



# HoloRuminant

Understanding microbiomes of the ruminant holobiont

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## European Focus Group Meeting

Brussels 14th November, 2022

**Horizon 2020**

**Call: H2020-SFS-2018-2020**

(Sustainable Food Security)

**Topic: SFS-02-2020**

**Type of action: RIA**





# Agenda

- About the Project
- Objectives
- Work packages
- Farm practices and studies
- Questions



- **Aims? To understand the role of microorganisms** in livestock production and their influence on animal health, productivity and overall sustainability
- **Why? To develop diagnostics, management and nutritional strategies** to improve animal health, performance and lower greenhouse gas emissions



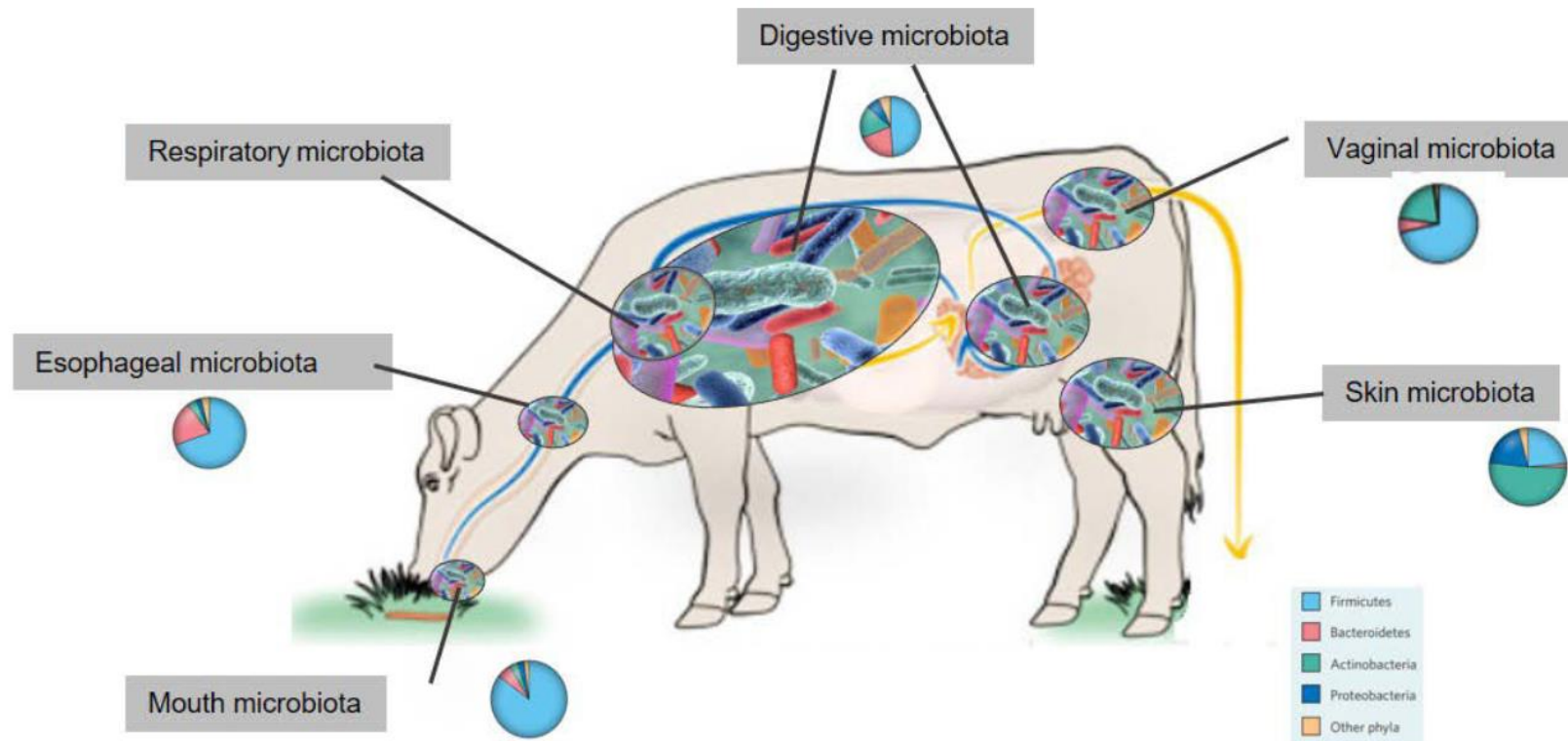




# What are we talking about?

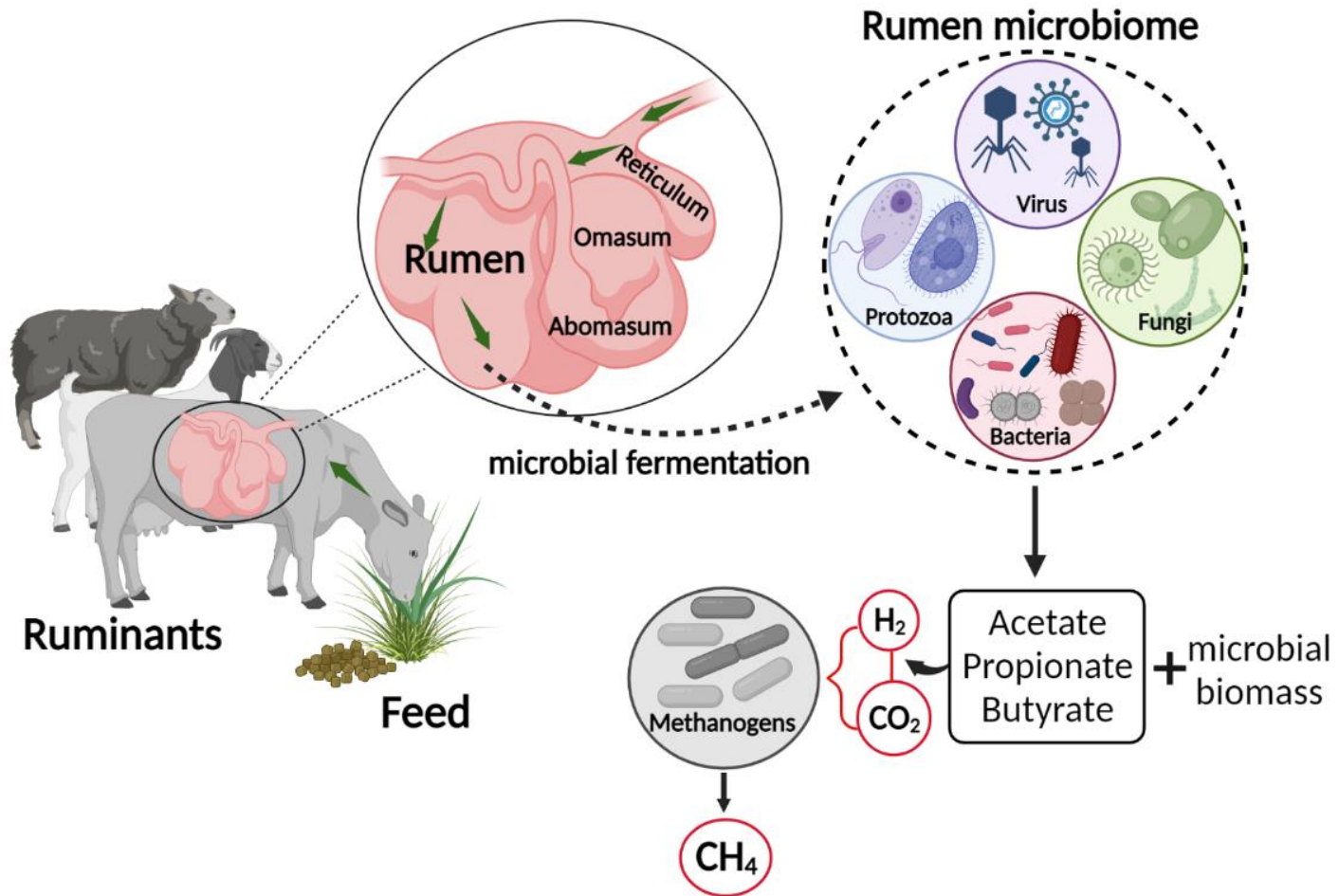
## Microorganisms / microbiota / microbiome ...

*The microbiota is the community of microorganisms (such as fungi, bacteria and viruses) that exists in a particular environment.*





# Example: Rumen microbiome



# Objectives

Characterise  
ruminant-associated  
microbiomes

1

Define microbiome  
establishment and  
maintenance

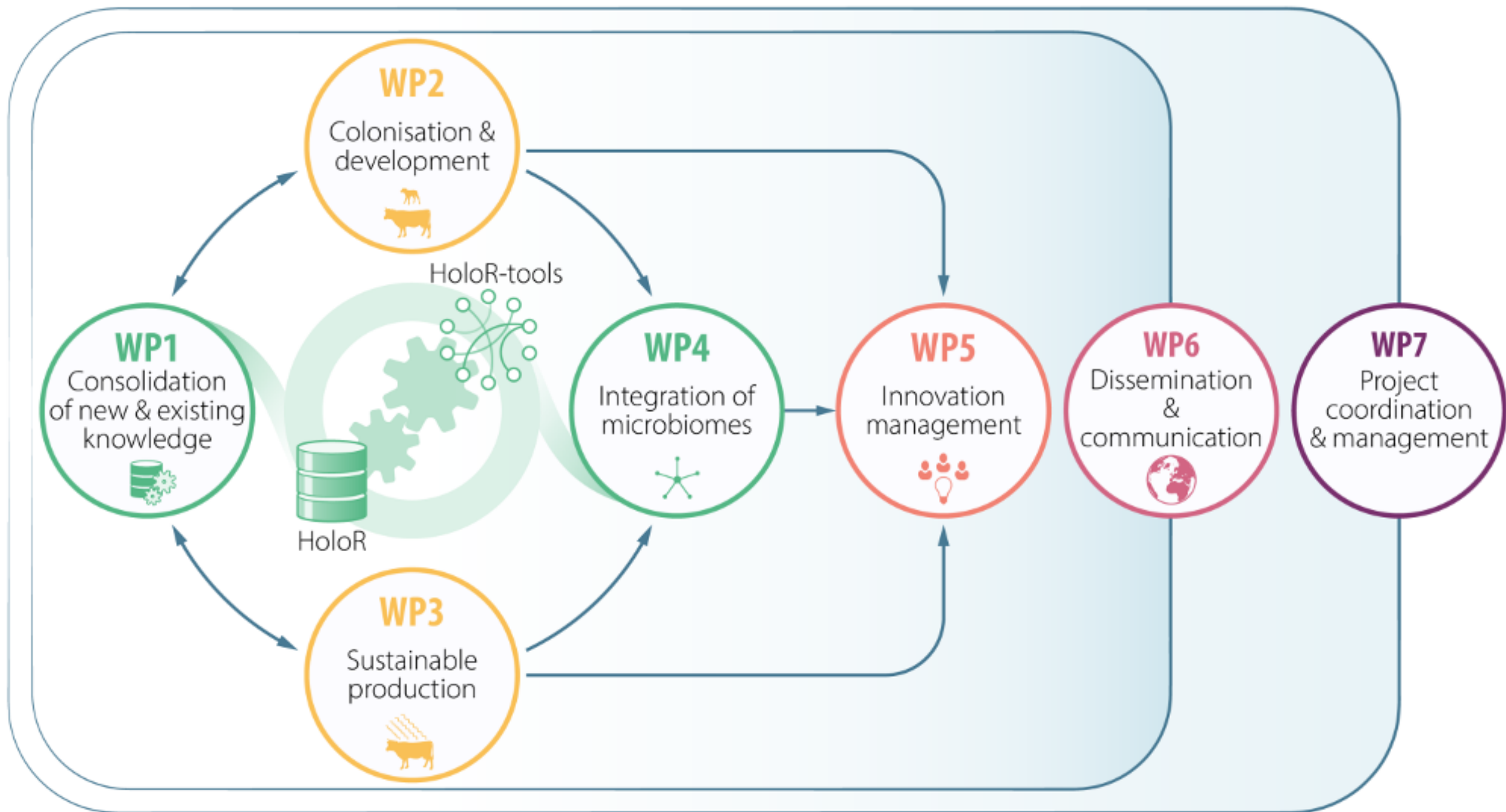
2

Evaluate the  
effect of ruminant  
microbiomes on  
animal production,  
health and  
welfare

3

Facilitate the  
adoption of  
the proposed  
innovations by  
end-users

4





Understanding the causes, effects and stability of the microbial communities establishing at different body sites of cattle and sheep

### Objectives

1. Define the **contribution of maternal and environmental microbiomes** to the establishment and maintenance of microbiomes at a series of economically important body sites;
2. Identify **management practices** (and associated mechanisms) modulating the establishment and persistence of these microbiomes;
3. Evaluate the effects of different **breeds and genotypes** on the establishment of microbiomes across different ruminant livestock species and production systems.





Task 2.2: Persistence of established microbiomes and effects on subsequent animal performance and health.

Task 2.3: Longitudinal study of important microbiomes in cattle establishment phase.

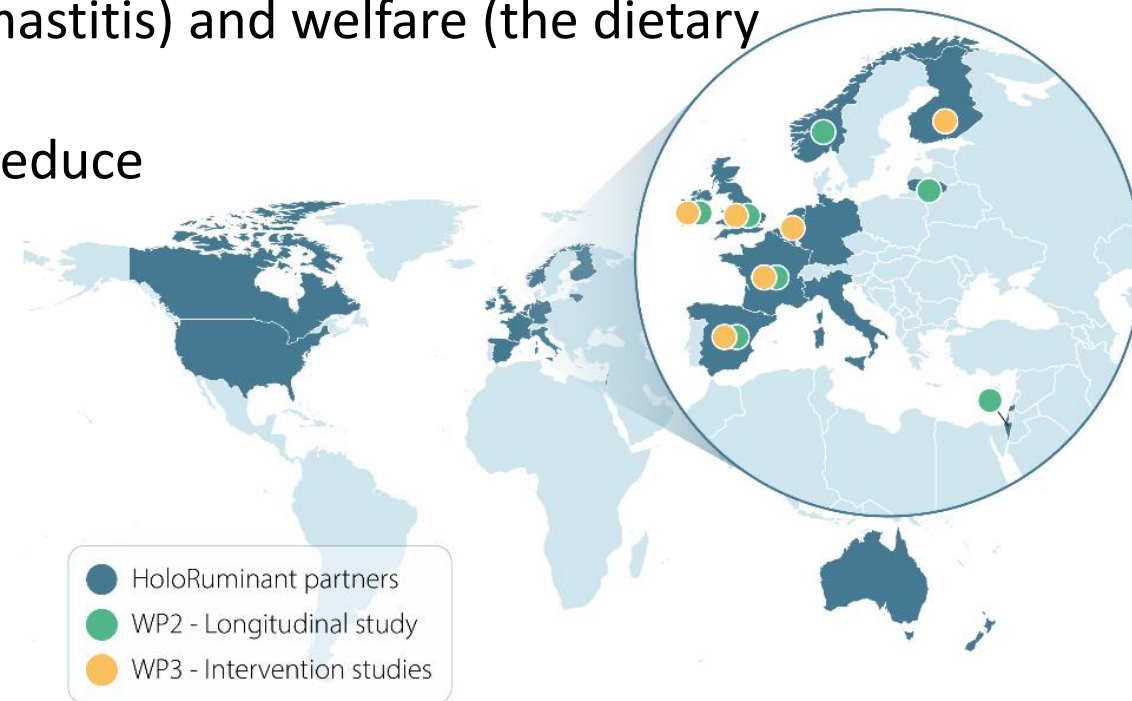




# WP3 – Ruminant microbiomes and sustainable production



- To establish the link between host-associated multi-site microbiomes and phenotypes related with health/disease/welfare/production leading to improved sustainability of ruminant production
  - Early life farm-management with emphasis on (i) maternal-calf bonding; (ii) adult companionship; and (iii) early life transportation.
  - During disease (viral respiratory disease, mastitis) and welfare (the dietary transition period).
  - Environmental challenges to significantly reduce (i) methane emissions and (ii) negative effects of heat stress



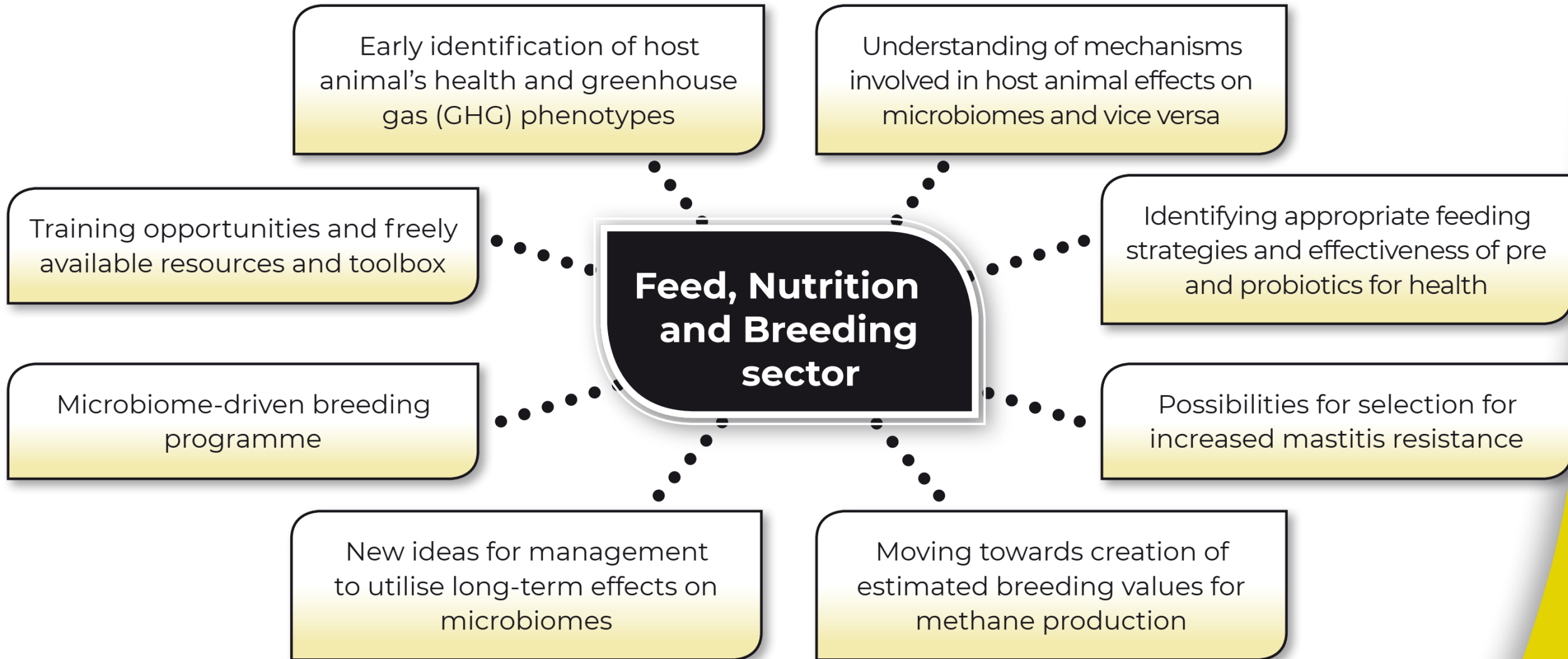
# The project will generate new knowledge and tools shared in an open-access database (HoloR) and repository (HoloR-tools)



The expected results of the project are:

- To develop standard procedures for data sampling and handling
- To construct meta-omic datasets that depict the rumen microbiome
- To identify biomarkers for the development of lower-cost breeding tools
- To identify the key microbes that impact phenotypes for improved health and welfare and reduced environmental impact
- To develop an industry baseline for the ideal microbiome
- To develop socially and economically acceptable approaches to control the ruminant microbiome







Improved animal health, welfare and production sustainability using microbiome “solutions”

Critical determination of microbiome role in various diseases, animal nutrition and a dietary transition across calving

**Farm managers and farmers**

Higher resilience of livestock systems to seasonal instabilities and dietary changes

Recommendations for farmers on how to handle young animals

Development of feed additives and alternative feeding strategies

Improved guidelines for transport and management

Nutritional interventions across the lifetime of animals

Development of diagnostic tools to evaluate animal susceptibility for health threats





Reduced GHG emissions and  
carbon footprint

**Policymakers  
and the general  
public**

Recommendations for reduced  
environmental impact

Recommendations of  
improvement of animal health  
guidelines





*Thank you for your attention*

**[www.holoruminant.eu](http://www.holoruminant.eu)**

