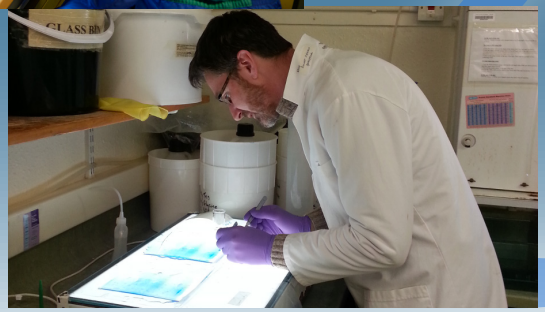
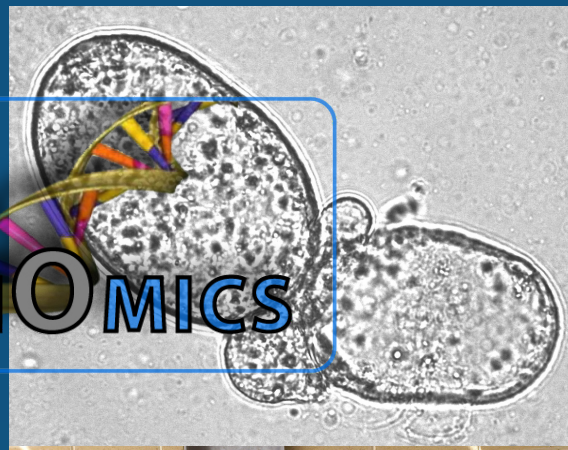
PROJECT PARTNERS

- Rowett Institute of Nutrition and Health (UK),
- Parco Tecnologico Padano S.R.L. (Italy)
- Maa Ja Elintarviketalouden Tutkimuskeskus (Finland)
- Sveriges Lantbruksuniversitet (Sweden)
- Ustav Zivocisne Fyziologie A Genetiky AV CR, V.V.I. (Czech Republic)
- Universita Cattolica Del Sacro Cuore (Italy)
- University Of Nottingham (UK)
- Centre National De La Recherche Scientifique (France)
- European Federation of Animal Science (Italy)
- European Forum Of Farm Animal Breeders (Netherlands)
- Quality Meat Scotland (UK)

For more detail visit: *www.ruminomics.eu*
Contact us at: *info@ruminomics.eu*

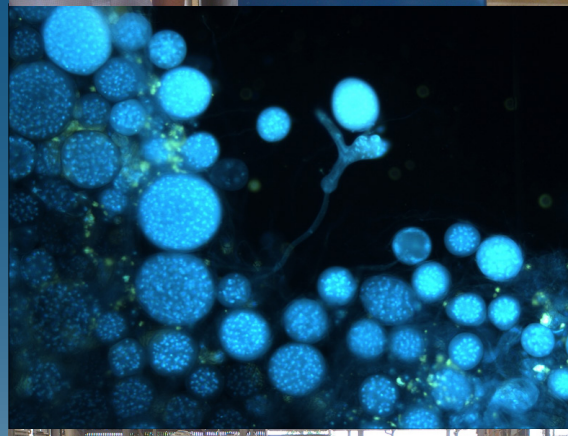


RuminOmics



Connecting the animal genome, gastrointestinal microbiomes and nutrition

RuminOmics aims to improve digestion efficiency and reduce the environmental impacts of ruminant livestock production



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Background

Ruminant livestock make a significant contribution to greenhouse gas (GHG) emissions. Enteric emissions in the form of methane together with losses from manures and those associated with land use changes comprise the majority of livestock related GHG. Technologies that increase rumen efficiency and lower methane emissions form a vital mitigation strategy to reduce global warming impacts.

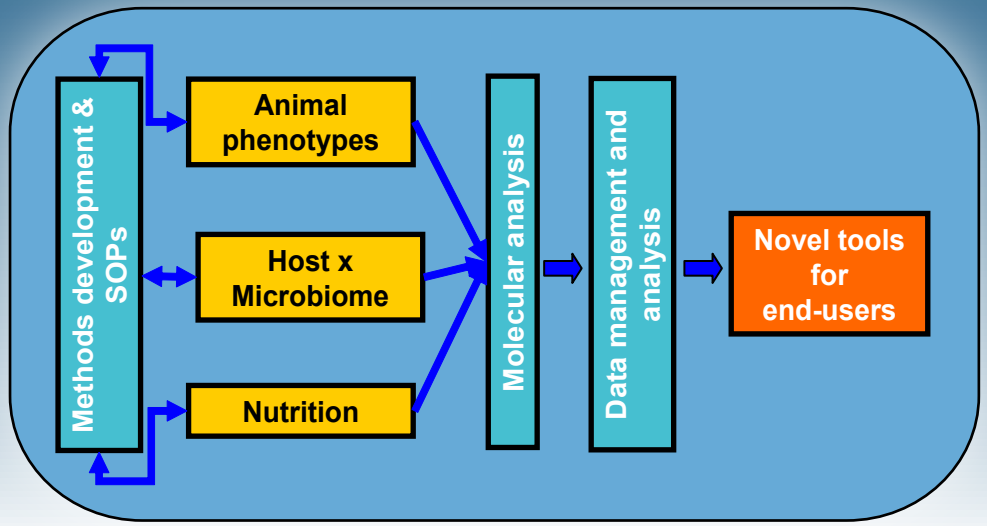
Objective

RuminOmics will integrate expertise and technologies to increase rumen efficiency and decrease the environmental footprint of ruminant production, significantly advancing current knowledge in this sector.

Methods

RuminOmics will exploit state-of-the-art omics technologies and the comprehensive resources of project partners (over 1000 cows) to understand how ruminant gastrointestinal microbial ecosystems, or microbiomes, are controlled by the host animal and by the diet consumed, and how this impacts on greenhouse gas emissions, efficiency and product quality.

Project structure



Project Progress

- **Animal phenotypes and metagenomic analysis.** So far 540 of 1000 cows have been sampled from commercial and experimental farms using novel techniques to determine intake, milk production, diet digestibility, rumen microbial biomass, methane and feed efficiency, with the aim of providing a large dataset to examine relationships between cow genome, rumen microbiome, digestion and production efficiency under practical conditions.
- **Reindeer for a better understanding of cows.** The composition and functioning of the rumen are being compared between cows and reindeer. Initial results suggest that reindeer produced less methane than non-lactating cows per kg of feed eaten but slightly more per unit of liveweight.
- **Trade offs between Greenhouse Gas and N Losses.** Increasing dietary CP concentration decreased quadratically methane emissions per kg dry matter intake but increased N loss. It is important to take into account both global warming and nitrogen pollution impacts when we change the diet of dairy cattle.
- **DNA metabarcoding.** Using amplicon-based techniques such as DNA metabarcoding to describe the microbial composition of a complex ecosystem like rumen disgesta is prone to several technical biases. It is thus important to evaluate the limitations and flaws of each DNA metabarcoding marker system. For this purpose, Ruminomics is organizing a "ring test" with several other labs involved in DNA-based taxonomic characterization of rumen microbiomes across the world.
- **Collaborative workshops.**
  - Joint RuminOmics/Rumen Microbial Genomics Network workshop *Harmonizartion of techniques associated with ruminal microbiome and metagenome analysis,* Dublin June 2013. Find presentations here: http://www.ruminomics.eu/index.php/dublin-workshop/
  - Joint RuminOmics/ECO-FCE/Rumen Microbial Genomics Network workshop on *How does the gut microbiota influence feed efficiency,* Aberdeen June 2014. You can find the presentations on the RuminOmics website: http://www.ruminomics.eu/index.php/joint-ruminomics-workshop/