

Title

Regulation of physiological and biochemical parameters during moderate intensity training in a dyslipidemic Wistar rat. Evaluation of the efficiency of microalgal extracts used as food supplements.

Doctoral school

EDSML – Bretagne Loire

<https://theses.doctorat-bretagneloire.fr/sml/theses-2022>

Laboratory

Le Mans University – BiOSSE – Biology of Organisms, Stress Health Environment

Supervision

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Scientific context

A sedentary lifestyle increases the risk of cardiovascular diseases development in association with metabolic disorders that can induce dyslipidemia and diabetes. Several cellular mechanisms are involved in the installation of these metabolic disorders. Among these, the inflammation, oxidative stress, hormonal disorders or dysregulation of lipid or carbohydrate metabolism can be cited.

Numerous nutritional studies have already shown the benefit of food supplementation based on biologically active molecules that can be used in prevention of the onset of metabolic disorders leading to cardiovascular diseases. Among these dietary supplements, marine animal and plant sources, rich in omega-3 fatty acids, carotenoids and phytosterols, are known to prevent cardiovascular risk, dyslipidemia or carbohydrate metabolism disorders.

The objective of this thesis is to evaluate the beneficial effects of a moderate intensity physical activity combined with marine food supplementation on the prevention of the onset of dyslipidemia.

Aim and objectives

In this context, the model rat male Wistar, will be submitted to endurance training together with diet supplementation using a marine microalgal extract. This extract, characterized, is an association of molecules on which few studies have been carried out. During this thesis, a hydrophylic and a liposoluble extract will be tested. In this work, different physiological, biochemical and molecular parameters will be monitored, in association with (i) muscle activity, (ii) the use of lipid and carbohydrates stocks, (iii) mechanisms of inflammation and oxidative stress, and (iv) the physical recovery during training protocol. These parameters will be studied in different tissues such as blood, liver, skeletal muscle and adipose tissue.

In order to identify the role played by each compound contained in the microalgal extracts, in vitro studies will be conducted on a hepatic cell line.

Profile and skills: the candidate will have a background in animal physiology, metabolism and/or cell biology. Knowledge of biochemical, molecular and omics analyses will be appreciated.

Keywords: physical activity - dyslipidemia - metabolic regulation - food supplement – microalgae - animal and cellular models