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Partners

University of Bologna
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MICROWEAN

Alteration of vertical transmission of microbiota due to early weaning and its effects on host health

The MicroWean project focuses on the microbial colonisation of mucosal surfaces during the first days of life, a process that is essential for neonatal development.

It has been suggested that there is a critical period during which any disruption of microbiota-host interactions can cause irreversible damage to the priming process in the host, preventing the establishment of healthy homeostasis.

During their development cycle, plants maintain dynamic and intimate interactions with communities of microorganisms.

The gut microbiota in the early years of life is mainly shaped by vertical mother-to-child transmission. Weaning is a crucial process of maternal microbial imprinting that has an impact on primocolonisation. Today, there is a trend in westernised human populations, as well as in animal production, to hasten weaning, which could have a direct impact on the health of the newborn. Indeed, while piglets suffering from early weaning are susceptible to diarrhoea, the human health consequences of early weaning are not so well established.

Objectives

During the MicroWean project, we plan to develop a murine model of early weaning in human and pig hosts. We will study:

- How vertical transmission of microbiota is affected by early weaning
- The microbial functions that are disrupted by this phenomenon and the effects on the host
- In addition, in order to determine how changes in the microbiota can be transmitted, mice will be followed over several generations
- Finally, we will attempt to restore the altered vertical transmission of the microbiota through a nutritional approach

This project will provide a solid proof of concept for future application to human and swine health by identifying biomarkers and nutritional approaches potentially useful for the management of these complex systems.



Partners

INRAE division	INRAE unit	Expertise
MICA Microbiology and the Food Chain	MICALIS	Host-microbiota dialogue. Vertical transmission of microbiota. Murine models
	MetaGenoPolis	Complete shotgun intestinal metagenomic analysis. Reference catalogue of murine microbial genes
GA Animal Genetics	MetaGenoPolis	Genetics, genomics, metagenomics, swine health, holobiont
Partenaire		Expertise
DEPARTMENT OF PHARMACY AND BIOTECHNOLOGY University of Bologna (Italie)		Human microbiota and breastfeeding
DEPARTMENT OF ANIMAL GENETICS Institute of Agrifood Research and technology (Espagne)		Co-network analysis and data integration