EDA OSLO 2026
DELIRIUM: FROM MECHANISMS TO BETTER CARE
Pathophysiology day
4 November 2026
Radisson Blu Scandinavia Hotel, Oslo

Registration and coffee

Time: from 09:00

Welcome

Time: 09:50–10:00

Colm Cunningham and Leiv Otto Watne

Session 1: Glymphatic system, CSF clearance and delirium

Time: 10:00–11:30

The other half of brain clearance: choroid plexus, barriers and CSF in the human brain



Per Selnes
Akershus University Hospital

Talk description: Most clinical delirium research meets the brain's fluids through a lumbar puncture, and much current thinking about brain clearance runs through the glymphatic hypothesis. Both depend on a larger system that is easy to overlook: the choroid plexus, which produces much of the CSF and forms the blood–CSF barrier, and the perivascular and meningeal routes by which fluid and solutes leave the brain. This talk offers a clinician's map of that system – how CSF is made, where it goes, how it is cleared, and which parts can be measured in living humans with MRI and CSF markers. I will use Skogholt's disease, a rare maternally inherited disorder of choroid plexus–centred clearance failure, as a human model of

what happens when one part of the system breaks down, and close with what this means for how we sample and interpret CSF in delirium.

Bio: Per Selnes is a neurologist and Head of Research in the Division of Medicine at Akershus University Hospital. He holds a PhD on neurodegeneration with a focus on MRI and began his research career in Alzheimer's disease. His current work centres on the brain's fluid interfaces – the choroid plexus, the blood–CSF barrier and CSF clearance – combining advanced MRI with CSF proteomics. He leads a research programme on Skogholt's disease, a rare maternally inherited disorder that his group has characterised as a choroid plexus–centred clearance failure, and uses it as a human model for clearance mechanisms relevant to dementia and delirium. He also leads the hospital side of the EpiGen translational research environment.

Brain blood flow, glymphatic system, astrocyte/neuron interplay and real-time cellular metabolic imaging

Rune Enger
University of Oslo

Talk description: Mouse models exploring brain blood flow, glymphatic system, astrocyte/neuron interplay and real-time cellular metabolic imaging.

Glymphatic dysfunction as a driver of delirium



Hans Christian Boesen (Denmark)
Zealand University Hospital

Talk description:

- Brief introduction to the glymphatic system and to glymphatic dysfunction as a unifying hypothesis for delirium.
- Mechanical ventilation and anaesthesia – a new murine delirium model: Glymphatic stagnation and raised ICP leads to delirium and neuroinflammation in mice.
- Perspectives and measurement of glymphatic function in human.

Bio: Hans Christian Toft Boesen, MD, EDIC, SSAI, Specialist in Anaesthesiology and intensive care. Clinical work in intensive care focusing on delirium, and sleep promotion, starting out in 2010 implementing CAM-ICU and non-sedation. Sleep-studies with polysomnography in ICU-delirium. In cooperation with Professor Maiken Nedergaard's group suggesting glymphatic dysfunction as a unifying hypothesis for delirium.

11:30–12:00	**Coffee break**

Session 2: New techniques and opportunities in delirium research

Time: 12:00–13:00

Interplay between delirium, frailty, dementia and biomarkers in the HUNT cohort (n=10,000)



Geir Selbæk (Norway)
Norwegian National Centre for Ageing and Health;
University of Oslo

Talk description: Delirium and dementia are closely linked, but the biological mechanisms underlying their relationship are incompletely understood. This presentation will provide an overview of the HUNT4 70+ cohort, a population-based study of nearly 10,000 older adults with comprehensive cognitive assessment and biomarker data. Using the concepts of resistance and resilience, I will discuss why some individuals maintain cognitive health despite substantial risk or underlying pathology. Attention will be given to plasma biomarkers of Alzheimer's disease neuropathological changes (p-tau217) and neurodegeneration (neurofilament light, NfL), and their relationship with cognitive impairment and dementia. Finally, I will present preliminary findings on the association between p-tau217 and subsequent risk of delirium, and explore factors associated with resistance to delirium among individuals at increased risk.

Bio: Geir Selbæk is a psychiatrist, Research Director at the Norwegian Centre for Ageing and Health and Professor of Geriatric Medicine at the University of Oslo. His research focuses on ageing and cognitive impairment in population-based studies, particularly in the Health Study in Trøndelag (HUNT). He is a member of the Lancet Commission on Dementia Prevention, Intervention and Care.

Exploring the cellular and molecular mechanisms of delirium using human stem cell-derived models



Sofie Lautrup (Denmark)
Akershus University Hospital;
University of Oslo

Johannes Frank
Akershus University Hospital;
University of Oslo.

Talk description: Despite delirium being a common and serious complication in hospitalised patients, our understanding of the cellular and molecular mechanisms underlying this condition remains limited. Current research relies heavily on clinical observations and analyses of patient-derived samples, such as blood and cerebrospinal fluid, making it challenging to investigate and validate potential disease mechanisms. To address this gap, we are developing human induced

pluripotent stem cell (iPSC)-derived models to investigate the cellular responses associated with delirium. By combining different neural cell types and genetic backgrounds, we aim to explore the role of neuroinflammation and its potential links to neurodegeneration. Our work seeks to establish a clinically relevant experimental platform that will facilitate mechanistic studies and advance our understanding of delirium and its association with long-term cognitive impairment.

Bio – Sofie Lautrup: Dr Sofie Lautrup is a molecular biologist and researcher at Akershus University Hospital and the University of Oslo. During her PhD at Aarhus University, Denmark, she investigated links between DNA repair, ageing, and cognitive function, and also studied mechanisms of premature ageing (MAD 2018). She worked in Dr Vilhelm A. Bohr's laboratory at the National Institute on Aging, USA, investigating NAD+ metabolism and mitochondrial function in models of Alzheimer's disease, work she has expanded on during her post-doc in the Evandro Fei Fang laboratory in Oslo. Her current research focuses on the molecular mechanisms underlying brain ageing and age-related neurological disorders, with particular emphasis on mitochondrial homeostasis, cellular stress responses, and mechanisms of neuronal vulnerability. More recently, her research has expanded to delirium, integrating human samples with experimental models to better understand its underlying biology. Dr Lautrup has authored or co-authored more than 30 scientific publications among others in Alzheimer's & Dementia, Nature Neuroscience, Nature Aging and Aging Cell.

Bio – Johannes Frank: Johannes Frank is a PhD fellow in the Fang laboratory at Akershus University Hospital and the University of Oslo. He holds a master's degree in Molecular Biology with a major in Neuroscience from the University of Vienna, Austria, where he worked with *C. elegans* models of Alzheimer's disease. His current research focuses on ferroptosis across the lifespan and its contribution to neurodegenerative disease, with particular interest in cellular stress responses and mechanisms of neuronal vulnerability. His fellowship is funded by the Marie Skłodowska-Curie Actions Doctoral Network NADIS and includes research secondments at Amsterdam University Medical Centers, The Netherlands, and Institut Imagine in Paris, France. These experiences have broadened his expertise in molecular and cellular approaches to ageing and neurological disease.

13:00–14:00	**Lunch (Restaurant)**

Session 3: Delirium and metabolism

Time: 14:00–15:30

Changes in brain energy metabolism in mouse and humans: from cross-sectional to real time



Colm Cunningham (Ireland)
Trinity College Dublin

Bio: Dr Colm Cunningham is an Associate Professor in Neuroscience, in the School of Biochemistry and Immunology in Trinity College Dublin (TCD). His main research interest is to develop and study animal models to understand the impact of inflammation, in particular systemic inflammation, on brain function and neurodegeneration. He obtained a Ph.D. in Neurochemistry in TCD and did post-doctoral research with Prof. Hugh Perry's CNS inflammation group in the University of Southampton. He was awarded a Wellcome Trust Career Development Fellowship in 2006 to establish the first animal models of delirium during dementia in Trinity College Dublin and won a WT Senior Fellowship in 2010 to further pursue inflammatory mechanisms relevant to delirium. The interaction between prior neurodegenerative pathology and superimposed secondary insults in delirium and long-term cognitive decline is now the major focus of his work and his lab is currently supported by the US National Institutes of Health (NIH), The Irish Research Council and the Health Research Board.

Context dependent metabolic stress in delirium



Lasse Giil (Norway)
University of Bergen

Talk description: Delirium and metabolic coma can cause profound brain dysfunction that is often reversible. This talk presents a neuroenergetic framework proposing that illness-related synaptic dysfunction reduces neuronal ATP demand and helps stabilize the neuronal energetic state, including ATP free energy (ΔG), under stress. This response may preserve neuronal viability, at the cost of impaired network function, cognition and consciousness. This viewpoint makes several testable predictions about the relationship between brain functions (clinical or EEG activity), cerebral glucose and oxygen use, neuronal injury and neuronal ATP ΔG.

Metabolism of mice and men/women



Robert D. Sanders (Australia)
University of Sydney; Royal Prince Alfred Hospital

Talk description: Describing recent mouse work, as well as recent observational studies in humans (including unpublished data), Prof Sanders will build on recent papers implicating the kynurenine pathway in delirium and why this is critical to both the acute and long-term effects of delirium.

Bio: Prof Robert Sanders is the Nuffield Chair of Anaesthetics, University of Sydney; Academic Head of Department, Department of Anaesthetics, Royal Prince Alfred Hospital; a founding member of the European Society of Anaesthesiologists Task Force on Postoperative Delirium; and an Executive Committee member of the Australasian Delirium Association (Research Working group co-lead).

He is passionate about understanding the pathophysiology of delirium with his work including animal models and translational phenotyping studies in patients (neuroimaging, EEG, plasma biomarkers). The resulting knowledge has driven clinical trials. He co-designed, recruited patients for and published the MENDS2 RCT in the New England Journal of Medicine. He currently leads an NHMRC Clinical Trials Cohort Scheme-funded multicentre clinical trial to define the role of dexmedetomidine in preventing postoperative delirium after cardiac surgery. More recently he has started the MRFF-funded NOTBADD perioperative non-cardiac surgery delirium-prevention platform pilot study. In a new direction, our group has pioneered novel Bayesian meta-analysis tools to allow us to synthesize evidence rapidly and clearly for consumers.