

DOKTORSKÝ STUDIJNÍ PROGRAM/DOCTORAL STUDY PROGRAM**VYPSÁNÍ TÉMATU/LISTING OF TOPIC**

Studijní program/*Study Program*: **Nutrition and Food**

Studijní obor/*Branch of Study*: **program without field**

Katedra/*Department of*: **chemie**

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Konzultant/*Co-supervisor*: **Ing. Matyáš Orsák, Ph.D.**

Forma studia/*Form of Study*: **Full_time**

Typ tématu/*Type of Theme*: Disposable

Téma/Topic: Study of molecular biomarkers in the etiopathogenesis of type 2 diabetes mellitus in biological matrices by metabolomic approaches

Hypotézy/Hypotheses:

1. T2DM pathogenesis corresponds to the concentration levels of signaling molecules - biomarkers
2. Biomarkers reflecting the pathogenesis of metabolic syndrome and T2DM are present in different concentrations in a number of different bio-matrices (adipose tissue, skeletal muscle, plasma, urine, etc.).
3. During the pathogenesis of T2DM, there is a change in the concentration of inflammatory biomarkers and oxidative stress biomarkers that are induced by diet and eating habits

Anotace/Summary: The topic of insulin resistance and metabolic syndrome has received considerable attention due to their contribution to the development of cardiovascular diseases and the increasing prevalence of type 2 diabetes mellitus. Despite a number of new insights into the pathogenesis of the metabolic syndrome gained through the development of molecular methods, many molecular mechanisms remain unresolved. The negative impact of oxidative stress and inflammation, and their common mechanism, is very likely to play an important role in the development of complications associated with the metabolic syndrome. Many questions regarding the negative effects of oxidative stress remain unresolved. The causes of oxidative stress in insulin resistance and diabetes are unknown, and it is not known whether it is due to increased free radical generation or insufficient intracellular antioxidant potential, which is of major importance in terms of potential therapeutic impact. Oxidative stress takes place in tissues where it can induce damage to cellular integrity, and therefore the causes and consequences of oxidative stress on disorders in individual organs cannot be assessed from plasma levels. Therefore, it is important to analyse oxidative stress parameters in individual tissues. Equally important is the question to what extent oxidative stress or the antioxidant system in tissues can be influenced by appropriate therapy. It follows that

the study of oxidative stress and the search for effective nutritional and pharmacological therapies using appropriate experimental models is highly desirable in terms of prevention or therapy of metabolic syndrome-associated disorders.

The aim of the present study is to demonstrate the increased concentrations of lipoperoxidation products observed in impaired glucose tolerance, in rats with extreme genetically fixed obesity. Biological material will be provided by the IKEM and the 1st and 2nd Medical Faculty of the UK. Experimental animals (rats) will be fed different nutritional schemes (different types of diets) and the health status of the rats will be monitored, including all biomarker panels (oxidative stress signaling molecules, inflammatory responses, etc.).

Zdroje financování práce/*Funding Sources*: source of department

V/In Praze

dne/*Date*: 20.01.2022

Podpis/*Signature*: