

Vilniaus universitetas  
Medicinos fakultetas



# STUDENTŲ MOKSLINĖS VEIKLOS TINKLO LXXVI KONFERENCIJA



Vilnius, 2024 m. gegužės 13–17 d.

## **PRANEŠIMŲ TEZĖS**

Leidinį sudarė

VU MF Mokslo ir inovacijų skyriaus

inovacijų specialistas Kristijonas PUTEIKIS ir

administratorė Rima DAUNORAVIČIENĖ



VILNIAUS  
UNIVERSITETO  
LEIDYKLA

2024

## Mokslo komitetas:

doc. dr. Valdemaras Jotautas  
dr. Diana Bužinskienė  
prof. dr. Violeta Kvedarienė  
prof. dr. (HP) Saulius Vosylius  
prof. habil. dr. (HP) Gintautas Brimas  
Indrė Sakalauskaitė  
Laura Lukavičiūtė  
dr. Agnė Abraitienė  
doc. dr. Jūratė Pečeliūnienė  
prof. dr. Vaiva Hendrixson  
doc. dr. Ieva Stundienė  
prof. dr. Eglė Preikšaitienė  
doc. dr. Birutė Zablockienė  
prof. dr. Pranas Šerpytis  
Artūras Mackevičius

dr. Žymantas Jagelavičius  
doc. dr. Agnė Kirkliauskienė  
prof. dr. Marius Miglinas  
Žilvinas Chomanskis  
doc. dr. Kristina Ryliškienė  
prof. dr. Vilma Brukienė  
doc. dr. Saulius Galgauskas  
Andrius Žučenka  
doc. dr. Birutė Brasiūnienė  
doc. dr. Jaunius Kurtinaitis  
prof. dr. Eugenijus Lesinskas  
doc. dr. Goda Vaitkevičienė  
prof. dr. Alvydas Navickas  
doc. dr. Rima Viliūnienė  
prof. dr. (HP) Edvardas Danila

prof. dr. Nomedą Rima Valevičienė  
Teresė Palšytė  
doc. dr. Vytautas Tutkus  
doc. dr. Danutė Povilėnaitė  
dr. Viktorija Andrejevaitė  
prof. dr. Robertas Stasys Samalavičius  
dr. Agnė Jakavonytė-Akstinienė  
doc. dr. Jurgita Stasiūnienė  
dr. Arnas Bakavičius  
prof. dr. Gilvydas Verkauskas  
prof. dr. Sigitą Lesinskienė  
doc. dr. Marija Jakubauskienė  
prof. dr. (HP) Janina Tutkuvienė

## Organizacinis komitetas:

Kristina Marcinkevičiūtė  
Viktorija Rakovskaitė  
Austėja Grudytė  
Justina Semenkovaitė  
Matas Žekonis  
Rokas Žekonis  
Milvydė Marija Tamutytė  
Augustė Senulytė  
Miglė Miglinaitė  
Rokas Bartuška  
Damian Luka Mialkowskyj  
Karina Mickevičiūtė  
Jovita Patricija Druta  
Emilija Šauklytė

Austėja Račytė  
Tadas Abartis  
Mindaugas Smetaninas  
Rafal Sinkevič  
Gerda Šlažaitė  
Kamilė Čeponytė  
Einis Novičenko  
Benas Matuzevičius  
Gabriela Šimkonytė  
Ieva Ruzgytė  
Milda Mikalonytė  
gyd. rez. Valentinas Kūgis  
gyd. rez. Gabrielė Bielinytė  
Vėjas Vytautas Jokubynas

Deivilė Kvaraciejūtė  
Julija Pargaliauskaitė  
Paulius Montvila  
Rūta Bleifertaitė  
Alicija Šavareikaitė  
Julija Kondrotaitė  
Gediminas Gumbis  
Joana Leščevskaja  
Gabrielė Bajoraitė  
Augustinas Stasiūnas  
Odeta Aliukonytė  
Robertas Basijokas  
Elvin Francišek Bogdzevič

## EXPLORING NEUROPHYSIOLOGICAL AND CARDIOVASCULAR RESPONSES TO INTENSE PHYSICAL ACTIVITY: THE ROLE OF BRAIN-DERIVED NEUROTROPHIC FACTOR

**Author.** Damian Luka MIALKOWSKYJ, V year; Julija Elena KOEHNKE, VI year; Niklas–Immanuel HAUSTEIN, V year; Philipp Juergen Dieter KALKA, V year.

**Supervisor.** Prof. dr. Vaiva HENDRIXSON, VU MF Institute of Biomedical Sciences, Department of Physiology, Biochemistry, Microbiology and Laboratory Medicine.

**Background and Aim.** This study aims to investigate the interconnections between Brain–Derived Neurotrophic Factor (BDNF) levels and the perceived intensity of high–intensity exercise, as well as the immediate effect on heart rate. BDNF, a neurotrophin crucial for neuronal growth and synaptic plasticity, may demonstrate dynamic changes in response to varying exercise intensities. Understanding the relationship between BDNF levels, exercise intensity, and heart rate provides valuable insights into the neurobiological and cardiovascular adaptations induced by exercise. By exploring these connections, the study seeks to enhance comprehension of how exercise intensity influences BDNF secretion and its potential implications for cognitive and cardiovascular health.

**Materials and Methods.** Fifteen participants, consisting of eight women and seven men, were enrolled in this study, with all procedures conducted following ethical guidelines and informed consent obtained from each participant. Pre–exercise and post–exercise blood samples were collected from participants who refrained from any exercise activity for at least 48 hours prior to testing. These blood samples were analyzed for BDNF levels using enzyme–linked immunosorbent assay (ELISA) detection kits. Additionally, subjective ratings of high–intensity exercise intensity were recorded using standardized scales, along with immediate measurement of heart rate post–exercise.

**Results.** Analysis of the data obtained from the fifteen participants (n=15) revealed significant findings regarding the relationship between perceived intensity of high–intensity exercise and BDNF levels after exercise, as well as heart rate. Results indicated that following high–intensity exercise, BDNF levels were measured at a mean concentration of 15.554 ng/ml, and the mean heart rate immediately after exercise was recorded at 142.8 bpm. Participants reported a mean perceived exercise intensity of 7.867 out of 10. A Wilcoxon signed–rank exact test indicated significant associations between exercise intensity and post–exercise BDNF levels ( $V = 0$ ,  $p$ –value = 0.00006104), as well as heart rate, suggesting a correlation between exercise intensity and both physiological responses.

**Conclusions.** This study provides valuable insights into the connection between BDNF levels, exercise intensity, and heart rate following high-intensity exercise. The observed increase in BDNF levels suggests its potential role in mediating exercise-induced neurobiological adaptations, while the immediate elevation in heart rate reflects the acute cardiovascular response to intense physical activity. These findings underscore the importance of exercise intensity in modulating neurobiological and cardiovascular responses, highlighting the multifaceted benefits of high-intensity exercise for cognitive and cardiovascular health. However, the study is limited by its relatively small sample size. Therefore, further research with larger sample sizes is warranted to validate these findings and explore their implications for cognitive and cardiovascular outcomes.

**Keywords.** BDNF; Exercise Intensity; Heart Rate; Cognitive Health; Cardiovascular Health.