ME-CFS24-007 - The role of the skeletal muscle and myocardial metabolism in ME/CFS: in vivo MRS study.

Zusammenfassung

Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) is complex pathology comprising of physical fatigue and neurocognitive, autonomic and immunological symptoms. Several studies have shown that changes in skeletal muscle mitochondrial capacity are one of the hallmarks of ME/CFS. Furthermore, the presence of oxidative damage of lipid component, excitation-contraction alteration with modification of Ca2+ transport, passage from slow to fast fibre typology and the inability to increase glucose uptake framed the picture of “old muscle in a young body”. In this project we will apply state-of-the-art magnetic resonance spectroscopy and imaging (MRS/I) to characterize the skeletal muscle and cardiac morphology and biochemistry in patients with long Covid w/o ME/CFS and compare it to healthy volunteers. Applying non-invasive dynamic 31P MRS we will measure mitochondrial oxidative capacity. 1H MRS will be applied to measure skeletal muscle carnosine, intracellular lipid content and lactate accumulation following the exercise test and static 31P MRS to measure recently suggested surrogate marker of aging and insulin resistance – glycerophosphocholine. Patients will undergo thorough clinical functional examination and metabolic phenotyping. Research included in this project will create new knowledge about the tissue specific molecular mechanisms of ME/CFS. It will bring together details on relations of skeletal muscle mitochondrial capacity, cardiac energy metabolism and function to whole body fitness, circulating biomarkers and clinical phenotype of ME/CFS. We will use the knowledge of these study results to create new hypotheses for our next research steps including assessments following specific therapy regimens and broader population enabling for example assessment of possible covariates (sex, age, metabolic diseases, lifestyle). Inclusion of clinical site in the project team will facilitate the translation of the research results into clinical practice.

Wissenschaftliche Disziplinen:
Radiology (40%) | Metabolic diseases (30%) | Medical rehabilitation (30%)

Schlagworte:
Magnetic resonanceMetabolismMuscleHeartExercise challengeChronic Fatigue SyndromCOVID

Principal Investigator:	Martin Krssak
Institution:	Medical University of Vienna
Co-Principal Investigator(s):	Ralf Harun Zwick (Ludwig Boltzmann Gesellschaft (LBG)) Thomas Scherer (Medical University of Vienna)



Status: Abgeschlossen (01.01.2025 – 31.07.2026)
GrantID: 10.47379/MECFS24007

Weiterführende Links zu den beteiligten Personen und zum Projekt finden Sie unter

https://wwtf.at/funding/programmes/ei/ME-CFS24-007/