

Faculty of Biological, Agronomic and Environmental Engineering

BRAI2102 Advanced animal physiology and biochemistry

[22.5h+0h exercises] 2 credits

This course is taught in the 2nd semester

Teacher(s): Cathy Debier, Isabelle Donnay
Language: French
Level: Second cycle

Aims

At the end of the course, the student will have acquired a detailed knowledge of important physiological functions (digestion, reproduction, lactation) aiming at improving the command of ruminant productions.

The ruminants have been chosen as animal model because of their physiological complexity, their capacity to develop in very different and sometimes hostile environments, and their importance at the international level.

Main themes

At first, the functional specificities of the digestive tract of different ruminant species (with a special focus on reared animals) are analysed in order to understand the means necessary to reach the nutritional equilibrium between energy and nitrogen.

The second step deals with a study of the reproductive system of cattle with the aim of understanding the techniques of assisted reproduction (ART).

Based on a better knowledge regarding both digestion and reproduction, the course deals then with the biochemistry of the lactation process, the metabolic imbalance associated to the lactation period, and the physiological impact of an imbalanced diet, in terms of energy and nitrogen, in reared ruminants.

Content and teaching methods

The course comprises two parts of 1 ECTS each.

Part A (1 ECTS) starts with a revision of the motility behaviour of the digestive tract of reared ruminants. It then gives a detailed description of the anatomical and functional specificities of digestion that allow to classify these animals in different groups (grazers, browsers, intermediate feeders), in relation with their production capacities (0.5 ECTS). Part A then offers a reminder of the techniques used to detect the heat of animals and to diagnose the gestation status in cattle. It then presents the techniques used to synchronise/induce the oestrus, induce multiple ovulations, transfer embryos, produce embryos in vitro, and perform artificial insemination, cloning and transgenesis in these animals (0.5 ECTS).

Part B (1 ECTS) gives a detailed view of the biochemistry of lactation, of the metabolic adaptations necessary in the whole body to allow the secretion of large quantities of milk (in the case of high yielding cows), as well as of the major metabolic diseases associated with lactation (milk fever, ketosis) (0.5 ECTS). On the basis of published experiments, Part B also deals with the metabolic consequences of a nitrogen/energy imbalance in reared ruminants (0.5 ECTS).

Other credits in programs

BIR22/8A Deuxième année du programme conduisant au grade de (2 credits)
 bio-ingénieur : Sciences agronomiques (Intégrée, productions animales, végétales & économie)