

Ecole doctorale Vie et Santé, Université de STRASBOURG

Open PhD thesis project for the competition to 3 year PhD Fellowship of the French Ministry

Project : Metabolic and circadian impact of time-access to a balanced vs. unbalanced diet: study in a diurnal animal model

Growing knowledge suggests that appropriately timed and regular meals are beneficial for metabolic health and well-being. Indeed, it has been observed that people with high-energy dinners and/or erratic or nocturnal eating habits have an increased incidence of type 2 diabetes, obesity and cardiovascular disease. The central mechanisms behind these temporal aspects of food intake are poorly understood. Within the central nervous system, the hypothalamus is involved in the control of food intake, satiety, energy homeostasis and the temporal organization of all biological functions and behaviors related to the hypothalamic circadian biological clock. Thus, the project aims to study chrononutrition in *Arvicanthis ansorgei*, a relevant diurnal rodent with characteristics similar to those of humans, such as daytime wakefulness, nocturnal sleep and a cone-rich retina.

The first objective aims to characterize the feeding pattern of our diurnal rodent model fed with a balanced diet. We will determine the temporal structure over 24 hours of consumption (feeding rhythm), meal periods, number and duration of meals in animals exposed to a light-dark cycle (daily rhythm) and then transferred to constant darkness (circadian rhythm). At the same time, the circadian profiles of metabolic hormones (insulin, leptin and corticosterone), metabolites (glucose, fatty acids, triglycerides) as well as those of energy expenditure and respiratory quotient will be evaluated. In addition, we will analyze the daily profiles of (i) clock gene expression in hypothalamic structures involved in the temporal regulation of food intake and (ii) the concentrations of neuropeptides involved in the homeostatic control of food intake (orexins, NPY, histamine and CCK) that will be quantified in cerebrospinal fluid.

Aim 2 is to characterize feeding pattern and metabolic disturbances induced by unbalanced diets. Thus, by quantifying the same parameters as those mentioned in objective 1, we will evaluate which kind of metabolic, homeostasis and rhythmic disturbances are induced by an unbalanced diet (enriched in fat/sugar) when this diet is delivered (i) without temporal restriction and (ii) only in the evening or in the morning. We hypothesize that the disturbances following morning ingestion could be less, since this food intake is a break in the fast following the resting period of this diurnal model.

This project, which has already been ethically validated and authorized by ministerial authorities, will improve fundamental knowledge on the feeding behavior of diurnal mammals and recommendations for a healthier diet for metabolism, health and well-being.

The candidate will apply for 3 year PhD Fellowship of the French Ministry in June 2021. Training for the selection process will be provided by the host research laboratory. The candidate should have a good [knowledge in animal physiology and neurosciences](#). [Experience in animal handling, will be appreciated](#)

Contact us before mid May 2021: Send your application (cover letter with motivations, CV with academic grades) to either : Sylvie Raison: raison@unistra.fr / Dominique Ciocca : ciocca@neuro-cnrs.unistra.fr / Etienne Challet : challet@inci-cnrs.unistra.fr

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