce microbiota maturation
- Metabolites produced by the gut microbiota after the onset of solid food ingestion might contribute to the postnatal maturation of the epithelial barrier