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#### INRAE unit

GenPhySE  
NUMECAN

#### Partners

LS2N (Nantes)  
AgResearch (Nlle-  
Zélande)



## Determining the role of metabolites derived from the intestinal microbiota in the neonatal programming of epithelial cells by primocolonising bacteria in piglets

The HOLOPIG project concerns the microbial control of intestinal epithelial barrier maturation and its long-term effects on mammalian health. We propose to use the pig holobiont as a model to identify the mode of action of primocolonising bacteria on host epithelial cells.

The primocolonisation of the gut by the microbiota plays a major role in the postnatal maturation of intestinal epithelial cells. This microbially controlled developmental process has long-term consequences for digestive and immune homeostasis. Thus, early life is considered a "window of opportunity" for programming health through modulation of the microbiota. This control of microbial colonisation in young mammals can be achieved by modulating the environment in early life, by nutritional ingredients (e.g. pre/probiotics) or by microbiota transplantation. However, these tools cannot yet be used effectively because the optimal composition and functionality of the microbiota in early life is not clearly defined.

### Objectives

The goal of this project is to determine the role of metabolites, produced by primordial gut bacteria, in the programming of epithelial barrier function in early life and later, using organoid cultures and systems biology approaches. This project will benefit:

- Animal production with the long-term objective of improving animal robustness through modulation of the microbiota early in life.
- Humans with the development of strategies to improve short- and long-term gut health in neonates.



## Partners

INRAE division	INRAE unit	Expertise
<b>PHASE</b> Animal Physiology and Livestock Systems	GenPhySE NED	Functionality of the gut microbiota, In vitro analyses of bacterial metabolites
<b>AlimH</b> Human Nutrition and Food Safety	NUMECAN EAT	Digestive physiology, Intestinal barrier development, Nutrition, Piglet model
<b>GA</b> Animal Genetics	GenPhySE GeneEpi	Epigenetics, Bioinformatics
Partenaire	Expertise	
<b>LS2N</b> CNRS (France)	Systems biology. Integration of omics data	
<b>AgResearch</b> Nouvelle-Zélande	Physiology, Nutrition. Piglet organoid culture	