# Reasoning of dissertation topic and competency of potential supervisor for admission into LSU biology doctoral studies with a participation of Tartu university 2025

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| **Area of research (title)** | **Natural sciences** |
| **Field of research (title)** | **Biology** |
| **Topic of research** | **The impact of smoking on musculoskeletal system repair mechanisms** |
| **Institution** | **Lithuanian Sports University** |

**Potential supervisor**

| **Pedagogical and scientific degree** | **Name, surname** | **Academic position** |
|---|---|---|
| PhD | Danguole Satkunskiene | Professor |

**Short reasoning of proposed dissertation topic**

| **Title** |
|---|
| **Effects of Smoking on Tendon Injury, Regeneration, and Biomechanical Function** |
| **Short research description (including aims and objectives) (maximum 1500 characters).** |

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

Smoking introduces thousands of toxic chemicals into the body, including nicotine and reactive oxygen species (ROS), which together compromise cellular health, blood flow, oxygen delivery, and muscle tissue repair (Shirahata et al., 2025; Siafaka et al., 2007; Decker et al., 2023; Chen et al., 2023). Protein synthesis, a critical process in muscle and tendon hypertrophy and recovery, is significantly hampered in smokers (Goodman et al., 2013; Correia et al., 2022; Chen et al., 2018). Smoking also triggers chronic systemic inflammation, contributing further to impaired recovery. (Wang et al., 2022; Sharma et al., 2020; Saito et al., 2012). This shift reduces the muscle's ability to recover and perform prolonged physical tasks effectively.

Comparative studies between smokers and non-smokers have consistently found that smokers experience significantly slower recovery rates, reduced muscle strength, and higher fatigue levels after physical activity (Madani et al., 2012; Wiener et al., 2020; Mündel, 2017).

Additionally, smokers exhibit delayed collagen synthesis, compromised tendon repair, and longer times to return to baseline performance after exertion or injury (Gill et al., 2006). These effects can severely hinder rehabilitation efforts and extend the duration of physical therapy following musculoskeletal injuries. These findings emphasize the importance of integrating smoking cessation support into musculoskeletal rehabilitation programs to enhance recovery outcomes and long-term health.

Although the effects of smoking on skeletal muscle function are well-documented, the influence of smoking on tendon response to physical stress, recovery dynamics, and healing characteristics is still poorly understood.