

Invited symposium 15. Nordic meeting in Neuropsychology, Trondheim, 2024

**Title of symposium:** Mechanisms mediating cognitive effects of physical training

**Chair:** Jens Egeland, Director of Research, Clinic of Mental Health and Addiction, Vestfold Hospital Trust and professor University of Oslo, Norway.

**Presenters:**

- Atefe Rafiee Tari, leader research group on circulation and imaging, Faculty of Medicine & Health Science, Norwegian University of Science and Technology, Trondheim, Norway.
- Gry Bang-Kittilsen, PhD candidate, clinical neuropsychologist, Vestfold Health Care Trust, Tønsberg, Norway.
- Jonna Nilsson, Assistant Professor, Swedish School of Sport and Health Sciences, Stockholm, Sweden.
- Joseph Firth, MD, PhD, University of Manchester, UK.

**Brief description of symposium:**

Tari's talk will be about the underlying mechanisms of the seemingly protective effects of exercise on the brain. Findings from her group suggest that systemic neurotrophic factors are induced by exercise, and that some factors released into blood following exercise might cross the blood-brain barrier, or exert protective brain effects via other neurotrophic factors. She asks whether transfusion of exercise-induced molecules protect against Alzheimer's disease?

Bang-Kittilsen asks what characterizes patients with schizophrenia that respond with improved neurocognitive functions following physical exercise? It could be intervention factors such as exercise mode, intensity, frequency and duration, or sex, age or duration of illness. She will explore mediating and moderating factors in secondary analyses from a previous RCT, especially the relationship between the brain-derived neurotrophic factor and neurocognitive response to exercise.

Nilssons's talk will first summarize the current state of the research field, using a recent umbrella review as a starting point. The absence of firm theoretical models of the mechanisms involved will be highlighted as one likely cause of the unsatisfactory progress in the field. She will describe findings from experimental studies centered on some of the proposed mechanisms, including brain-derived neurotrophic factor and conclude with a humble call for continued theory building to allow progress beyond the present black-box approach.

Firth will depart from general population research demonstrating how physical exercise improve cognitive function, increase brain health and reduce risk and effects of aging-related diseases. Findings from interventional research in people with psychotic disorders will be presented, the neurological mechanisms explored, and detail how exercise type, dose and style of administration impact on effectiveness. The presentation will conclude with examples of practical and effective implementation of exercise schemes in mental healthcare for psychosis, discussing how future research can build on the existing findings.