

JOB OFFER

Doctoral thesis on

Characterization of the molecular profile of plasma microvesicles to understand and phenotype feed efficiency or body composition of cattle

The National Research Institute for Agriculture, Food and the Environment (INRAE) is a public research institute bringing together a working community of 12,000 people, with 268 research, service and experimental units, located in 18 centers throughout the France. INRAE is positioned among the world leaders in agricultural and food sciences, plant and animal sciences. INRAE's research aims to build solutions for multi-performance agriculture, quality food and sustainable management of resources and ecosystems.

YOUR MISSION AND ACTIVITIES

■ You will join the **Biomarkers team** of the **Joint Herbivore Research Unit** by **Dr Isabelle CASSAR-MALEK** and **Dr Muriel BONNET** who are in charge of research programmes aimed respectively at identifying, in cattle, the physiological mechanisms and biomarkers of feed efficiency and at determining the roles of adiposity and adipokines on animal performance. Isabelle CASSAR-MALEK and Muriel BONNET will supervise the student during his/her thesis and the diploma will be awarded by the University Clermont Auvergne. The thesis scholarship will be provided by INRAE and Clermont-Auvergne Métropole.

■ **Scientific context and objective of the thesis:**

Understanding the construction of cattle production phenotypes and their expression in the grassland production system is a knowledge challenge to characterize agroecological systems and have biomarkers for animal phenotyping. At the international level, omics studies are being implemented to decipher more particularly the physiological mechanisms controlling the phenotype of feed efficiency and body composition in cattle. However, if the biological pathways associated with these phenotypes begin to be described in several tissues separately, the dialogue between the tissues that contribute to their construction remains to be characterized. The team's results identify exosomes (small extracellular vesicles) as potential actors in the physiological dialogue regulating the expression of these phenotypes and as a potential source of biomarkers. The thesis aims to characterize the molecular signatures present in circulating microvesicles (exosomes) and explaining feed efficiency or body composition in meat-producing crossbred cattle raised on grass. Its program relies on the hypothesis that the integration of proteomic and lipidomic exosomal signatures and phenotypic data will characterize the mechanisms involved in these phenotypes and identify minimally invasive biomarkers to characterize them.

■ In order to meet the objective of the thesis, you will be more particularly in charge of:

- 1) Optimizing newly acquired methods for preparing bovine plasma exosomes
- 2) Preparing and characterizing plasma exosomes from cattle raised according to two production systems valuing the grassland resource (especially grazed) and cattle crosses (meat x dairy)
- 3) Using proteomics and lipidomics approaches to characterize exosomal molecular signatures associated with phenotypes of feed efficiency or body composition in these modes of production. Statistical methods to integrate data of various nature (omics and phenotypic) will be implemented.

■ **Special conditions of activity**

The thesis will be carried out in the Biomarkers team of the UMR Herbivores ([web site](#)) at the Theix site of the INRAE Clermont-Auvergne-Rhône-Alpes Research Centre (63122 Saint-Genès-Champanelle) accessible by a free shuttle.

THE PROFILE WE ARE LOOKING FOR

- **Recommended training:** Master in cellular and molecular biology or in animal physiology.
- **Desired knowledge:** whole-body physiology in mammals, datamining.
- **Experience appreciated:** data analysis on R, M2 internship or end of study carried out in a research laboratory
- **Skills sought:** writing and presentation skills will be appreciated. Knowledge of physiology or livestock in general will be an advantage for the understanding of the project.

YOUR QUALITY OF LIFE AT INRAE

By joining INRAE, you will be able to benefit from the type of contract:

- [sports and cultural activities](#)
- collective catering.

↘ Reception arrangements

- Unit: **UMR Herbivores**
- Postal code + city : **63122 St Genès Champanelle**
- Type of contract : **fixed term contract**
- Duration of the contract : **36 months**
- Date of entry into office : **01/11/2022**
- Remuneration : **1975 € monthly gross**

↘ How to apply

Send a cover letter and CV to Isabelle CASSAR-MALEK & Muriel BONNET:
isabelle.cassar-malek@inrae.fr
muriel.bonnet@inrae.fr

Write to the 2 supervisors

✘ Deadline to apply : September 1, 2022