

# THE HOST-MICROBIOTA INTERACTOME IN EARLY LIFE AND ITS ROLE IN GUT IMMUNE DEVELOPMENT

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## Introduction

In order to develop more sustainable livestock production systems, the health status of production animals has to be improved. Pre- and probiotics are interesting candidates to enhance health by means of elevating immune development, stimulating growth of beneficial bacteria and by improving the intestinal barrier. Successful application of such dietary components can result in reduction of antibiotic usage, which will lower the pressure on the emergence of antibiotic resistant microbes.

The mucosal immune system is exposed to pathogens, dietary components and commensal bacteria and in order to maintain gut homeostasis must either produce an active immune response or must react with tolerance. The ability to react accurately is important, since a wrong decision can result in allergy or susceptibility to infectious diseases.

## Aim

The aim of the project is to study dietary effects on microbiota composition in early life, identification of a healthy microbiome and determining its effect on host cells.

## Approach

To study the microbiota composition development in early life, pig and chicken in vivo studies will be carried out during which faecal and intestinal samples will be taken. Microbiota composition analysis will be determined by Illumina HiSeq sequencing of PCR-amplified 16S ribosomal RNA gene fragments.

To study the effect of dietary and microbial components on host cells, an in vitro assay will be developed that encompasses the growth of 3D organoids and organoid monolayers followed by stimulation. Subsequently, expression profiles of organoid cells are analysed for pro- and anti-inflammatory responses.