

**Reasoning of dissertation topic and competency of potential supervisor for admission into LSU biology doctoral studies with a participation of Tartu university 2024**

<b>Area of research (title and code)</b>	Biomedical Sciences
<b>Field of research (title and code)</b>	01B Biology
<b>Topic of research</b>	Health promotion
<b>Institution</b>	Lithuanian Sports University

**Potential supervisor**

<b>Pedagogical and scientific degree</b>	<b>Name, surname</b>	<b>Academic position</b>
Dr.	Aivaras Ratkevicius	Professor

**Short reasoning of proposed dissertation topic**

<b>Title</b>
Effects of medium-chain fatty acids on metabolic health and muscle function during weight rebound after interruption of semaglutide treatment or caloric restriction in mice
<b>Short research description (including aims and objectives) (maximum 1500 characters).</b> The overall aim of the study is to assess impact of medium chain fatty acids (MCFAs) supplements on weight rebound, body composition, metabolic and muscle health after withdrawal from semaglutide (S) treatment or caloric restriction (CR) in mice.  <b>Objective 1</b> is to compare effects of S treatment and CR on physical activity, weight loss, body composition, muscle and metabolic health when both interventions are matched by the same reduction in food intake. <b>Objective 2</b> is to compare effects of MCFA C8 and MCFA C:9 supplements on physical activity, body weight, body composition, muscle and metabolic health during weight rebound after withdrawal from S treatment or CR. <b>Objective 3</b> is to assess physiological adaptations of skeletal muscles to: a) weight loss induced by S treatment or CR, b) after weight rebound after withdrawal from S treatment or CR with and without MCFA supplements.
<b>Relevance of the problem, its novelty at national and international level (maximum 1500 characters).</b> 53% of adults in EU are overweight or obese (Eurostat 2021). One of the main strategies to tackle obesity is CR, but it is rarely sustainable and most people regain any lost weight (Jacquet et al. 2020). Development of pharmacological interventions against obesity accelerated after the discovery that glucagon-like peptide 1 (GLP-1) suppresses food intake in humans (8). Weekly injections of 2.4 mg of S (GLP-1 receptor agonist) resulted in ~17% weight loss over 62 weeks (Wilding et al. 2021). However, S can cause serious gastrointestinal problems while withdrawal from S treatment leads to weight rebound with significant negative consequences for health (Ruder et al. 2020)). It is likely that weight rebound after withdrawal of S treatment or CR will affect large numbers of people as use of GLP-1 receptor agonists spreads around the World. Recent studies show that dietary supplements of medium chain fatty acids (MCFAs) offer health benefits. 3-day supplements of MCFAs reduced negative consequences of hypercaloric HFD on insulin sensitivity in humans (Lundsgaard et al. 2021). It is important to investigate if these supplements can reduce body weight rebound or ameliorate worsening of metabolic health after withdrawal from S treatment or CR. C57Bl/6J mice, a model of human metabolism, can be used to carry out these investigations with rigid control of experimental conditions which are required in such studies.