

The reasoning of dissertation topic and competency of potential supervisor for admission onto joint LSU and TU doctoral studies in 2022

Area of research (title and code)	Natural Sciences (N 000)
Field of research (title and code)	Biology (N 010)
Topic of research	Genetics
Institution	Lithuanian sports university

Potential supervisor

Pedagogical and scientific degree	Alina Smalinskiene	Academic position
Professor, PhD		Professor

Short reasoning of proposed dissertation topic

Title "Genetic factors determining the formation of inguinal hernias in athletes and links with surgical or conservative treatment and its results"

While the risk of inguinal hernia is increased among first-degree relatives of individuals with a history of inguinal hernia, suggesting that there likely exist identifiable genetic risk factors responsible for many inguinal hernias, there is yet no data on the genetic or molecular markers predisposing athletes to inguinal hernia. Patients with an inguinal hernia present a disturbed collagen proportion with a reduced ratio of type I and type III collagen as well as abnormal ultra-structural changes of the deposited collagen. A defective collagen metabolism contributes to a decreased tensile strength and mechanical stability of both the connective tissues and the induced scar tissue. Therefore these alterations in collagen formation should be of central relevance in the pathophysiology of hernias. The genes encoding other extracellular proteins such as matrix metalloproteinases may also play an important role and therefore will be investigated in the frame of the current study. Pubalgic pain, also known as the athletic groin, is a quite common condition pestering career of many athletes. The underlying pathology involves inherited or acquired inguinal hernias of different severity.

Short research description (including aims and objectives) (maximum 1500 characters).

The proposed Ph.D. project aims to test the polymorphisms of the candidate genes coding for proteins of extracellular matrix as informative molecular markers predisposing to the risk of inguinal hernias under intense athletic training, as well as the usefulness of these markers in the prognosis of the outcomes of the condition.

Objectives:

1. To investigate polymorphisms of candidate genes encoding extracellular matrix proteins in athletes and control individuals and to evaluate the role of genetic varieties in inguinal hernias formation.
2. To evaluate the influence of intense sports training factors on the formation of inguinal hernias.
3. To evaluate the combined effect of genetic and intense sports training and environmental factors on the formation of inguinal hernia.

Relevance of the problem, its novelty at national and international level (maximum 1500 characters).

The combined effect of genetic and intense sports training factors for athletes with inguinal hernia will be performed for the first time in Lithuania. We hypothesize that SNPs of the extracellular matrix genes are associated with the incidence and the resolution of inguinal hernias in athletes, and the study implies that athletes detected to be at risk of inguinal hernias during the screening for predisposing molecular genetic markers might then be conditioned accordingly to mitigate the risk of the problem.

Research methods and possibilities for conducting these studies (maximum 1500 characters).

The study population of the affected subjects will be 200 competitive athletes of both genders with acute or long-term pain in either one or both legs. Athletes will undergo ultrasonographical differential diagnosis for having a groin hernia, suffering from other lesions, or rather having no aberrations from the normal anatomy. They will also be tested for the contractile function of knee extensors and flexors of both legs at different isokinetic speeds. Venous blood samples will be collected to purify genomic DNA from leucocytes by using commercially available kits. SNPs will be determined by RT-PCR. Then athletes will be either surgically or conservatively treated and followed up until recovery or for two years and allocated into either successful recovery or persistent pain group, and the association between the genetic markers and the outcome will be determined. The control group will consist of 200 asymptomatic athletes of similar age, training experience, competitive level, and sports represented, and they undergo the same screening and testing except for the medical treatment of the condition, even though ultrasound investigation reveals herniation or other abnormality.

Please indicate the links between the proposed topic for the doctoral thesis and biomechanics / physical therapy/sports study programs.

Undergraduate studies in Physical activity and public health and a master's degree in Sports physiology and genetics

Is the proposed topic for the doctoral thesis related to currently funded research projects? Please indicate the links between the proposed topic for the doctoral thesis and funded research projects

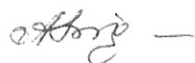
Not

Is the proposed topic for the doctoral thesis related to joint research with a foreign institution? Please indicate the links between the proposed topic for the doctoral thesis and research with a foreign institution

Not

Currently I am supervisor of one doctoral student.

Supervisor



(signature)

ALINA SMALINSKIENĖ

(Name, surname)

Date 13 05 2022