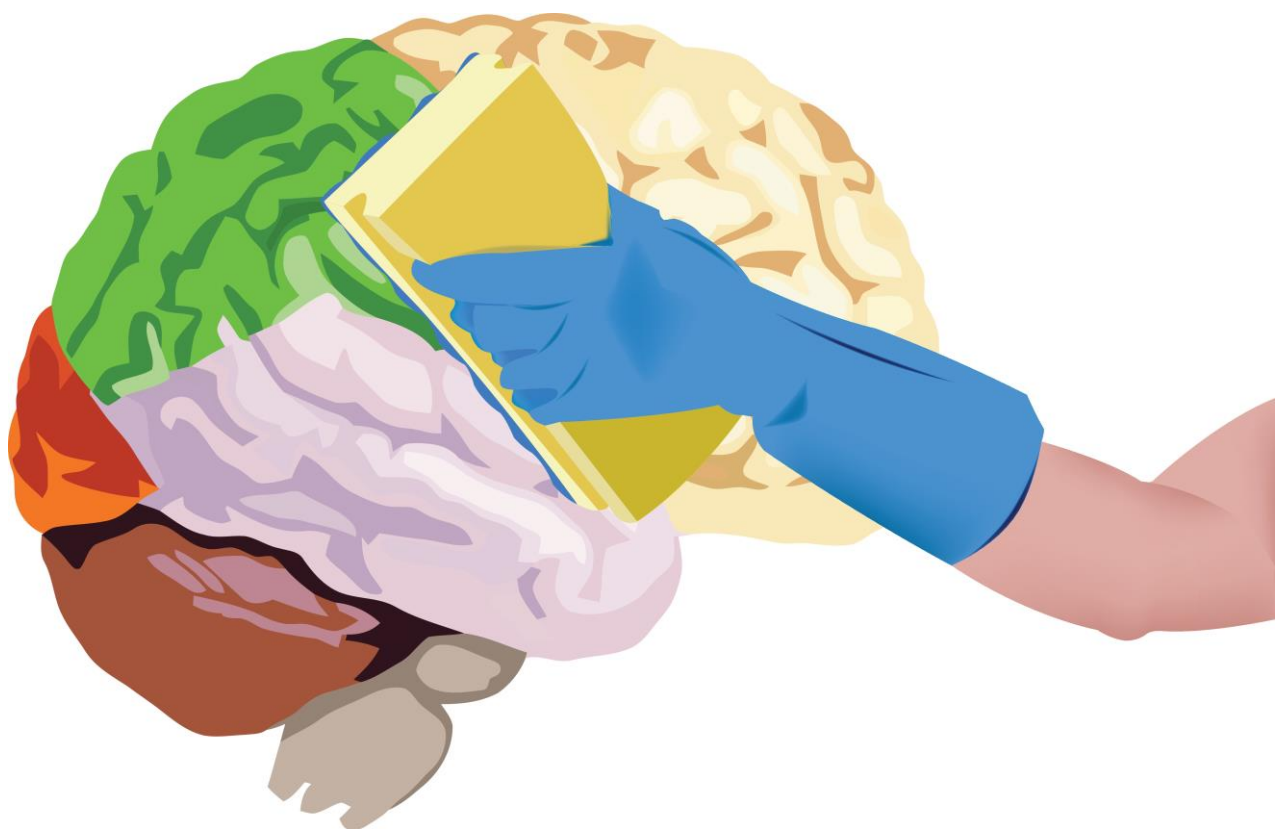




Annual Report of Research Activity 2017



Division of Clinical Neuroscience
University of Oslo and Oslo University Hospital





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Oslo University Hospital and The University of Oslo

Oslo University Hospital (OUH) is Norway's largest hospital with over 20 000 employees and a budget of 20 billion NOK. The Hospital has a local function for parts of Oslo's population. It has a regional function for the inhabitants in the South-Eastern Norway Regional Health Authority, and it also has a large number of national functions. The Hospital is responsible for the majority of medical research and education of health personnel in Norway.

The University of Oslo (UiO) is Norway's largest research and educational institution with 28 000 students and 7 000 employees. Professional breadth and internationally recognized research environments make UiO an important contributor to society. The Faculty of Medicine was established in 1814 and works for progressive education, research and dissemination for the patients' and society's best interests.

From Division Director Eva Bjørstad

Being the largest hospital in Norway, Oslo University Hospital provides highly specialized health care services to the citizens of Oslo and the Southeast health region. In addition, the Hospital has a nationwide responsibility for a number of national and multi-regional assignments. The Division of Clinical Neuroscience encompasses the fields neurology, neurosurgery, physical medicine and rehabilitation, neurohabilitation and neuropsychiatry. The proximity to patients and their medical issues are the cornerstones for the research conducted at our Hospital, and the research is aimed at improving patient care. High ethical standards ensure the confidentiality and our goal is to continuously improve diagnostics, treatment and management for all our patients.

Research activity at the Division of Clinical Neuroscience

The Division's research activity is organized into 15 different research groups covering a broad range of basic, clinical and epidemiological research with an overall aim to improve patient care with emphasis on diagnostic, therapeutic and preventive measures. Most group leaders have a combined position at Oslo University Hospital and the University of Oslo. In total the Division has 19 Professors, 5 Associate Professors, several postdoctoral fellowships and PhD students, administrative staff and technical staff. The Division has an advisory research board that in 2017 consisted of: Professor and Head of Research John-Anker Zwart, Division Director Eva Bjørstad, Senior Consultant Morten Lossius, Professor and Senior Consultant Eirik Helseth, Senior Consultant Mona Skjelland, Senior Consultant Nada Andelic, Senior Physical Therapist Slawomir Wojnusz, Quality and healthcare adviser Hege Hammer and Administrative Manager Agnete Hager. In 2017 there were in total 184 registered peer reviewed publications and 17 PhD dissertations.

Eva Bjørstad



Division of Clinical Neuroscience (NVR) Organizational Chart



*UiO employee(s)



Rehabilitation after trauma



Group Leader

Nada Andelic, MD/PhD, Researcher, Dept. of Nursing Science, UiO
(nada.andelic@medisin.uio.no) / OUH (nadand@ous-hf.no)

Group members

- Cecilie Røe, Professor, UiO
- Erik Bautz-Holter, Professor emeritus, UiO
- Helene Lundgaard Sjøberg, PhD, Senior researcher, OUH
- Unni Sveen, Professor, PhD, OUH
- Tonje Haug Nordenmark, PhD, Postdoc, OUH
- Marit V. Forslund, PhD, postdoc, UiO
- Tanja Karic, PhD, UiO
- Torgeir Hellstrøm, PhD, UiO
- Ingerid Kleffegaard, PhD fellow, OUH
- Mari S. Rasmussen, PhD fellow, UiO
- Emilie I. Howe, Cand Psych, PhD fellow, UiO
- Knut-Petter S. Langlo, PhD fellow, UiO
- Elin Western, PhD student
- Ida Maria Borgen Henriksen, PhD student, UiO
- Cathrine Buaas Tverdal, Mphil, UiO
- Sidsel Fjelltun, project coordinator, OUH

Associated group members

- Line Preede, MS research program, UiO

Research profile and aims

The research group generates knowledge about the mechanisms and consequences of trauma, patient care, trends and challenges in treatment and rehabilitation including the patients' healthcare needs. The main research focus is traumatic brain injuries (TBIs). The research conducted by this group is multidisciplinary and collaborative, where collaboration between genetics, intensive medicine, neurosurgery, neuroradiology, neuropsychology and rehabilitation has been established over the last 10 years. By combining the perspectives and methods of basal, clinical and health care service research, we may provide unique knowledge on the consequences of injuries, how to organize effective patient care and improve the functional outcomes after injuries.

The main aims are:

1. To better understand the mechanisms, course and consequences of TBI and multiple traumas by using translational research strategy.
2. To develop and build evidence based efficient protocols for the rehabilitation implementation.
3. To strengthen existing and initiate new national and international research collaborations on trauma/TBI research.

Main ongoing projects

- *Center-TBI (Collaborative European NeuroTrauma Effectiveness Research in TBI)*. Principal investigator at the Oslo University Hospital Study Site of Center-TBI Nada Andelic
- *The course of functional recovery after moderate-to-severe TBI (5, 10 and 20 years after injury)*. In collaboration with Sunnaas Rehabilitation hospital. Principal investigator Nada Andelic, Researchers: Torgeir Hellstrøm, Emilie I. Howe. Marit Forslund
- *The family as a resource for improved patient and family functioning after traumatic brain injury*. A randomized controlled trial of a family centered intervention. Principal investigator Helene L. Sjøberg, PhD fellow Mari S. Rasmussen
- *The effect evaluation of combined cognitive and vocational interventions after mild-to-moderate traumatic brain injury: a randomized controlled trial and qualitative process evaluation*. Principal Investigator: Nada Andelic, Phd fellows: Emilie I. Howe, Knut-Petter S. Langlo
- *Traumatic brain injury; needs and treatment options in the chronic phase. A randomized controlled community-based intervention*. Principal investigator: Cecilie Røe, PhD fellow Ida M. Borgen Henriksen
- *OSU6162 in the treatment of fatigue and other neuropsychological sequelae after aneurysmal subarachnoid hemorrhage - a double-blind, randomised, placebo-controlled study*. P Principal investigators Angelika Sorteberg, Tonje Haug Nordenmark. PhD fellow Elin Western

Other projects

- *Vestibular Rehabilitation for Patients with Dizziness and Balance Problems after Traumatic Brain Injury*. In collaboration with OsloMet – Oslo Metropolitan University. Principal investigator Helene L. Sjøberg; PhD fellow Ingerid Kleffegård
- *Global functioning and quality of life 5 and 10 years after aneurysmal subarachnoid hemorrhage*. Principal investigator Tonje Haug Nordenmark
- *Morphological brain damage and functional impairment following mild traumatic brain injury*. Principal investigators Cecilie Røe and Nada Andelic; PhD Torgeir Hellstrøm
- *Transitions in rehabilitation: Biographical reconstruction, experiential knowledge and professional expertise*. In collaboration with OsloMet. Investigators from OUH Helene L. Sjøberg and Unni Sveen
- *Effect of adapted physical activity and goal-setting on physical and mental health. In collaboration with Beitostølen Health Sport Center*. Principal investigators Cecilie Røe and Erik-Bautz Holter, fellow Line Preede

Funding

- European Union's Seventh Framework Programme for Research and Development
- Norwegian Research Council
- Norwegian Extra Foundation for Health and Rehabilitation
- University of Oslo
- Oslo University Hospital



Most important national and international collaborators

National

Oslo Traumatic Brain Injury Outcome and Rehabilitation Research Network (OBIOR-research network)
- Hospitals in the South-East Region including Sunnaas Rehabilitation Hospital
- The Norwegian University Hospitals
- OsloMet - Oslo Metropolitan University
- Department of Vocational Rehabilitation, Norwegian Labor and Welfare Administration, Oslo, Norway - NAV
- Universities of Oslo, Bergen, Trondheim and Tromsø

International

- Karolinska, Uppsala, Umeå and Salgrenska University Hospitals, Sweden
- Copenhagen University Hospital and Hammel Rehabilitation and Research Centre, Denmark
- Virginia Commonwealth University, Richmond, US
- BioCruces Health Research Institute, Spain
- University of California, San Diego, CA, USA
- University of Gottingen, Germany
- CENTER-TBI collaborators across the European hospitals/universities

Scientific production of the research group in 2017

Peer reviewed original research articles: 17

Other publications: 10

Selected publications:

Maas AIR, Menon DK, Adelson PD, Andelic N, Bell MJ, Belli A, Bragge P, Brazinova A, Büki A, Chesnut RM, Citerio G, Coburn M, Cooper DJ, Crowder AT, Czeiter E, Czosnyka M, Diaz-Arrastia R, Dreier JP, Duhaime AC, Ercole A, van Essen TA, Feigin VL, Gao G, Giacino J, Gonzalez-Lara LE et al. (2017). *“Traumatic brain injury: integrated approaches to improve prevention, clinical care, and research”* Lancet Neurol, 16 (12), 987-1048

Hellstrøm T, Kaufmann T, Andelic N, Soberg HL, Sigurdardottir S, Helseth E, Andreassen OA, Westlye LT (2017). Predicting Outcome 12 Months after Mild Traumatic Brain Injury in Patients Admitted to a Neurosurgery Service. Front Neurol, 8, 125

Soberg HL, Roe C, Brunborg C, von Steinbüchel N, Andelic N (2017). The Norwegian version of the QOLIBRI - a study of metric properties based on a 12 month follow-up of persons with traumatic brain injury. Health Qual Life Outcomes, 15 (1), 14



Painful musculoskeletal disorders



Group Leader

Cecilie Røe, Professor, Head of Dept of Physical Medicine and Rehabilitation, UiO
(cecilie.roe@medisin.uio.no)/ OUH (cecilie.roe@ous-hf.no)

Group Members

- Erik Bautz-Holter, Professor emeritus, UiO
- Siri Bjorland, PhD student, UiO
- Jens Ivar Brox, Professor, UiO
- Kaia Beck Engebretsen, PT, PhD, OUH
- Marte Heide, PhD student, UIO
- Aasne Hoksrud, PhD, OUH
- Marianne Bakke Johnsen, PhD, OUH
- Niels-Gunnar Juel, MD, OUH
- Synnøve Kvalheim, PhD student, UiO
- Elisabeth Kvalvaag, PhD student, UiO
- Aurora Lie Moen, PhD student, UiO
- Kjersti Myhre, PhD, OUH
- Marianne Mørk, PhD student, OUH
- Line Preede, Research line student, UiO
- Elina Schistad, PhD, postdoctoral student Pain Medicine, UiO
- Sigrid Skatteboe, PhD student, OUH
- Mirad Taso, PhD student, OUH

Research profile and aims

The research unit generates knowledge regarding diagnostics, treatment and rehabilitation of painful musculoskeletal conditions. The main focus is on neck, back and shoulder conditions. The research is multidisciplinary, and collaboration with basal, clinical and health care service milieus established. Based on the framework of the International Classification of Functioning, Disability and Health (ICF) and the biopsychosocial model, interaction between the genetic and other basal disease mechanisms with psychosocial, personal and environmental factors are studied regarding the course of pain, functioning and participation. Furthermore, developing and evaluating treatment models in prospective and randomized studies, aiming to improve functioning and return to work are focus areas.

The main aims are:

- To understand the mechanisms, course and consequences of painful musculoskeletal conditions.
- To develop and evaluate treatment models for painful musculoskeletal conditions.



Ongoing projects

- The long-term course of low back pain and radiculopathy. Principal investigators Cecilie Røe and Johannes Gjerstad, National Institute of Occupational health. PhD fellow Siri Bjorland
- Reliability of Modic changes. Principal investigator Elina Schistad
- Efficacy of labral repair, biceps tenodesis and diagnostic arthroscopy for SLAP lesions of the shoulder, a randomized controlled trial. Principal investigator Jens Ivar Brox. PhD fellow Cecilie Piene Schrøder
- Significance of diagnostics and effect of pressure wave treatment in addition to guided training. Pricipal investigator Cecilie Røe, PhD fellow Elisabeth Kvalvaag
- An investigation of neck/back and shoulder patients expectations to treatment outcome, regarding pain-reduction and functional improvements. Principal investigator Lars-Petter Granan. PhD fellow Sigrid Skatteboe
- Improving functioning and participation among persons with physical disabilities. Principal investigator Cecilie Røe. Research line student Line Preede
- Clinical course and prognostic factors for shoulder pain patients in primary and specialized care. Principal investigator Kaia Engebretsen
- Frozen shoulder- a prospective study with 4 years follow up. Principal investigator Niels Gunnar Juel
- Antibiotic treatment in patients with chronic low back pain and Modic Changes: randomized trial. Conducted by FORMI. Principal investigator in the research group Jens Ivar Brox and Elina Schistad
- A randomized controlled study of surgical versus non-surgical treatment for cervical radiculopathi. Pricipal investigator Jens Ivar Brox, PhD fellow Mirad Taso
- The effectiveness of radial extracorporeal shockwave therapy, standardized exercise program or usual care for patients with plantar fasciopathy. Study protocol for a double-blind, randomized, sham-controlled trial. Principal investigator Aasne Fenne Hoksrud, PhD fellow Marianne Mørk and Marte Heide.

Most important national and international collaborators

National

- Dept of Orthopaedics, OUH
- National Institute of Occupational Health
- Dept of Physical medicine and Rehabilitation at St Olavs Hospital / Trondheim University Hospital, University Hospital of North Norway and Haukeland University Hospital

International

- Torsten Gordh, Uppsala University, Sweden
- Juan Lu, Paul Perrin, Virginia Commonwealth University, US
- ICF Research Branch, Switzerland
- University of Munich, Switzerland
- University of Lucerne, Switzerland





Scientific production of the research group in 2017

Peer reviewed original research articles: 24

Doctoral dissertation:

Aurora Moen: Avhandling "Disc herniation, inflammatory mediators and lumbar radicular pain".
Dissertation UIO 17.02.17

Selected publications:

Bjorland, Siri; Røe, Cecilie; Moen, Aurora Lie; Schistad, Ellina Iordanova; Aqsa, Mahmood; Gjerstad, Johannes. Genetic predictors of recovery in low back and lumbar radicular pain. Pain 2017; Volum 158.(8) s. 1456-1460

Kvalvaag, Elisabeth Myrset; Brox, Jens Ivar; Engebretsen, Kaia Beck; Sjøberg, Helene L.; Juel, Niels Gunnar; Bautz-Holter, Erik; Sandvik, Leiv; Røe, Cecilie.
Effectiveness of radial extracorporeal shock wave therapy (rESWT) when combined with supervised exercises in patients with subacromial shoulder pain: a double-masked, randomized, sham-controlled trial. American Journal of Sports Medicine 2017; Volum 45.(11) s. 2547-2554

Schistad EI, Stubhaug A, Furberg AS, Engdahl BL, Nielsen CS (2017)
C-reactive protein and cold-pressor tolerance in the general population: the Tromsø Study
Pain, 158 (7), 1280-1288

Funding

- The Research Council of Norway
- South-Eastern Norway Regional Health Authority
- Sofies Minde Ortopedi
- Oslo University Hospital (interaction means)



Complex epilepsy



Group Leader

Morten I. Lossius, Consultant neurologist, National Centre for Epilepsy, OUH (mortenl@ous-hf.no) and Professor, UiO (morten.lossius@medisin.uio.no)

Group Members

- Marit Bjørnvold, MD/PhD, SSE
- Cecilie Johannessen Landmark, MSc/PhD, SSE and OsloMET
- Kristin Alfstad, MD/PhD, SSE
- Karl Otto Nakken, MD/PhD, SSE
- Erik Hessen, Prof dr.philos, SSE and UiO
- Magnhild Kverneland, MSc, SSE and UiO
- Kari Modalsli Aaberg, MD, SSE and UiO
- Hilde Karterud, Cand.san/PhD, SSE and UiO
- Antonia Villagran, MD, SSE and UiO
- Torleiv Svendsen, MD, SSE and UiO
- Silje Syrstad, Educationalist, UiO
- Oliver Henning, MD, SSE
- Sigrid Pedersen, MSc, SSE
- Eli B. Kyte, Clin. Neuro.Psych, SSE

Associated group members

- Anette Huuse Farnen, MD, Innlandet Hospital and UiO
- Marte Syvertsen, MD, Vestre Viken and UiO

Research profile and aims

Clinical research in patients with difficult-to-treat epilepsy, with particular focus on:

1. Characterization of different epilepsy syndromes (genotype/phenotype)
2. Clinical pharmacology of antiepileptic drugs
3. Different diagnostic and treatment options; EEG, pharmacotherapy, surgery, VNS, diets
4. Psychosocial, psychiatric and neurocognitive aspects
5. Psychogenic non-epileptic seizures

Ongoing projects

PhD candidates in the UiO PhD program:

- Hilde Karterud: *“Medically unexplained seizures: a qualitative study of the development of patients illness perceptions”*. Supervisor: Mette Bech Risør. Co-supervisor: Ole Rikard Haavet. Dissertation May 18, 2017
- Silje Syrstad: *Nocturnal epileptiform activity in EEG and language skills*. Supervisor: Solveig Alma Lyster. Co-supervisor: Marit Bjørnvold. Dissertation Dec 2017
- Kari Modalsli Aaberg: *Epilepsy in young children*. Supervisor: Camilla Stoltenberg. Co-supervisors: Pål Suren, Per Magnus, Richard Chin, and Morten I. Lossius
- Magnhild Kverneland: *Effect of modified Atkin’s diet in adult patients with pharmaco-resistant focal epilepsy. A randomized controlled study*. Supervisor: Karl Otto Nakken. Co-supervisor: Erik Taubøll
- Antonia Villagran. *Psychiatric comorbidity in patients with psychogenic non-epileptic seizures (PNES)*. Supervisor: Morten I. Lossius. Co-supervisor: Roderick Duncan
- Torleiv Svendsen: *Tolerability and efficacy of new antiepileptic drugs*. Supervisor: Cecilie Johannessen Landmark. Co-supervisors: Ole Morten Rønning and Morten I. Lossius
- Sigrid Pedersen: *Epilepsy in Children: The Impact of the Gut Microbiota and Epigenetics in Successful Treatment of Epilepsy*. Supervisor: Kaja Kristine Selmer. Co-supervisors: Knut Rudi, Per Ole Iversen, and Benedicte Alexandra Lie

Post doc:

- Silje Alvestad: *“Scandinavian multi-registry study of antiepileptic drug teratogenicity: the SCAN-A study”*

PhD-candidates not yet in the UiO PhD program:

- Eli B. Kyte: *Impact of epilepsy surgery on cognition, psychiatry and quality of life at the commencement of aging*. Supervisor: Morten I. Lossius
- Oliver Henning: *Sexuality, depression and side effects in refractory epilepsy patients*. Supervisor: Morten I. Lossius

PhD-candidates in the UiO PhD program, associated to the group:

- Anette Huuse Farnen: *Effect of epilepsy and antiepileptic drugs in pregnancy: cognition, neurodevelopmental symptoms and obstetric outcome in offspring – a prospective cohort study*. Supervisor: Morten I. Lossius. Co-supervisor: Merethe Øien

International projects:

- *“EURAP study. An International Antiepileptic Drugs and Pregnancy Registry”* (International concerted Action on the Teratogenesis of Anti-epileptic Drugs) (<http://www.eurapinternational.org/>); **Silje Alvestad and Kari Mette Lillestølen**, National coordinators

- “E-PILEPSY” is a pan European project, with the primary aim of improving awareness and accessibility of surgery for epilepsy across different countries. Epilepsy surgery is an established treatment in the management of individuals with drug resistant focal epilepsy (<http://www.e-pilepsy.eu/>); **Morten I. Lossius**, associated partner
- “Nordic prospective observational study of outcomes after rare epilepsysurgery procedures”; **Fridny Heimsdottir**
- “TRACE” (Transcutan VNS (t-VNS) for drug resistant epilepsy); **Oliver Henning, Konstantin Kostov**
- “Pharmacokinetic variability, efficacy and tolerability of a new antiepileptic drug, brivaracetam”. Scandinavian project between the National Center for Epilepsy in Norway and Denmark (Filadelfia, Dianalund); **Torleiv Svendsen**, medical leader, **Cecilie Johannessen Landmark**, project leader
- “Children with refractory epilepsy and use of the newest antiepileptic drugs”. Scandinavian project between the National Center for Epilepsy in Norway and Denmark (Filadelfia, Dianalund); Margrete Larsen Burns, Marina Nikoronova, responsible in Denmark, **Cecilie Johannessen Landmark**, project leader
- “EDDI EMG triggered seizure alarm”; **Oliver Henning** in cooperation with Danish Epilepsy Center Dianalund
- “Scandinavian multi-registry study of antiepileptic drug teratogenicity: the SCAN-A study”; **Silje Alvestad**, post-doc, in cooperation with UiB/Haukeland
- **Tosca**. Novartis. Prot.No CRAD001MIC03: “TuberOus SCLerosis Registry to IncreAse Disease Awareness” International multicenter study. **Marit Bjørnvold**, Principle Investigator, and **Caroline Lund**
- **EXIST 3**. Novartis (everolimus). Prot.No. CRAD001M2304: “A three-arm, randomized, double-blind, placebo-controlled study of 2 trough-ranges of everolimus as adjunctive therapy in patients with tuberous schlerosis complex (TSC) who have refractory partial-onset seizures”. International multicenter study; **Marit Bjørnvold**, Principle Investigator **Caroline Lund**

Most important national and international collaborators

National

- Prof. Eylert Brodtkorb, St. Olavs Hospital/ Trondheim University Hospital
- Prof. Erik Taubøll, OUH

International

- Prof. Torbjörn Tomson, Karolinska Institutet, Stockholm, Sweden. (“European Registry of Antiepileptic drugs and Pregnancy”)
- Professors P Ryvlin (Lyon), H Cross (London), K Braun (Utrecht), P Dimova (Sofia), S Francione (Milano), H Hecimovic (Zagreb), C Helmstaedter (Bonn), V Kimiskidis (Thessaloniki), K Malmgren (Göteborg), P Marusic (Praha), E Trinka (Salzburg), and B Steinhoff (Kork). (“The E-PILEPSY project”)
- Prof. Marina Nikoronova, Dianalund, Denmark (“Children and new antiepileptic drugs”)
- Prof. Christoph Helmstaedter Bonn University Hospital
- Prof. Kristina Malmgren, Sahlgrenska University Hospital





Funding

- South-Eastern Norway Regional Health Authority
- Norwegian ExtraFoundation for Health and Rehabilitation
- Innlandet Hospital Trust
- The Competence Centre for Mental Delay and Epilepsy
- ADHD network research Funds

Scientific production of the research group in 2017

Peer reviewed original research articles: 12

Other publications: 16

Dissertations 2:

Hilde Elisabeth Nordahl Karterud: *Perceptions of illness and self in adolescents and adults with psychogenic, non-epileptic seizures (PNES)*. May 18, 2017

Silje Syrstad: *Nocturnal epileptiform activity in EEG and language skills*. Des 14, 2017

Selected publications:

Aaberg KM, Surén P, Sjøraas CL, Bakken IJ, **Lossius MI**, Stoltenberg C, Chin R (2017).

“Seizures, syndromes, and etiologies in childhood epilepsy: The International League Against Epilepsy 1981, 1989, and 2017 classifications used in a population-based cohort”. *Epilepsia*, 58 (11) 1880-91

Aaberg KM, Gunnes N, Bakken IJ, Lund Sjøraas C, Berntsen A, Magnus P, **Lossius MI**, Stoltenberg C, Chin R, Surén P (2017). *“Incidence and Prevalence of Childhood Epilepsy: A Nationwide Cohort Study”*. *Pediatrics*, 139 (5)

Johannessen Landmark C, Burns ML, Baftiu A, Farnen AH, **Lossius MI**, **Johannessen SI**, Tomson T (2017). *“Pharmacokinetic variability of valproate in women of childbearing age”*. *Epilepsia*, 58 (10), e142-e146



Neurovascular - Hydrocephalus Research Group



Group Leader

Per Kristian Eide, Professor, Dept of Neurosurgery, UiO (p.k.eide@medisin.uio.no)/
Head of Section, Dept of Neurosurgery, OUH (peide@ous-hf.no)

Group Members

- Brastad Evensen, Karen, PhD fellow, OUH
- Dahlberg, Daniel, PhD fellow, OUH
- Eide, Per Kristian, professor, OUH
- Eidsvåg, Vigdis A, PhD fellow, OUH
- Fric, Radek, PhD fellow, OUH
- Evju, Øyvind, PhD fellow, UiO
- Hassan, Mahdi, PhD fellow, UiO
- Karic, Tanja, PhD, OUH
- Lindegaard, Karl-Fredrik, Professor, OUH
- Lundar, Tryggve, Professor, OUH
- Meling, Torstein R, Professor, OUH
- Paulsen, Henriette, PhD fellow, OUH
- Ringstad, Geir A., Senior Consultant, PhD fellow, OUH
- Slettebø, Haldor, Senior Consultant, OUH
- Sortberg, Angelika, dr.med., OUH
- Sorteberg, Wilhelm, dr.med., OUH
- Stanisic, Milo, dr.med., OUH

Research profile and aims

The research group focuses on clinical and translational neurosurgical research within the fields of neurovascular disease and cerebrospinal fluid disorders.

1. Cerebrovascular disorders. Cerebral hemodynamics. Focus on intracranial aneurysms and subarachnoid hemorrhage, including neurointensive monitoring and outcome.
2. Brain Monitoring. Several projects study intracranial pathophysiology with a strong focus on intracranial pressure and arterial blood pressure dynamics, and cerebral autoregulation.
3. Hydrocephalus. Studies focus on the pathophysiology of hydrocephalus and alterations in pressure dynamics in hydrocephalus and other brain water disorders. Translational research has been initiated to study molecular-genetic mechanisms of hydrocephalus and diseases involving disorders in brain water homeostasis. Clinical studies focus on outcome of treatment of hydrocephalus. Studies on imaging of CSF circulation.

Ongoing projects

- Pathophysiology by cerebral abscesses
- Pathophysiology of hydrocephalus and abnormal brain pressure
- Pathophysiology of subarachnoid hemorrhage and subdural hematomas
- Outcome of treatment of subarachnoid hemorrhage, vascular compression syndromes, stroke and hydrocephalus
- Bleeding Risks of cerebral aneurysms
- Rehabilitation after subarachnoid hemorrhage
- Diagnostic Imaging by disturbances in the cerebrospinal fluid circulation
- Non-invasive monitoring of intracranial pressure

Most important national and international collaborators

National

- Simula, UiO
- Physical medical dept, OUH
- Dept of Radiology, OUH
- Interventional Centre, OUH
- Dept of Informatics, UiO
- Dept of Mathematics, UiO
- Dept of Neurology, OUH
- Trauma Clinic , OUH
- Sunnaas Rehabilitation Hospital
- Institute of Basic Medical Sciences, UiO

International

- University of Gothenburg, Sweden (Prof. Hansson)

Funding

- South-Eastern Norway Regional Health Authority
- European Union

Scientific production of the research group in 2017

Peer reviewed original research articles: 21

Invited lectures at international congresses:>15

Doctoral dissertation:

Frič R The pathophysiology of Chiari malformation type I with respect to static and pulsatile intracranial pressure. Institute of Clinical Medicine, Faculty of Medicine, University of Oslo, ISBN 978-82-8377-141-1. Dissertation December 15th 2017.

Selected publications:

Eidsvaag VA, Hansson HA, Heuser K, Nagelhus EA, **Eide PK** (2017). Brain Capillary Ultrastructure in Idiopathic Normal Pressure Hydrocephalus: Relationship With Static and Pulsatile Intracranial Pressure. J Neuropathol Exp Neurol, 76 (12), 1034-1045.

Ringstad G, Vatnehol SAS, **Eide PK** (2017). Glymphatic MRI in idiopathic normal pressure hydrocephalus. Brain, 140 (10), 2691-2705.

Skodvin TØ, Johnsen LH, Gjertsen Ø, Isaksen JG, **Sorteberg A** (2017). Cerebral Aneurysm Morphology Before and After Rupture: Nationwide Case Series of 29 Aneurysms. Stroke, 48 (4), 880-886



Oslo Neurosurgical Outcome Study Group (ONOSG)



Professor Eirik Helseth, MD/PhD, Consultant neurosurgeon, Dept of Neurosurgery, Oslo University Hospital (eirik.helseth@ous-hf.no) and Professor of Neurosurgery, Faculty of Medicine, University of Oslo (eirik.helseth@medisin.uio.no)



Torstein Meling, MD/PhD, Consultant neurosurgeon, Dept of Neurosurgery, Oslo University Hospital (tmeling@ous-hf.no), Associate Professor of Neurosurgery, Faculty of Medicine, University of Oslo and Assistant Professor, Institute of Psychology, University of Oslo (t.r.meling@medisin.uio.no)

Group Members

- Petter Brandal, MD/PhD, OUH
- Bjarne Lied, MD/PhD, Oslofjordklinikken
- Tom Børge Johannesen, MD/PhD, OUH
- David Scheie, MD/PhD, Rigshospitalet, Copenhagen, Denmark
- Mads Aarhus, MD/PhD, OUH
- Einar Vik-Mo, MD/PhD, OUH
- Charlotte Halvorsen, MD, PhD fellow, OUH
- Hege Linnerud, MD/PhD, OUH
- Markus Wiedmann, MD/PhD, OUH
- Jon-Terje Ramm-Pettersen, MD/PhD, OUH
- Pål Rønning, MD/PhD, OUH
- Benjamin Lassen, MD, PhD fellow, OUH
- Marton König, MD, PhD fellow, Faculty of medicine, UiO
-
- Tor Brommeland, MD/PhD, OUH
- Ali Rizvi, MD, PhD fellow, OUH
- Christina Teisner Høstmælingen, MD, PhD fellow, OUH
- Cathrine Buaas Tverdal, registrar and researcher
- Ola Fougner Skaansar, medical student, UiO
- Ingar Næss, medical student
- Guro Jahr, MD
- Michele Da Broi, MD

Research profile and aims

Main focus on surgical complications and outcome after surgery for:

- Intracranial tumors
- Intraspinial tumors
- Outpatient spinal surgery
- Neurotrauma

Ongoing projects

- Intraspinal tumors – Surgical management
- Cervical trauma – Epidemiology and Surgical management
- Traumatic Brain Injury – Epidemiology and management
- Intracranial tumors – Epidemiology, imaging and management

PhD projects

- Skull base tumors - Marton König
- CNS lymphomas – Guro Jahr
- Intracranial meningiomas – Michele Da Broi
- Intraspinal Tumors – Charlotte Halvorsen
- Odontoid fractures – Ali Rizvi
- Subaxial fractures - Christina Teiner Høstmælingen

PhD dissertations 2017

- Pål Rønning – TBI
- Ben Heskestad – TBI
- Hege Linnerud – Cervical fractures
- Markus Wiedmann – Brain Tumor Epidemiology

Funding

South-Eastern Norway Regional Health Authority

Scientific production of the research group in 2017

Peer reviewed original research articles: 25

Invited lectures at international congresses: 27

Selected publications:

Hosainey SAM, Lassen B, Helseth E, and Meling TR. *“Risk factors for new-onset shunt-dependency after craniotomies for intracranial tumors in adult patients”*. Neurosurgical Review 2017;41(1):323-331. doi: 10.1007/s10143-017-0869-1.

König M, Osnes TA, Lobmaier I, Bjerkehagen B, Bruland ØS, Hall KS, Meling TR. *“Multimodal treatment of craniofacial osteosarcoma with high-grade histology. A single-center experience over 35 years”*. Neurosurgical Review 2017;40(3):449-460. doi.org/10.1007/s10143-016-0802-z

Robertsen A, Førde R, Skaga NO, Helseth E. *“Treatment-limiting decisions in patients with severe traumatic brain injury in a Norwegian regional trauma center”*. Scand J Trauma Resusc Emerg Med. 2017 Apr 26;25(1):44. doi: 10.1186/s13049-017-0385-x

Vilhelm Magnus Laboratory for Neurosurgical Research



Group Leader

Iver A. Langmoen, MD/PhD, Professor, Dept of Neurosurgery, UiO
(i.a.langmoen@medisin.uio.no) /Dept of Neurosurgery, OUH (UXLAIV@ous-hf.no)

Group Members:

- Cecilie J Sandberg, MSc, PhD, Lab manager/HR/Daily activities, OUH
- Einar O. Vik-Mo, MD, PhD, Deputy group leader, OUH
- Kirsten Strømme Kireulf-Vieira, MD, PhD-student, UiO (dissertation February 2017)
- Awais Mughal, MD, PhD-student, OUH (dissertation March 2017)
- Pål Rønning, MD, PhD student (dissertation November 2017)
- Artem Fayzullin, MD, PhD-student, UiO
- Erlend Skaga, MD, PhD-student, UiO
- Marit Brynjufsen, MSc, PhD-student, UiO
- Zanina Grieg, MSc, OUH
- Maria Ewa Walewska, MSc, OUH
- Birthe Mikkelsen, BSc, OUH (leave of absence)
- Emily Palmero, BSc, OUH (maternity leave)
- Maria Ewa Walewska, MSc, OUH

Research profile and aims

The Vilhelm Magnus Laboratory (VML) is a section within the Department of Neurosurgery focusing on translational research: exploration of the biology underlying neurosurgical conditions with an ambition of making contributions to novel treatments. Research efforts during the last 15 years have been concentrated on stem cells from the adult human brain and brain cancer. The studies on brain cancer are focused on glioblastoma (GBM) which is both the most frequent and most deadly brain cancer (median survival in unselected series ≈10 months).

Aims:

- To characterize cell types and cellular mechanisms in GBMs with special attention on GBM stem cells (GSCs)
- To develop therapeutic strategies against GCSs
- To characterize human brain stem cells and develop cell types for treatment of neurodegenerative disorders

Ongoing projects

Background

Fifteen years ago we showed for the first time that stem cells from the adult human brain could differentiate into functional neurons, and that it was possible to generate a small nervous system with numerous neurons that fired action potentials and communicated via synapses, from a single stem cell harvested from the adult human brain (Moe et al *Brain*, 2005;128:2189-99, Westerlund et al *Exp Cell Res.* 2003; 289:378-83, Moe et al *Neurosurgery* 2005;56:1182-8).

Simultaneously we started to grow cells from GBMs. A population of cells from these tumors turned out to have stem cell-like properties. We showed that a GBM only can be transferred from one animal to another by transplantation of cells from the GSC subpopulation, in keeping with other results indicating that it is this subpopulation that is responsible for recurrence, growth and drug resistance. We have therefore characterized GSCs quite extensively (Varghese et al *Neurosurgery.* 2008;63:1022-33; Vik-Mo et al, *Neuro Oncol*, 2010 Dec;12:1220-30, Vik-Mo et al, *Exp Cell Res*, 2011 Apr 15;317:1049-59, Joel et al, *Dev Dyn*, 2013;242:1078-93, Sandberg et al, *Exp Cell Res*, 2013 15;319:2230-43, Fayzullin et al *Exp Cell Res.* 2016 10;349:199-213, Mughal et al, *Neoplasia.* 2018;20(643-6569).

Development of a stem cell-based vaccine in patients with brain cancer:

We developed the first clinical protocol that targeted stem cells in a solid tumor by transducing dendritic cells from patients with their own GBM mRNA. This significantly improved clinical outcome. Almost one out of four of the patients are still alive. Vik-Mo et al, *Cancer Immunol Immunother.* Vik-Mo et al 2013;62:1499-509.

The responders have a median survival of 7 years and are still recurrence free. A randomized trial of the vaccine was certified by all required authorities and started in the spring of 2018. Our intention in the current study is also to clarify why some patients respond and others do not; by in-depth studies of individual tumors and treatment responses.

Individualized systems medicine strategy to target GSCs in patients with recurrent glioblastoma:

In collaboration with our partners at the Finnish Institute for Molecular Medicine, we are combining the novel technical possibilities of high-throughput screening and deep sequencing with our established know-how on patient specific tumor stem cell cultures. Exploring a panel of 525 drugs established in clinical use, as well as drugs in early-phase development, at five different concentrations, we have screened stem cells from individual tumors for drug sensitivity. The approach has been coined Individualized Systems Medicine. This study has shown that GBMs from individual patients are very heterogeneous with respect to drug sensitivity. A manuscript has been submitted for publication.

A clinical trial where we treat patients based on the result from this screening has been planned and applications to relevant authorities are being sent.

Coordinated undermining of survival paths with nine repurposed drugs (CUSP9) and temozolomide in patient-derived GBM samples:

A major barrier to effective treatment in glioblastoma is the simultaneous activity of multiple survival and growth-promoting mechanisms. A conceptually new treatment approach has emerged focusing on coordinated blockade of the native survival paths of GBMs. The coordinated blockade is

undertaken by nine clinically well-known and repurposed drugs concomitant with the cytotoxic and standard of care, temozolomide, in a drug cocktail termed CUSP9. We have evaluated the in vitro efficacy of CUSP9 in patient-derived GBM samples using clinical relative drug concentrations across several different experimental cell assays. The coordinated approach has demonstrated a broad efficacy among several patient samples and experimental cell assays, and as the drugs have well-known safety profiles the results are intriguing for translation to patient treatment. A manuscript has been submitted for publication.

Characterization of invasive GCSs at the single cell level:

Glioblastomas are characterized by diffusely infiltrative growth. To investigate the invasive properties of glioblastoma cells we film cells while they invade into rodent brain slices or 3D-biomatrixes using time-lapse microscopy. We have identified subpopulations of cells with different invasive potentials. These cells display specific movement patterns and morphology. This is part of a PhD project where the last paper has been submitted and the thesis is expected to be submitted in 2018.

Molecular targeting of cancer stem cells in glioblastoma:

By performing a systematic comparison of gene expression in adult human neural stem cells and GSCs, we have identified differentially expressed genes that may have the potential as new and specific targets for treatment of glioblastoma. Our results from exploring several of these genes and pathways in-depth, suggest a functional role for the Wnt signaling pathway, PBK and NAT12/NAA30 in GBM. As a strategy to more efficiently and directly identify targets that are likely to trigger a therapeutic response, we are currently focusing on genetic high throughput loss-of function screening as tools to identify both individual and shared target hits in patient derived GSC cell cultures.

Most important national and international collaborators

National

- Gunnar Kvalheim, OUH
- Steinar Aamdal, OUH
- Gustav Gaudernack, Targovax
- Stefan Krauss, OUH
- Ola Myklebust, OUH
- Petter Brandal, OUH
- Elsa Lundanes, UiO
- Steven Wilson, UiO

International

- Krister Wennerberg, Markus Perola, Finnish Institute for Molecular Medicine, Finland
- Aki Laakso, Emilia Gaa-Paavola, Töölö Hospital, Helsinki, Finland
- Rainer Glass, LMU, München, Germany
- Krishna Bhat and Frederick Lang, MD Anderson Cancer Center, Houston, USA
- Winston Hide, Harvard University, MA, USA



Funding

- Norwegian Cancer Society
- The Norwegian Research Council
- Norwegian Stemcell Network and CAST
- OUH, Dept of Neurosurgery

Scientific production of the research group in 2017

Peer reviewed original research articles: 1

Dissertations:

Kierulf-Vieira KS. *“WNT Signalling in Glioma Stem Cells”*. PhD thesis 2017.

Mughal AA. *“Identification and validation of potential therapeutic molecular targets in glioblastoma initiating cells and characterization of the invasive phenotype of GBM – Where are the tumor cells and how can they be targeted?”* PhD thesis 2017.

Rønning PA. *“Traumatic brain injury: challenges in prognostication and the impact of intracranial pressure monitoring.”* PhD thesis 2017.

Selected publications:

Mughal AA, Zhang L, Fayzullin A, Server A, Li Y, Wu Y, Glass R, Meling T, Langmoen IA, Leergaard TB, Vik-Mo EO *“Patters of Invasive Growth in Malignant Gliomas – The Hippocampus Emerges as an Invasion-Spared Brain Region”* Neoplasia. 2018 Jul;20(7):643-656. doi: 10.1016



Movement Disorders



Group Leader

Espen Dietrichs, MD/PhD, Professor and Head of Dept of Neurology, UiO
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Group Members

- Victoria Berge, MD
- Silje Bjerknes, MD
- Kari Anne Bjørnarå, MD PhD (Vestre Viken)
- Marion Ingeborg Boldingh, MD PhD
- Ahmed Elsaï, MD PhD
- Erik Eriksen, MD
- Jan Christian Frich, Prof MD PhD
- Vidar Gundersen, Prof MD PhD
- Sandra Pilar Henriksen
- Morten Andreas Horn, MD PhD
- Zafar Iqbal, PhD
- Emilia Kerty, Prof MD PhD
- Jeanette Koht, MD PhD (Vestre Viken)
- Nadja Anette Myrvik Kvernmo, MD
- Sven Olav Løstegaard
- Angelina Hatløy Maniaol, MD PhD
- Lasse Pihlstrøm, MD
- Trine Haug Popperud, MD
- Siri Lynne Rydning, MD
- Inger Marie Skogseid, MD PhD
- Chantal M.E. Tallaksen, Prof MD PhD
- Mathias Toft, Prof MD PhD
- Iselin Marie Wedding, MD PhD
- Margrete Langmyhr

Research profile and aims

Our research aims at mapping the clinical expression, natural progression and treatment of movement disorders and neuromuscular disorders, as well as their causes (genetic disposition, environmental factors, and pathophysiological mechanisms).

Clinical research is performed at both sites of Department of Neurology, i.e. at Rikshospitalet (The National Hospital) and at Ullevål University Hospital. Laboratory research is performed in the Neuroscience Research Unit in our new facilities at Domus Medica IV, close to Rikshospitalet. Our Department is the secondary referral center for all neurology in Oslo (mainly at Ullevål), and the tertiary referral center for neurology in the South-East Health Region of Norway (which includes one



half of the Norwegian population). In addition, we have different national functions, including deep brain stimulation (DBS) for movement disorders and other conditions (shared with St. Olav's Hospital).

Ongoing projects

Our research group studies movement disorders and neuromuscular disorders. We have projects with focus on, e.g., Parkinson's Disease, dystonia, tremors, ataxia and other cerebellar diseases, hereditary spastic paraparesis, Huntington's Disease, and myasthenia gravis. These include clinical research as well as laboratory research/translational research.

Most important national and international collaborators

National

- Division of Surgery and Clinical Neuroscience, UiO (Internal collaboration, joint academic and laboratory)
- The other university hospitals in Norway
- Vestre Viken Hospital Trust

International

- FIGHT-MG, a collaboration of leading neurologists and researchers within Myasthenia Gravis research in Europe
Sponsored by EU. FP7 Grant 242210
- LUMC, prof J.J.G.M Verschuuren
- P. Bernasconi, Department of Neurology IV, Neuromuscular Diseases and Neuroimmunology, Fondazione Istituto Neurologico «Carlo Besta», Milan, Italy
- COURAGE-PD consortium (consortium studying risk factors for Parkinson's disease, participants from 10 European countries)
- Genetic risk factors for Parkinson's disease in Scandinavia (Umeå, Lübeck/Denmark, Göteborg, Linköping, Bergen/Stavanger)
- GEO-PD (consortium with participants from 25 countries)
- Prof Ole Andreassen, UiO, DemGene - Genetics by Dementia
- European networks for ataxia and hereditary spastic paraparesis (HSP)

Funding

Among others:

- European Union
- The Research Council of Norway
- South-Eastern Norway Regional Health Authority
- Norwegian ExtraFoundation for Health and Rehabilitation



Scientific production of the research group in 2017

Peer reviewed original research articles: 26

Selected publications:

Berge-Seidl V, Pihlstrøm L, Maple-Grødem J, Forsgren L, Linder J, Larsen JP, Tysnes OB, Toft M (2017) *“The GBA variant E326K is associated with Parkinson's disease and explains a genome-wide association signal”*, *Neurosci Lett*, 658, 48-52 PubMed 28830825 WOS 000414115200009 Cristin 1518381 FullText (Details)

Popperud TH, Boldingh MI, Rasmussen M, Kerty E (2017) *“Juvenile myasthenia gravis in Norway: Clinical characteristics, treatment, and long-term outcome in a nationwide population-based cohort”*, *Eur J Paediatr Neurol*, 21 (5), 707-714 PubMed 28457757 WOS 000408784100008 Cristin 1522325 FullText (Details)

Rydning SL, Backe PH, Sousa MML, Iqbal Z, Øye AM, Sheng Y, Yang M, Lin X, Slupphaug G, Nordenmark TH, Vigeland MD, Bjørås M, Tallaksen CM, Selmer KK (2017) *“Novel UCHL1 mutations reveal new insights into ubiquitin processing”*, *Hum Mol Genet*, 26 (6), 1031-1040 PubMed 28007905 WOS 000400911000001 Cristin 1426355 FullText (Details)



Cerebrovascular Research Group, OUH/UiO



Group Leader

David Russell, Professor, Dept. of Neurology, UiO (david.russell@medisin.uio.no) /
Consultant, OUH (drussell@ous-hf.no)

Group Members

- Christian Lund, MD,PhD, OUH
- Mona Skjelland, MD,PhD, OUH
- Anne Hege Aamodt, MD,PhD, OUH
- Karolina Ryeng Skagen, MD,PhD fellow, OUH
- Mahtab Zamani, MD/PhD fellow
- Azhar Abbas, MD,PhD fellow, OUH
- Kjersti Johnsrud, MD/PhD fellow
- Maren Hysten Ranhoff, MD/PhD fellow
- Kristine Stø, MD/PhD fellow

Research profile and aims

The main goal is to conduct high-quality cerebrovascular research leading to new knowledge and hopefully better treatment of stroke patients. The research group will promote and facilitate the use of the European Cerebrovascular Research infrastructure (ECRI) for the completion of large national and international stroke studies.

Ongoing projects

- The Unstable Carotid Artery Plaque Study (UCAPS)
- The Norwegian Pediatric stroke Study (NPSS)
- The Norwegian Acute Stroke Prehospital Project (NASPP)
- The Norwegian Atrial Fibrillation and Stroke Study (NAFS)
- The Norwegian Vascular Dementia and Atherosclerosis Study (NVDAS)
- Advanced ultrasound methods for identification of carotid plaque instability
- Oslo Acute Revascularization Stroke Study (OSCAR)
- The Gut bacteria, Atherosclerosis and Ischemic Stroke Study

Most important national and international collaborators

National

- Prof. Lars Thomassen, Haukeland University Hospital
- Norwegian Air Ambulance Foundation (NLA)

International

- Prof. L Csiba, University of Debrecen Medical School, Hungary
- Prof. N Bornstein, Tel Aviv Sourasky University Medical Centre, Israel





Funding

- South-Eastern Norway Regional Health Authority
- The Research Council of Norway

Scientific production of the research group in 2017

Peer reviewed original research articles: 10

Selected publications:

Johnsrud K, Skagen K, Seierstad T, Skjelland M, Russell D, Revheim ME (2017). "18-FDG PET/CT for the quantification of inflammation in large carotid artery plaques". *J Nucl Cardiol*. 2017 Dec 5. doi: 10.1007/s12350-017-1121-7. PMID: 29209949. PubMed 29209949 Cistin 1553132 FullText (Details)

Hov MR, Zakariassen E, Lindner T, Nome T, Bache KG, Røislien J, Gleditsch J, Solyga V, Russell D, Lund CG, NASPP study group (2017). "Interpretation of Brain CT Scans in the Field by Critical Care Physicians in a Mobile Stroke Unit". *J Neuroimaging*, 28 (1), 106-111. PubMed 28766306 WOS 000419308100013 Cistin 1562711 FullText (Details)

Logallo N, Novotny V, Assmus J, Kvistad CE, Alteheld L, Rønning OM, Thommessen B, Amthor KF, Ihle-Hansen H, Kurz M, Tobro H, Kaur K, Stankiewicz M, Carlsson M, Morsund Å, Idicula T, Aamodt AH, Lund C, Næss H, Waje-Andreassen U, Thomassen L (2017). "Tenecteplase versus alteplase for management of acute ischaemic stroke (NOR-TEST): a phase 3, randomised, open-label, blinded endpoint trial". *Lancet Neurol*, 16 (10), 781-788. PubMed 28780236 WOS 000410379900015 Cistin 1505190 FullText (Details)



Epilepsy Research Group – Department of Neurology



Group Leader

Erik Taubøll, Professor, Dept. of Neurology, UiO (erik.tauboll@medisin.uio.no) /
OUH (erik.tauboll@ous-hf.no)

Group Members

- Kjell Heuser, Postdoc, OUH
- Agnes Balint Bjørke, PhD fellow, OUH and Vestre Viken Hospital Trust
- Sigrid Svalheim, MD/PhD, OUH
- Toni Berger, MD/PhD fellow, OUH
- Line Bedos Ulvin, MD, OUH
- Monika Mokol, PhD fellow, Østfold Hospital Trust
- Dag Aurlien, Consultant, Stavanger Univ Hospital
- Alba Gonzalez; Ph.D. fellow, OUH
- Helle Hermann, PhD fellow, OUH
- Ellen Molteberg, MD, PhD fellow
- Line Sveberg, MD/PhD, OUH
- Ketil Berg Olsen, MD, OUH and Østfold Hospital Trust
- Leif Gjerstad, MD/PhD Professor, OUH/UiO, Prof. emeritus

Associated Group Members

- Cecilie Nome, Elective research student, UiO; TLE
- Erlend Nagelhus, MD/Ph.D, Professor, UiO and OUH
- Rune Enger, Postdoc, OUH/UiO
- Kaja K Selmer, Group leader, Dep of Clinical Genetics, OUH/UiO
- Erik Ropstad, professor, NMBU

Research profile and aims

The Epilepsy Research Group has been active for more than 20 years. Our research is currently focussed on three main areas:

1) Epilepsy-Translational Research. This focuses on research on temporal lobe epilepsy (TLE) through genetic, basic, and clinical studies. *The project leader is Kjell Heuser.* The main project concerns studying the role of the brain's glial cells in the development and exacerbation of epilepsy (epileptogenesis). The initial studies are basic research using epilepsy models. In addition, larger patient trials are used in which the clinical, radiological (MRI), and neuropsychological development of TLE is monitored over time.

2) “Gender issues”, endocrinology and long-term effects of epilepsy treatments (AEDs and ketogenic diet). *The project leader for AEDs is Sigrid Svalheim.* «Gender issues» has been an important area of research for the group over many years, with many PhD theses. The current major focus is studying the long-term side-effects of AEDs on hormones, immunology, haematology and bone health. The group also conducts basic research in zebra fish in collaboration with prof. Erik Ropstad and his research group at the Norwegian University of Life Sciences (NMBU), Department of Production Animal Clinical Sciences. *Project leader for ketogenic diet is Erik Taubøll.* Based on the material from a large study on the effect of ketogenic diet in adults with epilepsy performed at the National Center for Epilepsy in collaboration with Dep of Clinical Genetics OUS, Division of Clinical Nutrition UiO and Dep of Neurology we will now look into possible endocrine effects of the diet. PhD candidate is MD Ellen Molteberg, Senior consultant at the National center for Epilepsy.

3) Epilepsy and cardiology / SUDEP (sudden unexpected death in epilepsy patients). *The project leader is Dag Aurlien* who is presently based at Stavanger University Hospital. The project is a collaborative venture between Oslo University Hospital (OUH) and Stavanger University Hospital. There is a close collaboration with profs Kristina Haugaa and Thor Edvardsen, Department of Cardiology, OUH.

In addition to these three main areas of research, the group also has interests in deep brain stimulation (DBS) in epilepsy, ketogenic diets for adults, and status epilepticus.

Ongoing projects

- Can the brain's glial cells be a point of attack for novel AED treatments? This is a major project in which, among other approaches, a mouse model is being used to investigate how epilepsy arises and evolves over time. The main question is how glia cells behave during the development and worsening of epilepsy, and whether these changes can be affected by various drugs such as AEDs, anti-inflammatory drugs, drugs that affect intracellular cell signalling etc. The project was funded by the European Science Foundation until 2014, and is now funded by EU grant, 722053, Marie S Curie from nov 2017. It is also connected to the European EU Era-Net project, BRIE (Brain, Glia, Inflammation and Epilepsy) where Kjell Heuser is the leading Norwegian scientist BRIE.
- Is epilepsy a progressive disease? This is a long-term study that focuses on changes in the clinical, radiological and neuropsychological picture in patients with temporal lobe epilepsy. Comprehensive investigations are conducted on patients with newly diagnosed temporal lobe epilepsy at various time points over a 10-year period. The project is supported by Health and Rehabilitation with PhD candidate until 2018.
- Deep brain stimulation (DBS) in epilepsy. In this study patients with hard-to-treat epilepsy are treated with DBS using a blinded study design. This project was supported by Health and Rehabilitation until the end of 2017.



- Long-term effects of AEDs. Patients starting treatment with the AEDs levetiracetam and lamotrigine will be followed prospectively for two years in terms of immunological, hormonal, and haematological adverse reactions, and possible changes in bone health. The data will be collected through interviews, questionnaires, blood tests, and bone density measurements. In addition, experimental studies in zebrafish will be performed on possible changes in gene expression after AEF exposure. These experiments are done in collaboration with NMBU. This project is supported with a 50 % PhD student from Østfold Hospital.
- Epilepsy and cardiology. It has become increasingly clear that several epilepsies are channelopathies, as are many cardiac arrhythmias, and are associated with many of the same channels and ions. The relationship between particular generalized epilepsies and cardiac arrhythmias as long QT syndrome (LQTS) will be studied. This is also of central importance for understanding sudden unexpected death in epilepsy (SUDEP). We will also study the impact of several years of epilepsy on cardiac function. This project is supported by The South-Eastern Norway Regional Health Authority with a PhD student until the end of 2018.
- Status epilepticus. The aims of the study are: 1) to give a retrospective overview of a Norwegian adult SE cohort treated at OUH over a period of seventeen years, including epidemiological and etiological data. 2) to perform a quality control of the treatment of SE given in our hospital. 3) to investigate the factors associated with refractoriness and outcome in our cohort. MD Line Bedos Ulvin is PhD candidate in this project. Supervisors are Erik Taubøll, Ketil Berg Olsen and Kjell Heuser.

Most important national and international collaborators

National

- Dept. of Cardiology, OUH
- National Centre for Epilepsy
- Stavanger University Hospital
- Østfold Hospital
- Institute of Basic Medical Science, Glia cells research group (GLIALAB), UiO

International

- Institute of Cellular Neurosciences, Medical Faculty, University of Bonn, Germany (Prof. C. Steinhäuser)
- University of Innsbruck, Austria (Prof. G. Luef)

Scientific production of the research group in 2017

Peer-reviewed original research articles: 1

Other publications: 8 abstracts





Invited lectures at international congresses:

- Erik Taubøll: Modern treatment of Status epilepticus. Neuroforum – International neurology meeting. Ufa, Bashkortostan, Russia, 11-13 May 2017.
- Erik Taubøll: Interactions between epilepsy and hormones. Neuroforum – International neurology meeting. Ufa, Bashkortostan, Russia, 11-13 May 2017.
- Leif Gjerstad: The history of epilepsy and epilepsy research. Neuroforum – International neurology meeting. Ufa, Bashkortostan, Russia, 11-13 May 2017.
- Dag Aurlen: Sudden, unexplained death in epilepsy patients (SUDEP). Definition, incidence, risk factors, mechanisms and prevention. Neuroforum – International neurology meeting. Ufa, Bashkortostan, Russia, 11-13 May 2017.
- Sigrid Svalheim: Interactions between antiepileptic drugs and hormones. Neuroforum – International neurology meeting. Ufa, Bashkortostan, Russia, 11-13 May 2017.
- Line Sveberg: Treating women with epilepsy - clinical considerations in everyday practice. Neuroforum – International neurology meeting. Ufa, Bashkortostan, Russia, 11-13 May 2017.

Selected publications:

Eidsvaag VA, Hansson HA, Heuser K, Nagelhus EA, Eide PK. Brain Capillary Ultrastructure in Idiopathic Normal Pressure Hydrocephalus: Relationship With Static and Pulsatile Intracranial Pressure. J Neuropathol Exp Neurol. 2017 Dec 1;76(12):1034-1045.

Funding

- Health and rehab, 2 PhD students
- The South-Eastern Norway Regional Health Authority, 1 PhD
- EU grant, 722053, Marie S Curie programme, 1 PhD



Multiple Sclerosis (MS)



Group Leader

Hanne Flinstad Harbo, Professor and consultant of Neurology (MD/PhD/MHA), Department of Neurology. Oslo University Hospital (OUH) and Institute of Clinical Medicine, University of Oslo (UiO) (h.f.harbo@medisin.uio.no/uxhabb@ous-hf.no).

Group Members

- Hanne Flinstad Harbo, MD/PhD/MHA, Professor, OUH/UiO
- Elisabeth Gulowsen Celius, MD/PhD, Professor, OUH/UiO
- Tone Berge, MSc/PhD, researcher OUH, Ass. prof., OsloMet – Oslo Metropolitan University
- Steffan D. Bos-Haugen, MSc/PhD, researcher, UiO
- Daniel Rinker, PhD, OUS (from December 2017)
- Pål Berg-Hansen, MD/PhD, engagement ass. professor UiO and consultant OUH
- Gro Owren Nygaard, MD/PhD, OUH
- Sigrid Aune de Rodez Benavent, MD/PhD fellow, Department of Ophthalmology, OUH/UiO
- Ingvild Sjørum Leikfoss, MSci/PhD, UiO
- Pankaj K. Keshari, MSci/PhD fellow, OUH (until dissertation May 2017)
- Anna M. Eriksson, MSci/PhD fellow, UiO
- Ina S. Brorson, MSci/PhD fellow, OUH
- Einar August Høgestøl, MD/PhD fellow, UiO
- Cecilia Smith Simonsen, MD/PhD fellow, Drammen Hospital/OUH
- Heidi Øyen Flemmen, MD/PhD fellow, Skien Hospital/OUH
- Fernanda Kropf Correia, BSc, Masterstudent, UiO (MatNat, Until Master exam in November)
- Ingrid Mo, BSc, Masterstudent, UiO (MatNat, Until Master exam in November)
- Åshild Skardhamar, MD /PhD-fellow (application in preparation), OUH

Associated Group Members

- Marte Wendel Gustavsen, MD/PhD, Skien Hospital
- Stine Marit Moen, MD/PhD, Head of research and development, MS-Center, Hakadal
- Piotr Sowa, MD/PhD fellow, Department of Radiology, OUH

We have this year had 7 medical students connected to our group, writing student theses: Harbo and Høgestøl: Ellen Aspeggen (completed March 2018), Ingerid Tutturen and Magnus Ørseng Kværner. Celius: Janany Tharmakulasingam (completed March 2018). Berg-Hansen: Hedda Håkonsen Gretland, Inger Bjurstrøm, Victoria Løvstad

Research profile and aims

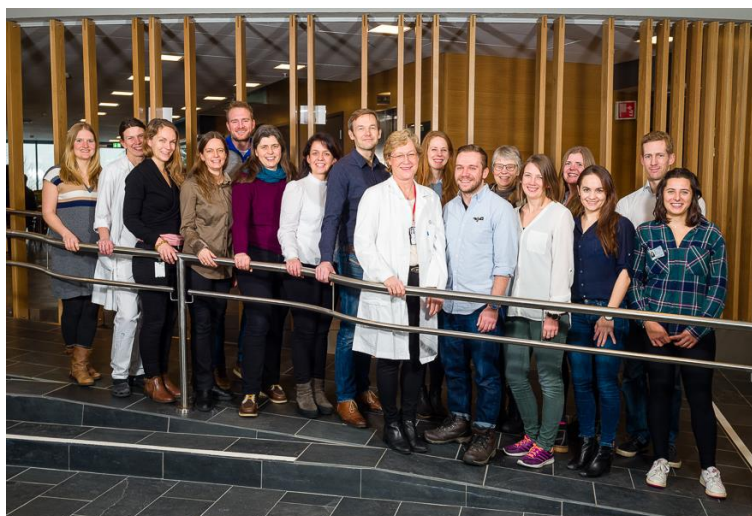
Multiple Sclerosis (MS) research group at the Department of Neurology, OUH and UiO, aims to identify characteristics and susceptibility factors of MS, and to contribute to a better understanding of the disease and development of better treatments. We perform genetic, immunological, clinical, epidemiological, environmental, MRI and translational studies of MS in collaboration with national and international research partners and networks.



Ongoing projects

- Sigrid Aune de Rodez Benavent, PhD fellow: A longitudinal cohort study of ophthalmologic biomarkers correlated with neurodegeneration in early MS. (OUH D-position Department of Ophthalmology) Supervisor: Elisabeth G. Celius, Co-supervisors: Emilia Kerty, Bruno Laeng and Liv Drosalum
- Tone Berge, researcher, Ingvild Sørnum Leikfoss (Senior Engineer): Vitamin D responsive regulation of susceptibility genes for autoimmune diseases. In collaboration with Professor Lisa Barcellos at the University of California, Berkeley (Peder Seather Grant held by Harbo/Barcellos and grants from Fritz and Ingrid Nilsens legat held by Berge)
- Steffan Daniel Bos, researcher: Identification of molecular mechanisms and biomarkers of Multiple Sclerosis (MS-biomarkers) – RNA sequencing of CD4+ and CD8+ T cells as potential biomarkers of MS phenotypes. (NFR researcher project grant held by Harbo)
- Anna M. Eriksson, PhD fellow: Identification of molecular mechanisms and biomarkers of Multiple Sclerosis (MS-biomarkers) – molecular characterization of DEXI and other MS susceptibility genes (NFR researcher project grant held by Harbo). Supervisor: Tone Berge, Co-supervisors: Hanne F. Harbo and Steffan D. Bos
- Ina S. Brorson, PhD fellow from 1.12.15 (UiO grant held by Harbo): Defining and characterizing molecular pathways in multiple sclerosis. Supervisor: Steffan Bos, Co-supervisors: Hanne F Harbo and Tone Berge
- Einar August Høgestøl, PhD fellow from 1.12.15: MRI- and other biomarkers in multiple sclerosis. (NFR researcher project grant held by Harbo). Supervisor: Hanne F Harbo, Co supervisor: Lars T Westlye and Gro O Nygaard
- Daniel Rinker, Post Doc from December 2017: Integrating genetic and MRI data in multiple sclerosis
- Cecilia Smith Simonsen, PhD fellow (OUH-Drammen grant): Predictors for disease susceptibility and disease progression in Multiple sclerosis, Supervisor: Elisabeth Gulowsen Celius, Co supervisors: Stine Marit Moen and Kari Anne Bjørnerå
- Heidi Øyen Flemmen, PhD fellow (Skien grant): Socioeconomic factors as predictors for disease susceptibility and disease progression in Multiple sclerosis, Supervisor: Elisabeth Gulowsen Celius, Co supervisor: Pål Berg-Hansen
- Åshild Skardhamar, MD, PhD fellow: Fatigue in Multiple Sclerosis. Supervisor: Elisabeth Gulowsen Celius
- Fernanda Kropf Correia (Master project): Molecular characterization of TAGAP- a GTPase-activating protein encoded by a multiple sclerosis susceptibility gene. Supervisor Tone Berge (completed November 2017)
- Ingrid Mo (Master project): Identifying protein interaction partners for DEXI – encoded by the multiple sclerosis associated dexamethasone-induced gene, DEXI. Supervisor Tone Berge (completed November 2017)
- Tone Berge, collaboration with Professor Frode Berven at the University of Bergen; Mass spectrometry analyses of immune cells in multiple sclerosis (Funded through a grant from Biogen Idec to Berge)
- Ingvild Sørnum Leikfoss (Senior engineer), Anna M. Eriksson: CLEC16A and other candidate genes

- Hanne F Harbo, Steffan D. Bos, Elisabeth G Celius. MS chip study, collaboration with IMSGC (Harbo Oslo PI)
- Hanne F Harbo, Steffan D. Bos, Elisabeth G Celius. Exome chip study, collaboration with IMSGC. (Harbo Oslo PI)
- Hanne F Harbo, Steffan D. Bos, Pål Berg-Hansen, Mona Beyer: BorrSci study, lead from Kristiansand (South-Eastern Norway Multi- Regional Health Authority grant)
- Hanne F Harbo, Steffan D. Bos, Pål Berg-Hansen, Tone Berge, Ingvild S Leifoss, Elisabeth G Celius Mona Beyer: MultipleMS - partner in EU Horizon 2020-prosjekt (Harbo Oslo PI)
- Hanne F Harbo, Einar A Høgestøl, Sigrid de Rodez Benavent, Steffan Bos, Tone Berge, Elisabeth G Celius, Mona Beyer: Sys4MS- Biotek 2021/NFR Project. (Harbo Oslo PI)
- Einar A Høgestøl, Steffan D. Bos, Hanne F Harbo: MYO Project. With Prof Pierre Gourraud, Nantes. NFR support for travel. NFR-Aurora travel grant (Harbo Oslo PI)
- Elisabeth G. Celius, Mona Beyer, Piotr Sowa, Tobias Granberg : Neuroprotective effects of alemtuzumab in patients with MS in a clinical setting
- Cecilia Smith simonsen, Astrid Edland, Elisabeth G. Celius : Effekt av FAMPYRA® på gange, syn, kognisjon, fatigue og vannlating hos pasienter med multiple sklerose
- Elisabeth G. Celius, Pål Berg-Hansen, Stine Marit Moen and SINTEF : AutoActive :Tools and Methods for Autonomous Analysis of Human Activities from Wearable Device Sensor Data (SINTEF PI)
- Elisabeth G. Celius, Stine Marit Moen/MS-Centre Hakadal and SINTEF: Digital oppfølging og støtte for personer med multipel sklerose (MS-DOS)
- E.G.Celius, P. Berg-Hansen, Kamila Rasova, Prague, Czech republic, Sunnaas, Hakadal MS-Centre, Kysthospitalet Stavern, HiOA :Physiotherapy in the Czech Republic and Norway. Project funded by EU



MS research group OUS-UiO photo 2018 at Domus Medica 4, UiO:

From left: Synne Brune (PhD student, MD), Gro Owren Nygaard (MD, PhD), Sigrid A. de Rodez Benavent (consultant of ophthalmology, PhD student, MD), Stine Marit Moen (consultant of neurology, MD, PhD, Head of research and development MS-Centre Hakadal), Einar August Høgestøl (PhD student, MD), Tone Berge (Ass.Professor at OsloMet – Oslo Metropolitan University and researcher at OUS, MSc, PhD), Heidi Øyen Flemmen (consultant of neurology, PhD student, MD), Pål Berg-Hansen (Ass.professor, PhD and consultant of neurology, MD,) Hanne F. Harbo (professor, consultant of neurology and group leader, MD, MHA, PhD), Cecilia Smith Simonsen (PhD student, MD), Daniel Rinker (Post Doc, PhD), Elisabeth Gulowsen Celius (consultant of neurology, Professor and project leader, MD, PhD), Anna Marie Eriksson (PhD student, MSc), Ina Skaara Brorson (PhD student, MSc), Ingvild Sørnum Leikfoss (Senior engineer, PhD, MSc), Steffan Daniel Bos (post doc, PhD, MSc), Maite Larrañaga Fernandez (Erasmus Bachelor Student).

Most important national and international collaborators

National

- Mona Beyer and Rigmor Lundby, Dept. of Radiology, OUH
- Benedicte A. Lie, Dept. of Medical Genetics, OUH /UiO
- Kristine Walhovd and Anders Fjell, Dept. of Psychology, UiO
- Anne Spurkland, Institute of Basic Medical Sciences, UiO
- Bettina Kulle Andreassen, Cancer Registry, Norway
- Emilia Kerty, Dept. of Neurology, OUH/UiO
- Liv Drolsum, Dept. of Ophthalmology, OUH/UiO
- Ole A. Andreassen and Lars T. Westlye, Dept. of Psychiatry, OUH/UiO
- Camilla Stoltenberg, Norwegian Institute of Public Health
- Inger Johanne Bakken, Norwegian Institute of Public Health
- Odd Stokke Gabrielsen, Section for Biochemistry and Molecular Biology, UiO
- Greger Abrahamsen, Division of Anatomy, Molecular Immunology (MOLIMMUN), UiO
- Vibeke Sundvold Gjerstad, Division of Anatomy, Molecular Immunology (MOLIMMUN), UiO
- Trygve Holmøy, Dept. of Neurology, Akershus University Hospital
- Torbjørn Rognes, Section for Biomedical Informatics, Dept. of Informatics, UiO
- Nils Inge Landrø and Bruno Laeng, Dept. of Psychology, UiO
- Ole Landsverk, Dept of Pathology, KLM, OUH
- K.B Nilsen and L. Etholm, Dept. of Neurophysiology, OUH
- Kjell-Morten Myhr and Jan Aarseth, Haukeland University Hospital
- Atle Bjørnerud, Dept. of Physics, Intervention Centre, UiO/OUH
- Frode Berven, Dept. of Biomedicine, University of Bergen

International

- Lisa Barcellos, University of California, Berkeley, US
- Stephen Sawcer, University of Cambridge, UK
- Jorge Oksenberg, University of California, San Francisco, US
- Sergio E. Baranzini, University of California, San Francisco, US
- Pablo Villoslada, Hospital Clinic of Barcelona, Spain
- Steve Francis, University of California, San Francisco, US
- Anders Dahle, University of California San Diego, US
- Soheil Damangir and Gabriela Spulber, Karolinska Institute, Stockholm, Sweden
- Jan Damoiseaux, Dept. of Neurology, Canisius Wilhelmina Hospital, Nijmegen, the Netherlands
- Joost Smolders, Dept. of Neurology, Canisius Wilhelmina Hospital, Nijmegen, the Netherlands
- B. Wilhelm, Steinbeis Transfer-Centre for Biomedical Optics and Function Testing, Tübingen, Germany
- Nordic MS genetics consortium (Hillert, Olsson, Kockum, Oturai, Sørensen, Saareala)
- International MS Genetics Consortium (Adrian Ivinson, Stephen Sawcer, Stephen Hauser, An Goris)
- Helen Tremlett, Dept of Neurology, Vancouver, Canada
- Pierre Antoine Gourraud, Hôpital St-Jacques - CHU de Nantes, France
- Tobias Granberg, Karolinska, Stockholm, Sweden
- Prof. Kamila Rasova, University of Prague, Czech Republic



Scientific production of the research group in 2017

Doctoral dissertations:

Pankaj K. Keshari 23. Jan. 2017: Title: Immunogenetic loci characterization of multiple sclerosis. Supervisors: Tone Berge, Hanne F. Harbo and Steffan D. Bos.

Piotr Sowa 29. Sept. 2017: Title: MRI biomarkers of Disease Activity and PRogression in Multiple Sclerosis. Supervisors: Mona K. Beyer, Hanne. F. Harbo.

Master thesis dissertations:

Fernanda Kropf Correia , November 9, 2017: Molecular characterization of TAGAP- a GTPase-activating protein encoded by a multiple sclerosis susceptibility gene. Supervisor Tone Berge

Ingrid Mo, November 7, 2017: Identifying protein interaction partners for DEXI – encoded by the multiple sclerosis associated dexamethasone-induced gene, DEXI. Supervisor Tone Berge

Selected publications:

Sowa P, Nygaard GO, Bjørnerud A, Celius EG, Harbo HF, Beyer MK. *“Magnetic resonance imaging perfusion is associated with disease severity and activity in multiple sclerosis”* Neuroradiology. 2017 Jul;59(7):655-664. doi: 10.1007/s00234-017-1849-4. Epub 2017 Jun 5. PMID:28585082

de Rodez Benavent SA, Nygaard GO, Harbo HF, Tønnesen S, Sowa P, Landrø NI, Wendel-Haga M, Etholm L, Nilsen KB, Drolsum L, Kerty E, Celius EG, Laeng B. *“Fatigue and cognition: Pupillary responses to problem-solving in early multiple sclerosis patients”* Brain Behav. 2017 May 17;7(7):e00717. doi: 10.1002/brb3.717. eCollection 2017 Jul. PMID:28729927

Simonsen CS, Edland A, Berg-Hansen P, Celius EG. *“High prevalence and increasing incidence of multiple sclerosis in the Norwegian county of Buskerud”* Acta Neurol Scand. 2017;135(4):412-8.

Funding

- South-Eastern Norway Regional Health Authority
- The Research Council of Norway
- University of Oslo
- European Commission: EU Horizon 2020
- European Commission/The Reserach Council of Norway: Sys4MS - Biotek 2021
- Norwegian Extra Foundation for Health and Rehabilitation
- South-Eastern Norway Multi- Regional Health Authority grant
- Unrestricted research grants from Novartis, Biogen, Genzyme, Forsberg and Aulie, and Ingrid and Fritz Nilsen, UNIFOR
- The Peder Sather Foundation
- Odd Fellow Foundation



Invited lectures at international congresses:

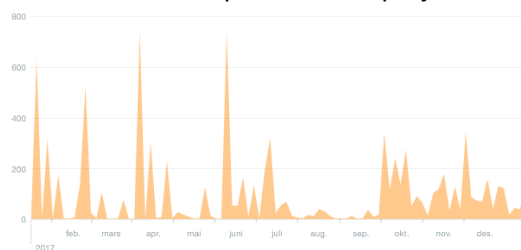
- Elisabeth G. Celius: Aubagio: Mechanism of action. Genzyme Academy, Barcelona. 16.6.17.
- Elisabeth G. Celius: Lemtrada. Portugese Neurology Meeting, Portugal 26.5.17
- Elisabeth G. Celius: Infections in patients with multiple sclerosis. Nordic Symposium, Copenhagen 28.1.17
- Elisabeth G. Celius: Hormones, pregnancy and lactation in MS. Nordic nurse symposium Stockholm 21.9.17.
- Elisabeth G. Celius: Con AHST. Nordic Neuroimmunology meeting Stockholm 2.3.17
- Hanne F Harbo: Nordic Neuroimmunology meeting Stockholm 2.3.17: Genetic and mitochondrial disorders mimicking MS
- Hanne F Harbo: NeuroMI 2017 International Symposium Personalised Medicine in Multiple Sclerosis 15.9.17: Genetics and genomic in MS
- Hanne F Harbo together with Mona K Beyer: MAGNIMS meeting, Milan 15.11.17: MS studies in Oslo
- Hanne F Harbo: PACTRIMS, Vietnam, 23.11.17: From Genetic Association to Functional Studies in MS

Hosting of meetings – invited guests:

- June 20th: Sys4MS Oslo meeting. Professor Villoslada, Barcelona Spain and the Sys4MS consortium
- September 8th: MS genetics-recent progress. Professor Stephen Sawcer, Cambridge, UK 17
- September 21st: Research seminar: CT and MRI in brain diseases. Key note speaker: Professor Maria Rocca, Milan, Italy
- November 13th: Work shop in bioinformatics. Brook Rhead, Berkeley, California, USA
- November 22nd: Nytt om MS-forskning ved Oslo universitetssykehus – meeting open to the public with presentations from our group
- December 5th: The MS Dash-board and MYO projects. Professor Pierre A Gourraud, Nantes, France

Social media :

- The research group has it's own designated Facebook page named “ Multipel Sklerose Forskningsgruppen Oslo”, currently with 198 followers. Here we keep our followers updated on our current ongoing research projects, as well as international MS research and dissemination activities concerning our research group
- We also have our own homepage at both the Oslo University Hospital and the University of Oslo, which we update on a regular basis
- In association with the Multiple MS project, we also manage both the Facebook page and Twitter account to promote the project in social media



People reached with our Facebook posts during 2017



Example of Facebook post

Pain Conditions



Group Leader

John-Anker Zwart, Professor, Dept. of Neurology, Head of Research, Division of Clinical Neuroscience, UiO (j.a.zwart@medisin.uio.no) / OUH (uxzwjo@ous-hf.no)

Group Members

- Ellen Jørum, Professor, UiO/OUH
- Kjersti Storheim, PhD/Associate Professor, OUH/OsloMet
- Astrid Lunestad, Research coordinator
- Britt Andenes, MD/PhD fellow, UiO
- Ingrid Fjeldheim Bånerud, Msc/Administrative, OUH
- Olaf Fjeld, MD/PhD fellow, UiO/OUH
- Håvard Furunes, MD/PhD fellow, UiO
- Margreth Grotle, Professor, OUH/HioA
- Maren Hjelle Guddal, Msc/PhD fellow, UiO
- Alf Inge Hellevik, MD/PhD fellow, OUH/NTNU
- Ingrid Heuch, MD/Senior researcher, OUH
- Synne Øien Stensland, MD/ Postdoctoral fellow, OUH
- Marianne Bakke Johnsen, PhD/Postdoctoral fellow,UiO
- Kristin Ørstavik, MD, PhD/ Senior consultant, OUS
- Inge Petter Kleggetveit, MD/Postdoctoral fellow, OUH
- Ida Løchting, Msc/PhD fellow, UiO
- Kristian Bernhard Nilsen, MD/Associate Professor, OUH
- Linda M. Pedersen, PhD/Postdoctoral fellow, OUH
- Vibeke Siewers, Research coordinator, OUS
- Jarle Sundseth, MD/PhD fellow, UiO/OUS
- Markus Wiedmann, MD/PhD fellow, UiO/OUH
- Monica Wigemyr, Msc/Research coordinator, OUH
- Bendik Winsvold, MD/Postdoctoral fellow, OUH
- Lars Christian Haugli Bråten, MD/PhD fellow, UiO/OUS
- Maria Dehli Vigeland, Msc/PhD fellow, UiO/OUH
- Sigrid Børte, MD/PhD fellow, UiO/OUH
- Eira Ebbs, Msc/Research coordinator, OUH
- Amy Mitchell, Msc/Research coordinator, OUH
- Marie Udnesseter Lie, Msc/Research coordiantor, OUH
- Espen Saxhaug Kristoffersen, MD/PhD, associate professor
- Elena Petriu, PT / Master student
- Marie Skovli Pettersen, Master student

Research profile and aims

The main focus of the research group is to generate research based knowledge on mechanisms, prevention and treatment of pain in the musculoskeletal- and nervous system.

Ongoing projects

- The Acute Low-Back Pain Study. Clinical, neurophysiological and genetic risk factors
- Genetic risk variants in migraine and cardiovascular disease. The Gene HUNT study
- Risk factors for anterior cruciate ligament injuries in Norwegian adolescents and young adults: (the ACL/HUNT studies)
- Genetic and environmental causes of migraine, a large-scale family-based analysis
- Early risk factors for migraine. The young-HUNT study
- Familiar hemiplegic migraine in Norway
- The AIM-study (Antibiotics In Modis changes); antibiotic treatment of chronic low-back pain with Modis changes, a randomised double blind multicenter placebo controlled trial
- Epigenetic and molecular biomarkers in chronic low back pain and Modic changes. A case-control study
- The HUNT OsteoArthritis study (the HOA-study)
- Lumbar disc prosthesis versus multidisciplinary rehabilitation in chronic back pain and localized degenerative disc. Long term follow-up of a randomized multicentre trial
- The NORwegian Degenerative spinal STENosis-trial (the NORDSTEN-study)
- Physical activity and sport participation during adolescence and musculoskeletal complaints in adulthood. A population based cohort study
- Spinal surgery in Norway. Trends, costs and regional differences
- The Norwegian Cervical Arthroplasty Trial. The NORCAT study. A prospective, single blinded, randomized, controlled multicenter study
- Risk factors for development of chronic pain after hospitalization for acute low back pain and/or sciatica (RUKSAR)
- Clinical and genetic aspects of neuropathic pain (CliNGNeuP)
- Conditioned pain modulation with respect to different test pain stimuli (CPM2TS)
- Physical activity, chronic low back pain and other musculoskeletal complaints, is there a causal relationship? The HUNT study
- Childbirths, hormonal factors and low back pain - a prospective epidemiological survey
- A Comparison of Anthropometric Measures for Assessing the Association between Body Size and Risk of Chronic Low Back Pain: The HUNT Study
- Back Pain in Elderly (BACE). A prospective cohort study of older people visiting primary care with a new episode of back pain
- Genetic risk factors for development of Pain – The Tromsø Study
- All-In-HUNT, genetic assessment of neurological and psychiatric disorders
- Targeting low back pain and comorbidity in primary care – a plan for a prospective study aimed to increase treatment effects in back pain (pilot project, NFR)



Most important national and international collaborators

National

- University Hospital of North Norway (UNN)
- Drammen Hospital
- St.Olavs Hospital/Trondheim University Hospital
- Østfold Hospital
- Haukeland University Hospital
- Stavanger University Hospital
- The National Institute of Occupational Health (STAMI)
- Norwegian University of Science and Technology (NTNU)
- OsloMet

International

- Leiden University Medical Centre (LUMC), the Netherlands
- Broad Institute of MIT and Harvard, Boston, US
- Institute for Molecular Medicine (FIMM), Finland
- University of Helsinki, Finland
- University of Oxford, UK
- Keele University, UK
- University of Odense, Denmark
- The low-back pain consortium
- The headache genetics consortium
- Erasmus MC, Rotterdam, the Netherlands

Scientific production of the research group in 2017

Peer reviewed original research articles: 26

PhD 2017:

- Ida Løchting: *“Illness Perceptions and Individual Quality Of Life in Patients with Low Back Pain - Methodology and Evaluation of Outcomes”*- dissertation 13 February 2017
- Markus Wiedmann: *“Height and body mass index and risk for primary tumours of the central nervous system”* – dissertation 19 June 2017
- Marianne Bakke Johnsen: *“Leisure time physical activity and smoking as potential risk factors for severe hip and knee osteoarthritis. The HUNT Study”* - dissertation 28 June 2017
- Jarle Sundseth: *“The comparison of outcome after arthroplasty of fusion in single level cervical disc disease”* - dissertation 17 November 2017

Master thesis:

- Elena Petriu: *“Reliability of two different conditioning pain modulation paradigms”*





Selected publications:

Stensland SØ, Zwart JA, Wentzel-Larsen T, Dyb G (2017) *“The headache of terror: A matched cohort study of adolescents from the Utøya and the HUNT Study”* *Neurology*, 90 (2), e111-e118. PubMed 29237795 Cristin 1529680 FullText (Details)

Helås T, Sagafos D, Kleggetveit IP, Quiding H, Jönsson B, Segerdahl M, Zhang Z, Salter H, Schmelz M, Jørum E (2017) *“Pain thresholds, supra-threshold pain and lidocaine sensitivity in patients with erythromelalgia, including the I848Tmutation in Na_v1.7”* *Eur J Pain*, 21 (8), 1316-1325. PubMed 28418213 WOS 000407567500004 Cristin 1521178 FullText (Details)

Johnsen MB, Vie GÅ, Winsvold BS, Bjørngaard JH, Åsvold BO, Gabrielsen ME, Pedersen LM, Hellevik AI, Langhammer A, Furnes O, Flugsrud GB, Skorpén F, Romundstad PR, Storheim K, Nordsletten L, Zwart JA (2017) *“The causal role of smoking on the risk of hip or knee replacement due to primary osteoarthritis: a Mendelian randomisation analysis of the HUNT study”* *Osteoarthritis Cartilage*, 25 (6), 817-823. PubMed 28049019 WOS 000405381600004 Cristin 1425034 FullText (Details)

Funding

- South-Eastern Norway Regional Health Authority
- The Research Council of Norway
- The Norwegian Fund for Post-Graduate Training in Physiotherapy
- UiO
- OUH



Brain plasticity and neuropsychiatry



Group Leader

Torbjørn Elvsåshagen; M.D., PhD, postdoctoral research fellow; Department of Neurology, OUH (telvsaha@ous-hf.no) and Norwegian Centre for Mental Disorders Research (NORMENT), UiO (torbjorn.elvsashagen@medisin.uio.no)

Group Members

- Erlend Bøen; M.D., Ph.D.; Diakonhjemmet Hospital
- Britta Bürker; M.D., Ph.D. research fellow; OUH/UiO
- Guro Dunvoll; M.Sc., Ph.D. research fellow; OUH/UiO/Oslo and Akershus University College of Applied Sciences
- Torfinn Hynnekleiv; M.D.; OUH and Innlandet Hospital Trust
- Katalin Juhasz; M.D.; Akershus University Hospital
- Eva A. Malt; M.D., Ph.D., Assoc. professor; Inst. of Clinical Medicine, UiO
- Ulrik F. Malt; M.D., Ph.D., Professor emeritus; Inst. of Clinical Medicine, UiO
- Kåre Osnes; M.D., Ph.D.; Diakonhjemmet Hospital
- Torunn Søyseth; M.Sc., OUH
- Mathias Valstad; M.Sc., Ph.D. research fellow; OUH/UiO
- Nathalia Zak; M.D., Ph.D. research fellow; OUH/UiO

Associated Group Members

- Stein Andersson; Ph.D., Professor; Dept. of Psychology, UiO
- Atle Bjørnerud; Ph.D., Professor; OUH
- Birgitte Boye; M.D., Ph.D., Professor; Inst. of Basic Medical Sciences, UiO
- Inge R. Groote; M.D., Ph.D., postdoctoral research fellow; OUH
- Torgeir Moberget; Ph.D., postdoctoral research fellow; OUH

Research profile and aims

Our group conducts research in the fields of adult brain plasticity and neuropsychiatry. Plasticity – the capacity for change – is increasingly recognized as an intrinsic property of the adult brain and may play important roles in the etiologies and treatments of neurological and psychiatric illnesses. Neuropsychiatry recognizes that the brain and mind are one, that mental illnesses are disorders of the brain, and that psychiatric symptoms are commonly found in neurological disorders. One important goal of neuropsychiatric research is to bridge the gap between neurology and psychiatry.

Among the main aims of our current research are:

1. To examine whether structural and functional brain plasticity are core characteristics of the human sleep-wake cycle
2. To increase our understanding of how novel schizophrenia- and bipolar disorder-associated genetic variants affect synaptic function and plasticity
3. To investigate whether adult hippocampal neurogenesis can be measured using magnetic resonance spectroscopy (MRS)

Ongoing projects

- Sleep-wake-dependent brain plasticity in health and depression
- Genes, synaptic function, and stem cells in bipolar disorder, schizophrenia, and autism spectrum disorder: from pathophysiology towards personalized medicine
- *In vivo* measurements of adult hippocampal neurogenesis using MRS
- Brain plasticity and psychobiology in bipolar II disorder and borderline personality disorder
- G-protein genotypes and associations with anxiety and depression in the HUNT Study
- Studies of genotype-phenotype interactions in the 3q29 microdeletion syndrome
- Neuropsychiatry and coping in heart and lung transplantation
- Non-invasive human LTP-like plasticity – examining robustness, functional significance and clinical utility of a novel biomarker
- Mapping and modulating brain networks in severe mental illness: towards new targets for therapeutic non-invasive brain stimulation

Most important national and international collaborators

National

- Prof. Ole A. Andreassen, NORMENT, UiO/OUH
- Prof. Erik Jönsson, NORMENT, UiO
- Prof. Srdjan Djurovic, NORMENT, UiO
- Ass. prof. Lars T. Westlye, NORMENT, UiO
- Prof. Bjørn Bjorvatn, Norwegian Competence Center for Sleep Disorders, Bergen
- Dr. Stine Knudsen, C. of Exp. For Neurodevelopmental Disorders and Hypersomnias, OUH
- Prof. Espen Dietrichs, Dept. of Neurology, OUH/UiO
- Prof. Guttorm Haugen, Dept. of Obstetrics and Gynecology, OUH/UiO
- Prof. Ragnhild Emblem, Dept. of Pediatric Surgery, OUH/UiO
- Prof. Sigmund Karterud, Dept. for Personality Psychiatry, OUH/UiO
- Prof. Lars Gullestad, Dept. of Cardiovascular Medicine, OUH/UiO
- Prof. Arne E. Vaaler, NTNU, BRAIN: Bipolar research and innovation network
- Prof. Hilde Nilsen, Dept. of Molecular Biology (EpiGen), UiO
- Prof. Jan Ivar Røssberg, OUS/UiO
- Prof. Gaute Einevoll, NMBU/UiO

International

- Ass. prof Ana Andreazza, Dept. of Psychiatry, University of Toronto, Canada
- Prof. and Chair Trevor Young, Dept. of Psychiatry, University of Toronto, Canada
- Prof. Eus van Someren, Netherlands Institute for Neuroscience, Amsterdam, the Netherlands
- Ass. prof. Mirjana Maletic-Savatic, Baylor College of Medicine, Houston, USA
- ENIGMA group (Enhancing NeuroImaging Genetics through Meta-Analysis)
- EURONET-SOMA: European Research Network on somatoform disorders; group leader: Prof. Bernd Löwe, Uni Hamburg-Eppendorf, Abt. Für Psychotherapie und Psychosomatische Medizin, Germany



Funding

- South-Eastern Norway Regional Health Authority
- Norwegian Competence Center for Sleep Disorders
- Oslo University Hospital
- Throne-Holst foundation
- Ebbe Frøland foundation

Scientific production of the research group in 2017

Peer reviewed original research articles: 33

Invited lectures at international congresses:

U.F. Malt. Psychopharmacology in neurological diseases. WPA congress, Berlin 11.10.2017.

Research grants:

South-Eastern Norway Regional Health Authority. Sleep-wake-dependent brain plasticity in health and depression, ~3.4MNOK, **PI: A. Bjørnerud**

Selected publications:

Elvsåshagen T, et al. Evidence for cortical structural plasticity in humans after a day of waking and sleep deprivation. *Neuroimage*. 2017 Aug 1;156:214-223.

Hibar DP, ... Bøen E, ... Elvsåshagen T, ... Malt UF, et al. Cortical abnormalities in bipolar disorder: an MRI analysis of 6503 individuals from the ENIGMA Bipolar Disorder Working Group. *Mol Psychiatry*. 2018 Apr;23(4):932-942. Epub 2017 May 2.

Moberget T, et al. Cerebellar volume and cerebellocerebral structural covariance in schizophrenia: a multisite mega-analysis of 983 patients and 1349 healthy controls. *Mol Psychiatry*. 2017 May 16. doi: 10.1038/mp.2017.106.



Cognitive Health in Trauma and Disease (CHTD)



Group Leader

Ira Ronit Hebold Haraldsen, MD/PhD, Psychiatrist, OUH (i.haraldse@ous-hf.no)

Group Members

- Vebjørn Anderson, BSc, Technician, OUH
- Aksel Erichsen, MD, PhD-candidate, OUH
- Christoffer Hatlestad, cand.psychol., PhD-candidate, OUH
- Kjersti Gulbrandsen, MNSc, Clinical Nurse Specialist, OUH
- Reidar Jessen, cand.psychol., PhD-candidate, OUH
- Syed Nuruddin, VetMD, OUH
- Patrick Riss, PhD, Chemist, OUH/UiO
- Uta Sailer, PhD, Senior Researcher, OUH/UiO
- Helle Stangeland, MSc, Clinical Research Coordinator, OUH
- Stefan Sütterlin, PhD, Psychologist, OUH/HiØF
- Maren Øglænd Torjusen, Research Assistant, OUH
- Linn Cesilie Tovås, Research Assistant, OUH
- Sławomir Wojniusz, PhD, Physiotherapist, OUH/Oslo MET

Research profile and aims

We want to understand how and why physical trauma and somatic disorders affect cognitive functions and brain health. Our aim is to contribute to improved prevention, diagnosis and treatment of neuropsychiatric and neuroendocrinological diseases through high-quality research.

We are interested in how physical trauma and somatic disorders affect the central nervous system.

The CHTD group conducts research in the following areas:

- Healthy aging and neurodegenerative disease
- Non-reproductive, cognitive functions of gonadotropin releasing hormone (GnRH) and its receptor (GnRHR)
- Sex differences in brain function

We are currently trying to learn more about how diverse somatic disorders affect cognitive health, especially during puberty and aging. Because of our team's hands-on experience with basic science methods, as well as our clinical experience, we are able to take part in several translational research projects. Our methods range from microscopy and immunohistochemistry, to molecular imaging by



positron emission tomography and radiochemistry, to MR imaging and electrophysiological neuropsychological testing.

We are an international group of researchers that come from a variety of different educational backgrounds, including medicine, psychology, physiotherapy, nursing and biological science. Our multidisciplinary approach to brain-behavior relations allows us to conduct research across various systems and cognitive levels; from molecules to cells to cognitive systems to behaviors.

Ongoing projects

- Development of a Novel F18-PET tracer for early diagnosis of Alzheimer Dementia
- Novel risk factor assay for Alzheimer’s disease-Multi-parametric quantification of HPG/HPT-axis dysfunction
- Cognitive impairment and cerebral metabolism in diabetes mellitus, and recovery with pancreas transplantation
- Does the gut hormone ghrelin act as a general reward enhancer?
- Effectiveness of somatocognitive therapy for the treatment of provoked localized vestibulodynia (the Pro-LoVe study)
- Gender dysphoria in adolescents – a qualitative study
- Gender dysphoria: Worldwide exacerbation, prevalence, and the impact of GnRH treatment on brain development; an investigation in a human and animal model (CONOS)

Most important national and international collaborators

National

- Kåre Inge Birkeland, OUH
- Atle Bjørnerud, OUH
- Tor Endestad, UiO
- Trond Jensen, OUH
- Jo Klaveness, UiO
- Pål Gunnar Larsen, OUH
- Per Magnus, FHI
- Mahmood Reza Amiry Moghaddam, UiO
- Dag Erlend Olberg, NMS
- Mona-Elisabeth Revheim, OUH
- Erik Ropstad, Norwegian School of Veterinary Science (NVH)
- Thor Audun Saga, NMS
- Thomas Schreiner, OUH
- Anne-Kristin Solbakk, OUH
- Jan Solberg, Invento2
- Erik Taubøll, UiO
- Reidun Torp, UiO

International

- Els Elaut, Belgium
- Griet De Cuypere, Belgium
- Guy T’Sjoen, Belgium
- Susanne Cerwenka, Germany
- Timo O. Nieder, Germany
- Hertha Richter-Appelt, The Netherlands
- Peggy Cohen-Kettenis, The Netherlands
- Neil Evans, Glasgow, Scotland
- Jane Robinson, Glasgow, Scotland
- Fernando Maestu, Madrid, Spain
- Ernesto Pereda, Madrid, Spain
- Walter Bockting, New York, USA





Scientific production of the research group in 2017

Peer reviewed original research articles: 13

Selected publications:

Bürker BS, Gullestad L, Gude E, Relbo Authen A, Grov I, Hol PK, Andreassen AK, Arora S, Dew MA, Fiane AE, **Haraldsen IR**, Malt UF, Andersson S (2017)

“Cognitive function after heart transplantation: Comparing everolimus-based and calcineurin inhibitor-based regimens”

Clin Transplant, 31 (4)

PubMed 28185318

Cropley M, Plans D, Morelli D, **Sütterlin S**, Inceoglu I, Thomas G, Chu C (2017)

“The Association between Work-Related Rumination and Heart Rate Variability: A Field Study”

Front Hum Neurosci, 11, 27

PubMed 28197087

Tukun FL, Olberg DE, **Riss PJ**, **Haraldsen I**, Kaass A, Klaveness J (2017)

“Recent Development of Non-Peptide GnRH Antagonists”

Molecules, 22 (12)

PubMed 29232843

Funding

- The Research Council of Norway – The Research Programme on Biotechnology for Innovation (BIOTEK 2021)
- South-Eastern Norway Regional Health Authority
- Throne Holst foundation



Intellectual disability and neurohabilitation



Group Leader

Bjørnar Hassel, Professor, Dept. of Neurohabilitation, OUH
(bjornar.hassel@ous-hf.no) and UiO (bjornar.hassel@medisin.uio.no)

Group Members

- Nils Olav Aanonsen, MD, OUH
- Sigrun Hope, MD, PhD, OUH
- Anne Katrin T. Holmøy, MD, OUH
- Kathrine Haggag, MD, OUS
- Jutta Rummel, MD, OUS
- Alma Sikiric, MD, OUS
- Helene Portilla, MD, OUS
- Daniel Dahlberg, MD, OUS
- Amalie Poole, Stud. med.
- Marleen van Walsem, PhD, OUS

Research profile and aims

The aim of the neurohabilitation research group is 1) to conduct research that will lead to improvement of the quality of life of persons with developmental disabilities, 2) to investigate mechanisms behind brain dysfunction and damage that leads to developmental disability.

In collaboration with the municipality of Oslo, SINTEF, and The University College of Oslo and Akershus we investigate the use of sensors for autonomic responses as a means of communication for developmentally disabled persons who are unable to express their needs.

To investigate mechanisms that underlie some forms of developmental disability we use clinical and preclinical approaches to elucidate mechanisms of toxicity of certain metabolites and microbes.

Ongoing projects

- Wearable sensors for autonomic responses as a means of communication for persons with developmental disability who lack the ability to express themselves
- Mechanisms of seizure generation and cell death during brain abscess formation, a preventable cause of developmental disability
- Mechanisms of cell death and seizure generation during formation of cystic brain tumors
- The effects on brain cells of propionic acid, a metabolite that causes cerebral dysfunction in an inborn error of metabolism
- The metabolism of fructose and its metabolite glyceraldehyde, two causes of neurodegeneration through formation of advanced glycation end products

Most important national and international collaborators

National

- Cecilie Morland, HIOA/Inst. of Pharmacy, UiO
- Frode Strisland, SINTEF – Smart sensor systems, Oslo
- Oslo Municipality and the burroughs of Nordstrand, Østensjø and Vestre Aker
- Erik Taubøll, Dept. of Neurology, UiO
- Farrukh A. Chaudhry, Inst. of Anatomy, UiO
- Torgeir Bruun Wyller, Dept. of Geriatrics, OUH
- Leiv Otto Watne, Dept. of Geriatrics, OUH
- Nenad Bogdanovic, Dept. of Geriatrics, OUH
- Espen Mariussen, Norwegian Defence Research Establishment, Kjeller
- Øyvind Voie, Norwegian Defence Research Establishment, Kjeller
- Frode Rise, Inst. of Chemistry, UiO

International

- Farshid Amirabdollahian, University of Hertfordshire, UK
- Sergio Guillen, Mysphera, TSB Real time location systems, Valencia, Spain
- Jordi Rovirasimon, Parc Sanitari Sant Joan de Deu, Barcelona, Spain
- Raymond Dingleline, Emory University, Atlanta, GA, USA

Scientific production of the research group in 2017

Peer reviewed original research articles: 3

Selected publications:

Idland AV, Wyller TB, Støen R, Dahl GT, Frihagen F, Brækhus A, Hassel B, Watne LO. *“Cerebrospinal Fluid Phosphate in Delirium after Hip Fracture”*. Dement Geriatr Cogn Dis Extra. 2017;7:309-317.

Hassel B, De Souza GA, Stensland ME, Ivanovic J, Voie Ø, Dahlberg D. *“The proteome of pus from human brain abscesses: host-derived neurotoxic proteins and the cell-type diversity of CNS pus”*. J Neurosurg. 2017:1-9.

Dahlberg D, Struys EA, Jansen EE, Mørkrid L, Midttun Ø, Hassel B. *“Cyst Fluid From Cystic, Malignant Brain Tumors: A Reservoir of Nutrients, Including Growth Factor-Like Nutrients, for Tumor Cells”*. Neurosurgery. 2017;80:917-924.

Specialized medical rehabilitation – Sunnaas Rehabilitation Hospital



Group Leader

Johan K. Stanghelle, MD/PhD, Director of Research (johan.stanghelle@sunnaas.no)/
Professor, Dept. of Physical Medicine and Rehabilitation, UiO
(j.k.stanghelle@medisin.uio.no)

Group Members

- Johan K. Stanghelle, MD/PhD, Professor, Sunnaas Rehabilitation Hospital/UiO
- Frank Becker, MD/PhD, ass Professor, Sunnaas Rehabilitation Hospital/UiO
- Grethe Månrum, MD/PhD, ass Professor, Sunnaas Rehabilitation Hospital/UiO
- Emil Kostovski, MD/PhD, postdoc fellow, Sunnaas Rehabilitation Hospital/UiO
- Svend Rand-Hendriksen, MD/PhD, postdoc fellow, Sunnaas Rehabilitation Hospital/UiO
- Dag Brekke, MD/PhD, Sunnaas Rehabilitation Hospital
- Tor Haugstad, MD/PhD, Sunnaas Rehabilitation Hospital
- Anne-Kristine Schanke, PSYCH/PhD, Professor, Sunnaas Rehabilitation Hospital/UiO
- Marianne Løvstad, PSYCH/PhD, ass Professor, Sunnaas Rehabilitation Hospital/UiO
- Solrun Sigurdardottir, PSYCH/PhD, postdoc fellow, Sunnaas Rehabilitation Hospital
- Jan Egil Nordvik, PSYCH/PhD, Sunnaas Rehabilitation Hospital
- Per Ola Rike, PSYCH/PhD, Sunnaas Rehabilitation Hospital
- Sveinung Tornås, PSYCH/PhD, Sunnaas Rehabilitation Hospital
- Solveig Hauger, PSYCH/PhD, Sunnaas Rehabilitation Hospital
- Arve I. Opheim, PT/PhD, Sunnaas Rehabilitation Hospital
- Vivien Jørgensen, PT/PhD, Sunnaas Rehabilitation Hospital
- Ellen Høyner, PT/PhD, Sunnaas Rehabilitation Hospital
- Anne Lannem, PT/PhD, ass Professor, Sunnaas Rehabilitation Hospital/Norwegian school of Sport Sciences
- Kirsti Skavberg Roaldsen, PT/PhD, ass Professor, Sunnaas Rehabilitation Hospital/OsloMet/Karolinska Institute
- Birgitta Langhammer, PT/PhD, Professor, Sunnaas Rehabilitation Hospital/OsloMet
- Ellen Berg Svendby, Cand Scient/PhD, Sunnaas Rehabilitation Hospital/OsloMet
- Grace I. Romsland, RN/PhD, Professor, Sunnaas Rehabilitation Hospital/OsloMet
- Melanie Kirmess, ST/PhD, ass Professor, Sunnaas Rehabilitation Hospital/UiO
- Vegard Strøm, Cand Scient/PhD, Sunnaas Rehabilitation Hospital
- Gry Velvin, SW/PhD, Sunnaas Rehabilitation Hospital

Associated group members:

- Fin Biering-Sørensen, MD/PhD, Professor, Copenhagen University
- Katharina Sunnerhagen, MD/PhD, Professor, Gothenburg University
- Lena Hartelius, ST/PhD, Professor, Gothenburg University
- Kerstin Fugl-Meyer, SW/PhD, Professor, Karolinska Institute
- Agneta Ståhle, PT/PhD, Professor, Karolinska Institute
- Helle Ploug Hansen, RN/PhD, Professor, University of Southern Denmark, Odense
- Jennie Ponsford, PSYCH/PhD, Professor, Monash University, Melbourne

Associated group members (continued):

PhD Fellows/MD: Thy Thy Vanem, Ingebjørg Irgens, Erlend Solberg Dørum, Hege Prag Øra, Claudia Nyberg, Vesna Miloshevska Jakimovska, Mladen Savikj, Svein Otto Fredwall
PhD Fellows/PSYCH: Kjersti Mæhlum Walle, Daniel Løke, Geneviève Richard, Knut Kolskår
PhD Fellows/RN: Anne-Stine Røberg, Anne Geard
PhD Fellows/PT: Emelie Butler Forslund, Matthijs Wouda, Linda Rennie, Anu Piira

PhD Fellows/SW: Jannike K. Vikan
PhD Fellows/ST: Maribeth C. Rivelsrud
PhD Fellows/OT: Anne-Marthe Sanders

Administration:

Annette M. Juelsen

Research profile and aims

Clinical and some basic research within specialized rehabilitation of patients with brain injuries, spinal cord injuries and multitrauma, and research within selected groups of seldom diagnosis.

Ongoing projects

- Follow-up of the most serious injured patients after the July 22nd attack
- Multinational studies on specialized rehabilitation for stroke patients and spinal cord injuries
- Several studies on neuropsychological consequences after brain injury
- Several studies on movement disorders and gait analysis
- Basic physiological mechanisms after spinal cord injuries
- Basic mechanisms after brain injuries (fMRI, electrophysiological functions etc)
- Several studies on patients with seldom diagnosis

Most important national and international collaborators

National

- Oslo University Hospital
- Institute of Psychology, UiO
- OsloMet
- Norwegian Sport High School
- Haukeland University Hospital
- St. Olav Hospital / Trondheim University Hospital
- University Hospital of North Norway
- Beitostølen Health Sport Center
- Hospitals in Health Region South-East

International

- Karolinska Institute, Stockholm, Sweden
- Gothenburg University, Sweden
- Copenhagen University, Denmark
- University of Southern Denmark, Odense; Denmark
- Monash University, Melbourne, Australia
- China Rehabilitation and Research Center (CRRC), China
- Rusk Institute of Rehabilitation , NY, USA
- Policlinic no2, Petrozavodsk, Karelia, Russian Federation



- Sheba Medical Center, Tel Aviv, Israel
- Betlehem Arab Society for Rehabilitation, Palestine (BASR)
- El Wafa Hospital, Gaza, Palestine
- Sahlgrenska University Hospital, Högsbo, Sweden
- Bayi 81 Rehabilitation Center, Sichuan, China
- Schweizer Paraplegiker-Forschung AG, Switzerland

Scientific production of the research group in 2017

Peer reviewed original research articles: 47

Other Publications: 20

Doctoral thesis:

Dag Brekke	Evaluations of the project "Rapid return to work"
Sveinung Tornås	Goal management training
Solveig Lægreid Hauger	Clinical utility of cognitive event related potentials
Per-Ola Rike	Critical factors for safe driving
Emelie Butler Forslund	Falls in wheelchair users with spinal cord injury
Leonidas Lundell	Skeletal muscle plasticity

Selected publications:

Hauger, Solveig Lægreid; Olafsen, Kjell; Schnakers, Caroline; Andelic, Nada; Nilsen, Kristian Bernhard; Helseth, Eirik; Funderud, Ingrid; Andersson, Stein; Schanke, Anne-Kristine; Løvstad, Marianne. Cognitive event-related potentials during the sub-acute phase of severe traumatic brain injury and their relationship to outcome. *Journal of Neurotrauma* 2017 ;Volum 34.(22) s.3124-3133

Kostovski, Emil; Biering-Sørensen, Fin; Lidal, Ingeborg Beate; Miloshevska Jakimovska, Vesna. Psychological distress and user experiences with health care provision in persons living with spinal cord injury for more than 20 years. *Spinal Cord* 2017 ;Volum 55.(9) s.864-869

Langhammer, Birgitta; Sunnerhagen, Katharina Stibrant; Lundgren-Nilsson, Åsa; Sällström, Susanne; Becker, Frank; Stanghelle, Johan K. Factors promoting /enhancing Activities of Daily Living after stroke in specialized rehabilitation. An observational multicenter study within the Sunnaas International Network. *European Journal of Physical and Rehabilitation Medicine* 2017 ;Volum 53.(5) s.725-734



Publication list NVR research groups 2017

Strøm V, Røe C, Matre D, Knardahl S (2017)

[Deep tissue hyperalgesia after computer work](#)

Scand J Pain, 3 (1), 53-60

PubMed [29913769](#) [FullText](#) ([Details](#))

Haugstad GK, [Kirste U](#), Leganger S, Haakonsen E, Haugstad TS (2017)

[Somatocognitive therapy in the management of chronic gynaecological pain. A review of the historical background and results of a current approach](#)

Scand J Pain, 2 (3), 124-129

PubMed [29913743](#) [FullText](#) ([Details](#))

Matre D, [Nilsen KB](#) (2017)

[Evoked potentials through small-fiber pathways - For both clinical and research purposes?](#)

Scand J Pain, 5 (2), 110

PubMed [29913673](#) [FullText](#) ([Details](#))

[Jørum E](#) (2017)

[Importance of clinical neurophysiological tests in the evaluation of pain: Indispensable in complex pain conditions](#)

Scand J Pain, 1 (4), 177-178

PubMed [29913986](#) [FullText](#) ([Details](#))

Moen GH, Moen A, [Gjerstad J](#) (2017)

[Local up-regulation of interferon- \$\gamma\$ \(IFN- \$\gamma\$ \) following disc herniation is involved in the inflammatory response underlying acute lumbar radicular pain](#)

Scand J Pain, 8 (1), 53

PubMed [29911625](#) [FullText](#) ([Details](#))

Olsen MB, Jacobsen LM, [Schistad EI](#), Pedersen LM, Rygh LJ, Røe C, [Gjerstad J](#) (2017)

[Recovery after a lumbar disc herniation is dependent on a gender and OPRM1 Asn40Asp genotype interaction](#)

Scand J Pain, 3 (3), 182

PubMed [29913859](#) [FullText](#) ([Details](#))

Jacobsena BA, [Dyb G](#), Hagen K, Stovner LJ, Holmen TL, [Zwart JA](#) (2017)

[The Nord-Trøndelag Health Study shows increased prevalence of primary recurrent headaches among adolescents over a four-year period](#)

Scand J Pain, 2 (3), 148-152

PubMed [29913741](#) [FullText](#) ([Details](#))

Johansen JB, [Roe C](#), Bakke E, Mengshoel AM, [Andelic N](#) (2017)

[Reliability and responsiveness of the Norwegian version of the Neck Disability Index](#)

Scand J Pain, 5 (1), 28-33

PubMed [29913660](#) [FullText](#) ([Details](#))

Røe C (2017)

[**Amplification of osteoarthritis pain by peripheral and central nervous systems pain mechanisms**](#)

Scand J Pain, 4 (2), 109-110

PubMed [29913897](#) [FullText \(Details\)](#)

Zhang Z, Schmelz M, Segerdahl M, Quiding H, Centerholt C, Juréus A, Carr TH, Whiteley J, Salter H, [Kvernebo MS](#), Ørstavik K, Helås T, Kleggetveit IP, Lunden LK, Jørum E (2017)

[**Exonic mutations in SCN9A \(NaV1.7\) are found in a minority of patients with erythromelalgia**](#)

Scand J Pain, 5 (4), 217-225

PubMed [29911575](#) [FullText \(Details\)](#)

Nilsen KB, Christiansen SE, Holmen LB, Sand T (2017)

[**The effect of a mental stressor on conditioned pain modulation in healthy subjects**](#)

Scand J Pain, 3 (3), 142-148

PubMed [29913861](#) [FullText \(Details\)](#)

Schistad EI, Jacobsen LM, Røe C, [Gjerstad J](#) (2017)

[**The interleukin-1 \$\alpha\$ gene C>T polymorphism rs1800587 is associated with increased pain intensity and decreased pressure pain thresholds in patients with lumbar radicular pain**](#)

Scand J Pain, 5 (3), 212

PubMed [29913687](#) [FullText \(Details\)](#)

Nilsen KB, Matrea D (2017)

[**Hyperalgesia after experimental and work-related sleep restriction**](#)

Scand J Pain, 8 (1), 52-53

PubMed [29911610](#) [FullText \(Details\)](#)

Kleggetveit IP, Namer B, Schmidt R, Helås T, Schmelz M, Jørum E (2017)

[**Hyperexcitable C-nociceptors in human paroxysmal pain**](#)

Scand J Pain, 1 (3), 170

PubMed [29913970](#) [FullText \(Details\)](#)

Johnsen MB, Hellevik AI, [Småstuen MC](#), Langhammer A, Furnes O, [Flugsrud GB](#), [Nordsletten L](#), Zwart JA, Storheim K (2017)

[**The mediating effect of body mass index on the relationship between smoking and hip or knee replacement due to primary osteoarthritis. A population-based cohort study \(the HUNT Study\)**](#)

PLoS One, 12 (12), e0190288

PubMed [29284048](#) WOS [000419033400047](#) Cristin [1543647](#) [FullText \(Details\)](#)

Blauwendraat C, Kia DA, [Pihlstrøm L](#), Gan-Or Z, Lesage S, Gibbs JR, Ding J, Alcalay RN, Hassin-Baer S, Pittman AM, Brooks J, Edsall C, Chung SJ, Goldwurm S, [Toft M](#), Schulte C, International Parkinson's Disease Genomics Consortium (IPDGC), COURAGE-PD Consortium, Hernandez D, Singleton AB, Nalls MA, Brice A, Scholz SW, Wood NW (2017)

[**Insufficient evidence for pathogenicity of SNCA His50Gln \(H50Q\) in Parkinson's disease**](#)

Neurobiol Aging, 64, 159.e5-159.e8

PubMed [29398121](#) WOS [000425755700023](#) [FullText \(Details\)](#)



Kolstad E, Bjørk M, Gilhus NE, Alfstad K, Clench-Aas J, Lossius M (2017)

[Young people with epilepsy have an increased risk of eating disorder and poor quality diet](#)

Epilepsia Open, 3 (1), 40-45

PubMed [29588986](#) [FullText \(Details\)](#)

Lugo RG, Helkala K, Knox BJ, Jøsok Ø, Lande NM, Sütterlin S (2017)

[Interceptive sensitivity as a proxy for emotional intensity and its relationship with perseverative cognition](#)

Psychol Res Behav Manag, 11, 1-8

PubMed [29296103](#) WOS [000419104500001](#) [FullText \(Details\)](#)

[Inderberg EM](#), [Mensali N](#), [Oksvold MP](#), [Fallang LE](#), [Fåne A](#), [Skorstad G](#), [Stenvik GE](#), [Progida C](#), [Bakke O](#), [Kvalheim G](#), [Myklebust JH](#), [Wälchli S](#) (2017)

[Human c-SRC kinase \(CSK\) overexpression makes T cells dummy](#)

Cancer Immunol Immunother, 67 (4), 525-536

PubMed [29248956](#) WOS [000427966200002](#) Cristin [1550585](#) [FullText \(Details\)](#)

[Storheim K](#), [Espeland A](#), [Grøvle L](#), [Skouen JS](#), [Aßmus J](#), [Anke A](#), [Froholdt A](#), [Pedersen LM](#), [Haugen AJ](#), [Fors T](#), [Schistad E](#), [Lutro O](#), [Marchand GH](#), [Kadar T](#), [Vetti N](#), [Randen S](#), [Nygaard ØP](#), [Brox JI](#), [Grotle M](#), [Zwart JA](#) (2017)

[Antibiotic treatment In patients with chronic low back pain and Modic changes \(the AIM study\): study protocol for a randomised controlled trial](#)

Trials, 18 (1), 596

PubMed [29246188](#) WOS [000418102500001](#) Cristin [1537626](#) [FullText \(Details\)](#)

Juel NG, [Brox JI](#), [Hellund JC](#), [Holte KB](#), [Berg TJ](#) (2017)

[The prevalence of radiological glenohumeral osteoarthritis in long-term type 1 diabetes: the Dialong shoulder study](#)

Scand J Rheumatol, 1-6 (in press)

PubMed [29239667](#) Cristin [1537989](#) [FullText \(Details\)](#)

[Stensland SØ](#), [Zwart JA](#), [Wentzel-Larsen T](#), [Dyb G](#) (2017)

[The headache of terror: A matched cohort study of adolescents from the Utøya and the HUNT Study](#)

Neurology, 90 (2), e111-e118

PubMed [29237795](#) WOS [000427797300003](#) Cristin [1529680](#) [FullText \(Details\)](#)

[Henning O](#), [Nakken KO](#) (2017)

[\[Behavioural arrest\]](#)

Tidsskr Nor Laegeforen, 137 (23-24)

PubMed [29231636](#) [FullText \(Details\)](#)

[Tukun FL](#), [Olberg DE](#), [Riss PJ](#), [Haraldsen I](#), [Kaass A](#), [Klaveness J](#) (2017)

[Recent Development of Non-Peptide GnRH Antagonists](#)

Molecules, 22 (12)

PubMed [29232843](#) WOS [000419242400153](#) Cristin [1560171](#) [FullText \(Details\)](#)



[Johnsrud K](#), Skagen K, [Seierstad T](#), Skjelland M, Russell D, [Revheim ME](#) (2017)
[¹⁸F-FDG PET/CT for the quantification of inflammation in large carotid artery plaques](#)
J Nucl Cardiol (in press)
PubMed [29209949](#) Cristin [1553132](#) [FullText \(Details\)](#)

Züchner M, Kondratskaya E, Sylte CB, Glover JC, [Boulland JL](#) (2017)
[Rapid recovery and altered neurochemical dependence of locomotor central pattern generation following lumbar neonatal spinal cord injury](#)
J Physiol, 596 (2), 281-303
PubMed [29086918](#) WOS [000419917700015](#) [FullText \(Details\)](#)

Arango-Lasprilla J, Olabarrieta-Landa L, Ertl MM, Stevens LF, Morlett-Paredes A, [Andelic N](#), Zasler N (2017)
[Survey on International Health Professional Training and Attitudes on Sexuality After Traumatic Brain Injury](#)
Sex. Disabil., 35 (4), 473-484
WOS [000414232500008](#) Cristin [1494247](#) [FullText \(Details\)](#)

Stanišić M, [Pripp AH](#) (2017)
[In Reply: A Reliable Grading System for Prediction of Chronic Subdural Hematoma Recurrence Requiring Reoperation After Initial Burr-Hole Surgery](#)
Neurosurgery, 81 (6), E78-E79
PubMed [29088404](#) WOS [000418758900007](#) [FullText \(Details\)](#)

Mansell G, Storheim K, [Løchting I](#), [Werner EL](#), [Grotle M](#) (2017)
[Identification of Indirect Effects in a Cognitive Patient Education \(COPE\) Intervention for Low Back Pain](#)
Phys Ther, 97 (12), 1138-1146
PubMed [29186635](#) WOS [000416400000004](#) Cristin [1570219](#) [FullText \(Details\)](#)

Eidsvaag VA, Hansson HA, Heuser K, Nagelhus EA, Eide PK (2017)
[Brain Capillary Ultrastructure in Idiopathic Normal Pressure Hydrocephalus: Relationship With Static and Pulsatile Intracranial Pressure](#)
J Neuropathol Exp Neurol, 76 (12), 1034-1045
PubMed [29040647](#) WOS [000417249600006](#) Cristin [1553225](#) [FullText \(Details\)](#)

Haveraaen L, Brouwers EPM, [Sveen U](#), Skarpaas LS, Sagvaag H, Aas RW (2017)
[The First Six Years of Building and Implementing a Return-to-Work Service for Patients with Acquired Brain Injury. The Rapid-Return-to-Work-Cohort-Study](#)
J Occup Rehabil, 27 (4), 623-632
PubMed [28144771](#) WOS [000416808600015](#) Cristin [1416219](#) [FullText \(Details\)](#)

Meling TR (2017)
[Color atlas of brainstem surgery, 1st edition](#)
Acta Neurochir., 159 (12), 2419-2420
WOS [000415354800028](#) [FullText \(Details\)](#)



[Ringstad G](#), Lindstrøm EK, Vatnehol SAS, Mardal KA, [Emblem KE](#), Eide PK (2017)
[Non-invasive assessment of pulsatile intracranial pressure with phase-contrast magnetic resonance imaging](#)

PLoS One, 12 (11), e0188896

PubMed [29190788](#) WOS [000416841900162](#) Cristin [1521885](#) [FullText \(Details\)](#)

Persson K, [Barca ML](#), Cavallin L, Brækhus A, [Knapskog AB](#), [Selbæk G](#), [Engedal K](#) (2017)

[Comparison of automated volumetry of the hippocampus using NeuroQuant® and visual assessment of the medial temporal lobe in Alzheimer's disease](#)

Acta Radiol, 59 (8), 997-1001

PubMed [29172642](#) Cristin [1520231](#) [FullText \(Details\)](#)

[Gregersen I](#), [Sandanger Ø](#), [Askevold ET](#), [Sagen EL](#), Yang K, [Holm S](#), [Pedersen TM](#), Skjelland M, [Krohg-Sørensen K](#), Hansen TV, [Dahl TB](#), [Otterdal K](#), Espevik T, [Aukrust P](#), [Yndestad A](#), [Halvorsen B](#) (2017)

[Interleukin 27 is increased in carotid atherosclerosis and promotes NLRP3 inflammasome activation](#)

PLoS One, 12 (11), e0188387

PubMed [29176764](#) WOS [000416291900070](#) Cristin [1522499](#) [FullText \(Details\)](#)

Heuch I, Heuch I, Hagen K, Mai XM, Langhammer A, Zwart JA (2017)

[Is there an association between vitamin D status and risk of chronic low back pain? A nested case-control analysis in the Nord-Trøndelag Health Study](#)

BMJ Open, 7 (11), e018521

PubMed [29175890](#) WOS [000422898800211](#) Cristin [1525405](#) [FullText \(Details\)](#)

[Kvalvaag E](#), Anvar M, Karlberg AC, Brox JI, Engebretsen KB, Soberg HL, Juel NG, Bautz-Holter E, [Sandvik L](#), Roe C (2017)

[Shoulder MRI features with clinical correlations in subacromial pain syndrome: a cross-sectional and prognostic study](#)

BMC Musculoskelet Disord, 18 (1), 469

PubMed [29157224](#) WOS [000416183500002](#) Cristin [1528091](#) [FullText \(Details\)](#)

Bürker BS, [Gude E](#), [Gullestad L](#), Grov I, Relbo Authen A, [Andreassen AK](#), Havik OE, Dew MA, [Fiane AE](#), Haraldsen IR, Malt UF, Andersson S (2017)

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