



Annual Report

Research Activity 2020



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 24 000 employees and a budget of 23 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, as well as 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.

Division of Clinical Neuroscience

Being the largest hospital in Norway, OUH 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 disciplines of neurology, neurosurgery, physical medicine and rehabilitation, neuro habilitation and complex epilepsy. The proximity to patients and their medical issues are the cornerstones for the research conducted at our Hospital, and the research aims 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

The Division's research activity is organized into 16 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 17 Professors, 3 Associate Professors, several postdoctoral fellowships and PhD students, administrative staff and technical staff.

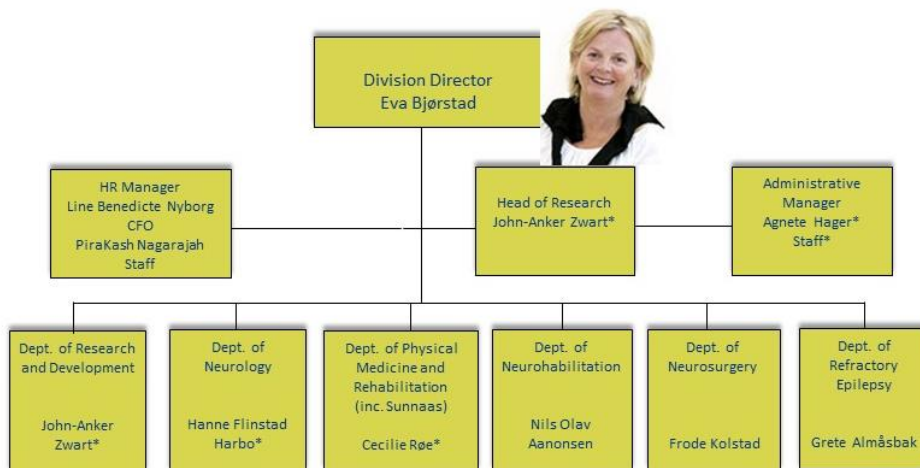
The Division has an advisory research board that in 2020 consisted of: Professor and Head of Research John-Anker Zwart, Division Director Eva Bjørstad, Professor and Senior Consultant Morten Lossius, Professor and Senior Consultant Eirik Helseth, Professor and Senior Consultant Mona Skjelland, Professor and Senior Consultant Nada Andelic and Administrative Manager Agnete Hager.

In 2020 there were in total 238 registered peer reviewed publications and 11 PhD dissertations, while Sunnaas Rehabilitation Hospital published 61 registered peer reviewed articles and had 2 PhD dissertations.

Eva Bjørstad, Division Director



Division of Clinical Neuroscience (NVR) Organizational Chart



*Uio employee(s)



Rehabilitation after trauma



Group Leader

Nada Andelic, MD/PhD, Professor, 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, Professor, OsloMet
- Unni Sveen, Professor, OsloMet
- Tonje Haug Nordenmark, Associate Professor, UiO
- Marit V. Forslund, Postdoc, OUH
- Tanja Karic, Researcher, OUH
- Torgeir Hellstrøm, Researcher, OUH
- Ingerid Kleffeltgård, Postdoc, OUH
- Mari S. Rasmussen, PhD fellow, UiO
- Emilie I. Howe, Cand Psych, PhD fellow, UiO
- Silje Fure, PhD fellow, UiO
- Elin Western, PhD fellow, UiO
- Ida Maria Borgen Henriksen, PhD fellow, UiO
- Håkon Moksnes, PhD fellow, UiO
- Christoph Schäfer, PhD fellow, UiT
- Cathrine Buaas Tverdal, PhD fellow, UiO

Associated group members

- Line Preede, PhD fellow, 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 injuries including traumatic brain injury (TBIs), multiple trauma and aneurysmal subarachnoid hemorrhage (aSAH). The research conducted by this group is multidisciplinary, where collaboration between genetics, intensive care medicine, neurosurgery, neuroradiology, neuropsychology and rehabilitation has been established over the last 15 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 of the research group for 2020-2025 are:

- To better understand the mechanisms, course and consequences of TBI, multiple traumas and aSAH by using translational research strategy





- To develop (and implement) cost-effective rehabilitation interventions to target TBI-related challenges in the short- and long-term after injury
- To improve collaboration and knowledge transfer between primary and secondary health care services to ensure seamless rehabilitation for trauma patients
- To strengthen existing and initiate new national and international multicenter research collaborations

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 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: Emile I. Howe and Silje Fure.
- 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, postdocs: Marit V. Forslund, Solveig L. Hauger, Ingerid Kleffelgård
- OSU6162 in the treatment of fatigue and other neuropsychological sequelae after aneurysmal subarachnoidal hemorrhage - a double-blind, randomised, placebo-controlled study. Principal investigators Angelika Sorteberg and Tonje Haug Nordenmark. PhD fellow Elin Western
- Rehabilitation needs after trauma. In collaboration with the National Trauma Register, University Hospital of North Norway and CHARM. Principal investigator Nada Andelic, PhD fellows Håkon Moksnes and Christoph Schäfer
- The course of functional recovery after moderate-to-severe TBI (5, 10 and 20 years after injury). Principal investigator Nada Andelic, Researchers: Cecilie Røe, Solrun Sigurdardottir, Torgeir Hellstrøm, Emilie I. Howe, Marit V. Forslund
- Changes in physical, cognitive and emotional functions 5 and 10 years after aneurysmal subarachnoid hemorrhage. Principal investigators: Tonje Haug Nordenmark and Tanja Karic

Other projects

- Development of persistent fatigue after moderate-to-severe TBI. In collaboration with Sunnaas Rehabilitation Hospital. Principal investigator Marianne Løsvstad, PhD fellow Daniel Løke
- 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, PhD fellow Line Preede
- Pediatric traumatic brain injury: A prospective study investigating incidence, outcomes and unmet treatments needs 2 years post-injury. In collaboration with Children Dept. Principal investigators Trond Diseth and Mia Myhre. PhD fellow Hilde M. Dahl
- Acute treatment of traumatic brain injury at Oslo University Hospital. Profile of patient population, hospital resource use and hospital discharge. In collaboration with Dept. of Neurosurgery. Principal investigator Eirik Helseth, PhD fellow Cathrine Buaas Tverdal





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 Rehab. Hospital
- OsloMet
- Work Research Institute (AFI)
- Norwegian Labor and Welfare Administration, Oslo
- NAV, Dept. of vocational rehabilitation
- Universities of Oslo, Bergen, Trondheim and Tromsø
- Helsam/Charm

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
- Hannover Medical School, Germany
- CENTER-TBI collaborators across the European hospitals/universities (particularly Finland, UK, France, Slovakia and Germany)

Funding

- European Union's Seventh Framework Programme for Research and Development
- Norwegian Research Council
- Heath Authority South-East Region
- Stiftelsen Dam
- University of Oslo
- Oslo University Hospital

Scientific production of the research group in 2020

Master thesis

Kjersti Sagstad: *“Biographical disruption following mild traumatic brain injury and experiences with the transition back to work. A qualitative study”* OsloMet, June 2020

Frida Kristine Torgersen: *“The aftermath of a Traumatic Brain Injury: psychological factors in patients and their families”* University of Southern Denmark, June 2020





Peer reviewed original research articles: 52

Other publications: 5

Selected publications:

Andelic N, Røe C, Brunborg C, Zeldovich M, Løvstad M, Løke D, Borgen IM, Voormolen DC, Howe EI, Forslund MV, Dahl HM, von Steinbuechel N; CENTER-TBI participants investigators.

“Frequency of fatigue and its changes in the first 6 months after traumatic brain injury: results from the CENTER-TBI study”

J Neurol. Epub 2020 Jul 16. doi: 10.1007/s00415-020-10022-2.

Sveen U, Guldager R, Soberg HL, Andreassen TA, Egerod I, Poulsen I.

“Rehabilitation interventions after traumatic brain injury: a scoping review”

Disabil Rehabil. 2020 Jun 13;1-8. doi: 10.1080/09638288.2020.1773940.

Howe EI, Fure SCR, Løvstad M, Enehaug H, Sagstad K, Hellstrøm T, Brunborg C, Røe C, Nordenmark TH, Sjøberg HL, Twamley E, Lu J, Andelic N.

“Effectiveness of Combining Compensatory Cognitive Training and Vocational Intervention vs. Treatment as Usual on Return to Work Following Mild-to-Moderate Traumatic Brain Injury: Interim Analysis at 3 and 6 Month Follow-Up”

Front Neurol. 2020 Nov 10;11:561400. doi: 10.3389/fneur.2020.561400.



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, OUH
- Jens Ivar Brox, Professor, UiO
- Kaia Beck Engebretsen, PT, PhD, OUH
- Marte Heide, PhD student, UiO
- Marianne Bakke Johnsen, PhD, UiO
- Niels-Gunnar Juel, MD, Dr. Philos, OUH
- Synnøve Kvalheim, PhD, OUH
- Kjersti Myhre, PhD, OUH
- Marianne Mørk, PhD student, OUH
- Line Preede, PhD student, UiO
- Elina Schistad, PhD, OUH
- Helene Skaara, MSc, OUH
- Sigrid Skatteboe, PhD, OUH
- Håkon Sveinall, PhD student. OUH
- Mirad Taso, PhD student, OUH
- Thy Vanem, 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

- A randomized controlled study of surgical versus non-surgical treatment for cervical radiculopathy. Principal 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. PhD fellows Marianne Mørk and Marte Heide
- Reliability of Modic changes. Principal investigator Elina Schistad
- Improving functioning and participation among persons with physical disabilities. Principal investigator Cecilie Røe. PhD fellow Line Preede
- Clinical course and prognostic factors for shoulder pain patients in primary and specialized care. Principal investigator Kaia Engebretsen
- 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
- Development of a minimum reporting set for rehabilitation services. Principal investigator Cecilie Røe
- The Norwegian Tennis Elbow (Note) study. Principal investigator Marianne Bakke Johnsen, PhD fellow Håkon Sveinall

Most important national and international collaborators

National

- Dept. of Orthopaedics, OUH
- Research Unit for Musculoskeletal Health, FORMI, OUH
- Institute of Health and Society, UiO
- Dept. of Physical medicine and Rehabilitation, St Olavs Hospital
- Dept. of Physical medicine and Rehabilitation, University Hospital of North Norway
- Dept. of Physical medicine and Rehabilitation, Haukeland University Hospital

International

- Christoph Gutenbrunner, Hannover Medical School, Department of Rehabilitation Medicine, Hannover, Germany
- Tuomas Lähdeoja, Helsinki University Central Hospital, Finland
- Juan Lu, Paul Perrin, Virginia Commonwealth University, US





Scientific production of the research group in 2020

Dissertations:

Cecile Piene Schrøder, Surgical Dept., Lovisenberg Diaconal Hospital; UiO March 2020:

“Treatment of Type II SLAP lesions of the shoulder. Efficacy of surgical treatment”

Main supervisor: Jens Ivar Brox

Lars Christian Haugli Bråten, FORMI, OUH; UiO January 2020:

“Chronic low back pain with Modic changes – Antibiotic treatment and clinical characteristics”

Co supervisors: Elina Schistad and Jens Ivar Brox

Peer reviewed original research articles: 18

Selected publications:

Bråten, Lars Christian Haugli; Grøvre, Lars; Espeland, Ansgar; Pripp, Are Hugo; Grotle, Margreth; Hellum, Christian; Haugen, Anne Julsrud; Froholdt, Anne; Rolfsen, Mads Peder; Nygaard, Øystein Petter; Lutro, Olav; Kristoffersen, Per M; Anke, Audny; Schistad, Ellina Iordanova; Skouen, Jan Sture; Brox, Jens Ivar; Zwart, John-Anker; Storheim, Kjersti.

“Clinical effect modifiers of antibiotic treatment in patients with chronic low back pain and Modic changes - Secondary analyses of a randomised, placebo-controlled trial (the AIM study)”

BMC Musculoskeletal Disorders 2020 ;Volum 21. s. 1-11

Hott, Alexandra Christine; Brox, Jens Ivar; Pripp, Are Hugo; Juel, Niels Gunnar; Liavaag, Sigurd.

“Patellofemoral pain: One year results of a randomized trial comparing hip exercise, knee exercise and free activity”

Scandinavian Journal of Medicine & Science in Sports 2020 ;Volum 30. s. 741-753

Vanem, Thy Thy; Rand-Hendriksen, Svend; Brunborg, Cathrine; Geiran, Odd; Røe, Cecilie.

“Health-related quality of life in Marfan syndrome: a 10-year follow-up”

Health and Quality of Life Outcomes 2020 ;Volum 18:376. s. 1-8

Funding

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



Complex epilepsy



Group Leader

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

Group Members

- Marit Bjørnvold, MD/PhD, NCE
- Cecilie Johannessen Landmark, MSc/PhD, NCE and OsloMet
- Kristin Alfstad, MD/PhD, NCE
- Karl Otto Nakken, MD/PhD, NCE
- Magnhild Kverneland, MSc/PhD, NCE
- Kari Modalsli Aaberg, MD/PhD, NCE
- Hilde Karterud, Cand.san/PhD, NCE
- Oliver Henning, MD, Dr. Philos., NCE
- Erik Sætre, MD/PhD, NCE
- Annette Holth Skogan, Clin.Neuro.Psych/PhD, NCE
- Lisa E. Hauger, Clin. Psych./PhD, NCE
- Silje Alvestad, MD/PhD, NCE

PhD candidates

- Torleiv Svendsen, MD, NCE and UiO
- Antonia Villagran, MD, NCE and UiO
- Eli B. Kyte, Clin.neuro.Psych, NCE and UiO
- Sigrid Pedersen, MSc, NCE
- Rune Markhus, MD, NCE
- Ellen Molteberg, MD, NCE and UiO
- Konstantin H. Kostov, MD, NCE and UiO
- Gernot Hlauschek, MD, NCE and UiO
- Merete Tschamper, MSc, NCE and UiO
- Truls Vikin, MD, NCE
- Kathrine C. Haavardsholm, MSc, NCE
- Fridny Heimisdottir, MD, NCE

Associated group members

- Anette Huuse Farmen, MD/PhD, Innlandet Hospital Trust and UiO
- Marte Syvertsen, MD/PhD, Vestre Viken Hospital Trust and UiO
- Kaja Kristine Selmer, MD/PhD, OUH and UiO
- Ine Cockerell, MSc, OUH and UiO

Research profile and aims

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

- Characterization of epilepsy syndromes (genotype/phenotype)
- Clinical pharmacology of antiepileptic drugs
- Diagnostic and treatment options; EEG, pharmacotherapy, surgery, VNS, ketogenic diets
- Psychosocial, psychiatric and neurocognitive aspects
- Psychogenic non-epileptic seizures

Dissertations

Magnhild Kverneland: *“Modified ketogenic (Atkin’s) diet as a treatment option for adults with drug-resistant epilepsy. A randomized controlled study”*

Supervisor: Karl Otto Nakken. Co-supervisors: Erik Taubøll and Per Ole Iversen. 28 February 2020

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. 5 March 2020

Oliver Henning: *“Sexuality, depression and side effects in refractory epilepsy patients”*

Senior researcher: Morten I Lossius. 19 November 2020

Ongoing projects

PhD candidates in the UiO PhD program:

- **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 K. Selmer. Co-supervisors: Knut Rudi, Per Ole Iversen and Benedicte Alexandra Lie
- **Ellen Molteberg:** *“Long term effects of modified Atkins diet in therapy-resistant epilepsy”* Supervisor: Erik Taubøll. Co-supervisor: Per Medbøe Thorsby and Karl O. Nakken
- **Eli B. Kyte:** *“Impact of epilepsy surgery on cognition, psychiatry and quality of life at the commencement of aging”* Supervisor: Kristin Å. Alfstad. Co-supervisor: Morten I. Lossius and Annette H. Skogan
- **Merete Tschamper:** *“Childhood epilepsy and parental health literacy”* Supervisor: Marie Hamilton Larsen. Co-supervisor: Astrid K. Wahl, Rita Jakobsen

Postdoc:

- **Silje Alvestad:** *“Scandinavian multi-registry study of antiepileptic drug teratogenicity: The SCAN-A study”*. Co-workers: Marte Bjørk, Torbjørn Tomsen, Jacob Christensen
- **Kristin Å. Alfstad:** *“Risk factors for psychiatric symptoms and executive problems in youth with epilepsy”*
Co-workers: Morten I. Lossius, Betty van Roy, Berit Hjelde Hansen, Erik Hessen
- **Kari M. Aaberg:** *«Development in childhood epilepsy»*. Co-workers: Pål Surén, Morten I. Lossius
- **Magnhild Kverneland:** *“Who should be treated with ketogenic diet for epilepsy”* Co-worker: Kaja K. Selmer
- **Erik Sætre:** *“Mortality in Epilepsy”* Co-worker: Michael Abdelnoor

PhD-candidates not yet in the UiO PhD program:

- **Kathrine C. Haavardsholm:** *“Long term effect of ketogenic diet in children with epilepsy”*
Supervisor: Anette Ramm –Pettersen, Co-supervisor: Kaja K. Selmer
- **Konstantin H. Kostov:** *“Clinical outcomes and determinants of effectiveness of vagus nerve stimulation in a large national refractory epilepsy population”*
Supervisor: Morten I. Lossius, Co-supervisor: Jukka Peltola
- **Gernot Hlauschek:** *“Identifying novel imaging and clinical biomarkers of epileptogenesis poststroke”*
Supervisor: Morten I. Lossius, Co-supervisors: Patrick Kwan and Meng Law
- **Fridny Heimisdottir:** *“Genetic mosaicism in focal epilepsy. Creating a platform for precision medicine in mosaic disorders”* Supervisor: Kaja K. Selmer Co-supervisors: Kristin Å. Alfstad, Inger-Lise Mero
- **Truls Vikin:** *“Epilepsy in children-how are they doing?”* Supervisor: Kari M. Aaberg, Co-supervisors: Pål Surén, Morten I. Lossius

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

- Ine Cockerell: *“Treatment and follow-up in patients with tuberous sclerosis”*
Supervisor: Terje Nærlund. Co-supervisors: Cecilie J. Landmark, Caroline Lund and Ketil Heimdal

National network

- EpilepsiNett: National Network for Evidence-based Epilepsy Care
Chairperson: Marte Syversen. Management team: Morten I. Lossius, Nils Erik Gilhus, Marte Bjørk, Kristin Å. Alfstad, Jørn Mandla Sibeko

International networks

- EpiCARE; European Reference Network (ERN) on rare and complex epilepsies. Head of Scientific Advisory Board: Morten I. Lossius
- NESREC Nordic Epilepsy Surgery Research Consortium

International projects:

- “EURAP study”. *An International Antiepileptic Drugs and Pregnancy Registry* (International concerted Action on the Teratogenesis of Anti-epileptic Drugs) [EURAP - International Registry of Antiepileptic Drugs and Pregnancy](#)
Silje Alvestad and Siri Myklebust, national coordinators
- “Computer based identification of morphometric abnormalities in MRI images in patients before and after operation in the temporal lobe” Kristin Å. Alfstad, Morten I. Lossius, Jugoslav Ivanovic, Pål Bache Marthinsen, OUH and Lars Pinborg, Copenhagen University Hospital, Denmark
- “Detection and classification of seizures with wearable sensors-new technology in the diagnosis of epilepsy” Kristin Å. Alfstad, Antonia Villagran, Rune Markhus and Kristina Malmgren, University of Gothenburg and Sahlgrenska University Hospital, Sweden
- “Ultra-long subcutaneous EEG monitoring: reliability, safety and impact on clinical management in uncontrolled epilepsies” Kristin Å. Alfstad, Oliver Henning, Margrete Halvorsen Bø, Arild Egge, OUH, Guido Rubboli, University of Copenhagen, Danish Epilepsy Centre, Dianalund, Denmark and Sándor Benizky, Aarhus University Hospital and Danish Epilepsy Centre, Dianalund, Denmark
- “Nordic prospective observational study of outcomes after rare epilepsy surgery procedures” Fridny Heimisdottir, Kristin Å. Alfstad and Tove Hallbook, University of Gothenburg and Sahlgrenska Hospital, Sweden
- “Pharmacokinetic variability, efficacy and tolerability of a new antiepileptic drug, brivaracetam” Scandinavian project between the National Centre for Epilepsy in Norway and Danish Epilepsy Centre, Dianalund, Denmark; 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 Centre for Epilepsy in Norway and Danish Epilepsy Centre, Dianalund, Denmark; Margrete Larsen Burns, Marina Nikorono, Danish Epilepsy Centre, Dianalund; responsible in Denmark, Cecilie Johannessen Landmark, project leader
- “ERAS-Trial (Effect Related to Auto Stimulation): Does additional ECG-triggered stimulation increase the efficacy of Vagus Nerve Stimulation?” Oliver Henning, Hrisimir Kostov and Tatiana Evsikova, Eylert Brodtkorb, St.Olavs Hospital, NTNU, Lieven Lagae, UZ Leuven University Hospital, Anne Sabers, University of Copenhagen and Jukka Petola, Tampere University Hospital
- “EEG in Nodding Syndrome (Onchocerca volvulus associated epilepsy)” Oliver Henning, Richard Idro, Makarere University, Kampala, Uganda

Expert groups etc.

- Cannabidiol International Expert group (CBD). Cecilie Johannessen Landmark
- Treatment strategies on pediatric epilepsies annual educational course
www.epiped-course.com (EpiPed.) Cecilie Johannessen Landmark
- Epilepsy Education Task Force of the International League Against Epilepsy (EpiED) Cecilie Johannessen Landmark
- Nordic Expert Group on Epilepsy and Dementia. Erik Sætre



Clinical studies (sponsored by the pharmaceutical industry)

- A Study to Test the Efficacy and Safety of Padsevonil as Treatment of Focal-onset Seizures in Adult Subjects With Drug-resistant Epilepsy (DUET) (EP0092)
- P.I. Torleiv Svendsen, Investigator: Morten I. Lossius, Study coordinator: Stein Atle Roestad
- UCB, Experience study (EPO0093). P.I: Torleiv Svendsen, Investigator: Morten I. Lossius, Study coordinator: Stein Atle Roestad

Most important national and international collaborators

National

- Prof. Eylert Brodtkorb, St. Olavs Hospital and NTNU, Trondheim
- Prof. Erik Taubøll, OUH and UiO
- Prof. Jeanette Koht, Viken Hospital Trust and UiO
- Prof. Nils Erik Gilhus, Haukeland University Hospital
- Ass. prof. Marte Bjørk, Haukeland University Hospital and UiB
- Marte Syvertsen, MD, Drammen Hospital and UiO

International

- Prof. Torbjörn Tomson, Karolinska Institutet, Stockholm, Sweden
- PhD Jacob Christensen, University of Århus, Denmark
- Prof. Marina Nikorova, Danish Epilepsy Centre, Dianalund, Denmark
- Prof. Anne Sabers, University of Copenhagen, Denmark
- Lars Pinborg, Copenhagen University Hospital, Denmark
- Prof. Richard Chin, Muir Maxwell Epilepsy Centre and University of Edinburgh
- MD Roderick Duncan, MD, DB Medical Research Centre, Christchurch, New Zealand
- Prof. Christoph Helmstaedter, Bonn University Hospital, Germany
- Prof. Lieven Lagae, UZ Leuven University Hospital, Belgium
- MD, PhD Richard Idro, Mulago National Referral Hospital, Kampala, Uganda
- Prof. Kristina Malmgren, Sahlgrenska University Hospital, Sweden
- Prof. Sándor Beniczky, Danish Epilepsy Centre, Dianalund, University of Århus, Denmark
- Prof. Guido Rubboli, Danish Epilepsy Centre, Dianalund, University of Copenhagen, Denmark
- Ass. Prof. Rikke Steensbjerre Møller, University of Southern Denmark, Denmark
- Prof. Jukka Peltola, Tampere University Hospital, Finland





Scientific production of the research group in 2020

Peer reviewed original research articles: 13

Other publications: 13

Selected publications:

Lossius K, de Saint Martin A, Myren-Svelstad S, Bjørnvold M, Minken G, Seegmuller C, Valenti Hirsch MP, Chelly J, Steinlein O, Picard F, Brodtkorb E (2020)

“Remarkable effect of transdermal nicotine in children with CHRNA4-related autosomal dominant sleep-related hypermotor epilepsy”

Epilepsy Behav, 105, 106944

Svendsen T, Brodtkorb E, Baftiu A, Lossius MI, Nakken KO, Johannessen SI, Johannessen Landmark C (2020)

“Clinical experience combined with therapeutic drug monitoring of lacosamide”

Acta Neurol Scand, 141 (4), 279-286

Molteberg E, Thorsby PM, Kverneland M, Iversen PO, Selmer KK, Nakken KO, Taubøll E (2020)

“Effects of modified Atkins diet on thyroid function in adult patients with pharmaco-resistant epilepsy”

Epilepsy Behav, 111, 107285

Funding

- South-Eastern Norway Regional Health Authority: 1 PhD, 1 postdoc 6 years
- Norwegian Foundation for Health and Rehabilitation (Stiftelsen Dam):
3 PhD, other financial support
- Norwegian chapter of ILAE
- Norwegian Epilepsy Society
- National Centre of Competence for Rare Diseases



Neurovascular–Cerebrospinal Fluid 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

- Aukrust, Camilla Grøver, PhD fellow UiO
- Dahlberg, Daniel, PhD, Oslo university hospital (OUH)
- Eide, Per Kristian, group leader
- Fric, Radek, PhD, OUH
- Hassan-Olive, Md Mahdi, PhD fellow, UiO
- Lashkarivand, Aslan, PhD fellow, UiO
- Langvatn, Erlend, Consultant, OUH
- Slettebø, Haldor, Senior Consultant, OUH
- Sortberg, Angelika, professor, UiO / Consultant OUH
- Sorteberg, Wilhelm, dr.med., OUH
- Stanisic, Milo, dr.med., OUH
- Ringsby, Jon-Olav, Consultant, OUH
- Rønning, Pål Andre, PhD, consultant, OUH
- Valnes, Lars-Magnus, PhD, Postdoc, OUH
- Wiedemann, Markus, PhD, Consultant, OUH

Research profile and aims

The Neurovascular & Cerebrospinal Fluid Research Group (Division of Clinical Neuroscience, University of Oslo and Oslo University Hospital) teams up with a multidisciplinary group of neurosurgeons and neuroscientists, mathematicians, PhD candidates, Postdocs and students, to provide a broad collaboration with a common vision; to challenge, discover and improve our current understanding and treatment of complex neurovascular and cerebrospinal fluid (CSF) disorders. We address the close interaction between the cerebral vasculature and the CSF, which we consider to have major impact on cerebral metabolism and metabolic failure. The group has a translational perspective with a strong clinical basis.

From the clinical perspective, the following diseases and disease states are targeted:

- Intracranial aneurysms and subarachnoid hemorrhage, including neuro-intensive surveillance and outcome. Cerebral hemodynamics and cerebral revascularization. Pathophysiology and treatment of chronic subdural hematomas.
- Cerebrospinal fluid diseases and role of cerebrospinal fluid in metabolic function of central nervous system, particularly in neurodegeneration and dementia, CSF disturbances, vascular disease and cerebral bleeds, inflammatory disease and neuro-oncology.
- Neuro-inflammatory conditions, particularly related to neurosurgical diseases.
- Brain Monitoring. Neurosurgical pathophysiology, intracranial pressure and arterial blood pressure dynamics.

Ongoing projects

- **Cerebrospinal fluid**
Efflux pathways. Glymphatic function. Meningeal lymphatic function. Imaging of CSF flow and CSF tracer transport, and CSF molecular clearance function. Pathophysiology of CNS diseases with CSF disturbance: Hydrocephalus. Normal pressure hydrocephalus. Idiopathic intracranial hypertension. Spontaneous intracranial hypotension. Idiopathic CSF obstruction from cysts. Chiari malformation.
- **Neurovascular**
Subarachnoid hemorrhage: Bleeding risks. Complications (Vasospasms. Hydrocephalus. Fatigue). Rehabilitation. Outcome. Vascular compression syndromes. Trigeminal neuralgia.
- **Neuro-inflammation**
Cerebral abscesses: Pathophysiology. Subdural hematoma: pathophysiology and role of neuroinflammation.
- **Brain monitoring**
Invasive and non-invasive intracranial pressure (ICP).

Most important national and international collaborators

National

- Simula Research Laboratory, UiO
- Dept of Physical Medicine and Rehabilitation, OUH
- Dept of Radiology, OUH
- The Intervention Centre, OUH
- Dept of Informatics, UiO
- Dept of Mathematics, UiO
- Dept of Neurology, OUH
- Division of Emergencies and Critical Care, OUH
- Sunnaas Rehabilitation Hospital
- Institute of Basic Medical Sciences, UiO

International

- University of Gothenburg, Sweden
- University of Kupio, Finland
- University of Copenhagen, Denmark

Funding

- South-Eastern Norway Regional Health Authority
- European Union





Scientific production of the research group in 2020

Peer reviewed original research articles: 20

Invited lectures at international congresses: >10

Selected publications:

Evensen KB, Eide PK (2020) *“Measuring intracranial pressure by invasive, less invasive or non-invasive means: limitations and avenues for improvement”*

Fluids and barriers of the CNS 17:34

Most accessed paper in the journal 2020.

Ringstad G, Eide PK (2020) *“Cerebrospinal fluid tracer efflux to parasagittal dura in humans”*

Nature communications 11:354

Description of a “new” functional region for direct molecular passage between CSF and meningeal lymphatic vessels: Parasagittal dura.

Western E, Sorteberg A, Brunborg C, Nordenmark TH (2020) *“Prevalence and predictors of fatigue after aneurysmal subarachnoid hemorrhage”*

Acta Neurochir. (Wien). 162:3107-3116

Clinical paper adressing a less recognized but important complication of SAH: Fatigue



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, Dept. of Neurosurgery, Geneva University Hospital (torstein.meling@hcuge.ch), Full professor of Neurosurgery, Faculty of Medicine, University of Geneva and Assistant Professor, Institute of Psychology, University of Oslo

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
- Hege Linnerud, MD/PhD, OUH
- Markus Wiedmann, MD/PhD, OUH
- Jon-Terje Ramm-Pettersen, MD/PhD, OUH
- Pål Rønning, MD/PhD, OUH
- Tor Brommeland, MD/PhD fellow, OUH
- Ali Rizvi, MD, PhD fellow, OUH
- Christina Teisner Høstmælingen, MD, PhD fellow, OUH
- Cathrine Buaas Tverdal, registrar and PhD fellow, OUH
- Dag Ferner Netteland, PhD fellow
- Ola Fougner Skaansar, medical student, UiO
- Ingar Næss, medical student, UiO
- Michele Da Broi, MD/PhD fellow
- Pål Galteland, MD/PhD fellow

Research profile and aims

Main focus on surgical complications and outcome after surgery for:

- Intracranial tumors
- Neurotrauma
- Bicycle related injuries



Ongoing projects 2020

- Cervical trauma – Epidemiology and Surgical management
- Traumatic Brain Injury – Epidemiology and management
- Intracranial tumors – Epidemiology, imaging and management
- CenterTBI – European study
- Transocular ultrasound for ICP measurement – with SINTEF/Nisonic
- GLOBAL NEUROTRAUMA OUTCOMES STUDY (GNOS)
- Low-grade gliomas: Scandinavian Study of Surgical Selection, Techniques and Results (S4TAR)

PhD projects

- Intracranial meningiomas – Michele Da Broi
- Odontoid fractures – Ali Rizvi
- Subaxial cervical fractures - Christina Teiner Høstmælingen
- Transocular ultrasound for ICP measurement - Dag Ferner Netteland
- Traumatic brain injury – Cathrine Buaas Tverdal
- Bicycle accidents – Pål Galteland

“Forskerlinje” projects

- Traumatic brain injury – Ola Fougner Skaansar
- Bicycle accidents – Ingar Næss

Funding

South-Eastern Norway Regional Health Authority

Scientific production of the research group in 2020

Dissertations 2020

Marton König; *“High-grade malignancies of the skull base and craniofacial region”*

Benjamin Lykkedrange Lassen; *“Complications after craniotomy for brain tumors”*

Einar Stensvold; *“Paediatric and adolescent medulloblastoma and CNS-PNET in Norway 1974 – 2013: Survival, regional differences, and late effects”*

Peer reviewed original research articles: >80 (including Center TBI-publications)

Invited lectures at international congresses: ~20





Selected publications:

“The effect of tumor removal via craniotomies on pre-existing hydrocephalus in adult patients with intracranial tumors”

Hosainey SAM, Lassen B, Helseth E, and Meling TR. *Neurosurgical Review* 2020;43(1):141–151. doi.org/10.1007/s10143-018-1021-6 (IF 2019 2.654)

“WHO Grade I Meningiomas: Classification-Tree for Predictive Factors of Survival”

Lemée JM, Corniola MV, Da Broi M, Joswig H, Scheie D, Schaller K, Helseth E, and Meling TR. *Neurosurgical Review* 2020;43(2):749-758. DOI: 10.1007/s10143-019-01117-0 (IF 2019 2.654)

Rizvi, S. A. M., Helseth, E., Harr, M. E., Mirzamohammadi, J., Ronning, P.
Mejlaender-Evjensvold, M, Linnerud, H

“Management and long-term outcome of type II acute odontoid fractures: a population-based consecutive series of 282 patients”

Spine J. 2020 Dec 17:S1529-9430(20)31248-1. doi: 10.1016/j.spinee.2020.11.012. Online ahead of print. PMID: 33346157



Vilhelm Magnus Laboratory for Neurosurgical Research



Group Leader

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Group Members:

- Cecilie J Sandberg, MSc, PhD, Lab manager/HR/Daily activities, OUH
- Einar O. Vik-Mo, MD, PhD, Deputy group leader, OUH
- Skarphedinn Haldorsson, MSc, PhD, Post Doc
- Luna Kutiti Djirackor, MD, PhD, Post Doc
- Erlend Skaga, MD, PhD-student, UiO
- Marit Brynjufsen, MSc, PhD-student, UiO
- Elise Solli, MSc, PhD-student, NTNU
- Zanina Grieg, MSc, OUH
- Birthe Mikkelsen, BSc, OUH (leave of absence)
- Emily Palmero, BSc, OUH
- Maria Walewska, MSc, OUH

Research profile and aims

After showing that the human brain contains stem cells that can differentiate into functional neurons, and that malignant brain tumors harbor cancer stem cells that are essential to tumor growth and progression, the Vilhelm Magnus Laboratory (VML) has focused purely on translational research, mainly on glioblastoma (GBM), the most frequent and deadly brain cancer (median survival in unselected series < 1 year).

This resulted in the first clinical protocol targeting stem cells in a solid tumor - an autologous vaccine against GBM stem cells, as well as an individualized systems medicine strategy, in which we test > 500 drugs against tumor stem cells from individual patients. The latter is also the first study of its kind in any type of solid tumor.

The Vilhelm Magnus Laboratory is a section within the Department of Neurosurgery.

Aims:

- To characterize cell types and cellular mechanisms in GBMs with special attention to GBM stem cells (GSCs)
- To develop therapeutic strategies against GBM targeting GCSs

Ongoing projects

Fifteen years ago we showed, for the first time, that stem cells from the adult human brain can differentiate into functional neurons, and that it is possible to generate a small nervous system with numerous neurons that fire action potentials and communicate 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. Through extensive comparisons between GSCs and normal stem cells from the adult brain (Varghese et al *Neurosurgery* 2008;63:1022-33), we identified genes and pathways which are dysregulated in GSCs, and provided the first clinical dataset that support the cancer stem cell hypothesis in glioblastoma (Sandberg et al, *Exp Cell Res*, 2013).

We further 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).



VML members Elise Solli, Einar Vik-Mo, Cecilie J Sandberg, Marit Brynjufsen, Luna Djirackor, Iver Langmoen, Emily Palmero and Skarphedinn Haldorsson.

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 mRNA from their own GBM stem cells. This significantly improved clinical outcome (Vik-Mo et al, *Cancer Immunol Immunother*. 2013;62:1499-509). One out of four of the patients are still alive.

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. This study is currently including patients. 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 heterogenous with respect to drug sensitivity (Skaga et al. 2019).

A clinical early phase trial where for feasibility evaluation of this strategy is in the process of regulatory approval.

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 9 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 (Skaga et al. 2019).

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 (Fayzullin et al.2019)

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 (Kierulf-Vieira KS et al.2020) , 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.

The molecular basis for tissue stiffness in glioblastoma:

Magnetic resonance imaging elastography is a novel imaging modality with the potential to preoperatively identify surgical risk by evaluating tumor stiffness. Through a collaboration with Dept. of Diagnostic Physics, we are further exploring the molecular basis for MRI heterogeneity in glioblastoma.

A molecular pipeline for individualized treatment in pediatric brain cancers:

Brain cancer is the most common cancer in children. We are exploring the use of rapid molecular characterization using Nanopore technology combined with stem cell biology and high throughput drug-screening to develop better individualized treatment strategies.



Most important national and international collaborators

National

- Gunnar Kvalheim/Dag Josefsen, OUH
- Steinar Aamdal/Paal Brunsvig, OUH
- Gustav Gaudernack, Targovax
- Kyrre Emblem, OUH
- Ola Myklebust, OUH
- Petter Brandal, OUH
- Else Marit Inderberg, OUH
- Elsa Lundanes, UiO
- Steven Wilson, UiO

International

- Krister Wennerberg, Markus Perola, Finnish Institute for Molecular Medicine, Finland
- Aki Laakso, Emilia Gaal-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
- Phillipp Euskirchen, Charité Universitätsmedizin, Berlin, Germany

Funding

- Norwegian Cancer Society
- Barnekreftforeningen
- The Norwegian Research Council
- South-Eastern Regional Health Authorities
- OUH, Dept. of Neurosurgery

Scientific production of the research group in 2020

PhD thesis

Cand.med. Erlend Skaga; *“Drug sensitivity and resistance testing of brain tumor stem cells for individualized functional precision medicine”*

Peer reviewed original research articles:

Kierulf-Vieira KS et al

«A Small-Molecule Tankyrase Inhibitor Reduces Glioma Stem Cell Proliferation and Sphere Formation»
Cancers (Basel). 2020 Jun 19;12(6):1630

Skaga E et al.

“Feasibility study of using high-throughput drug sensitivity testing to target recurrent glioblastoma stem cells for individualized treatment”
Clin Transl Med. 2019 Dec 30;8(1):33.

Functional Neurosurgery Group



Group Leader

Pål G. Larsson, MD/Dr. philos, Head of Clinical Neurophysiology, Dept. of Neurosurgery, OUH (pall@ous-hf.no)

Group Members

- Arild Egge, MD/PhD, OUH
- Frode Kolstad, MD/PhD, OUH
- Milo Stanisic, MD, Dr.med., OUH
- Jugoslav Ivanovic, MD/PhD fellow
- Mark Züchner, MD/PhD, OUH
- Ane Konglund, MD/PhD, OUH
- Marianne Nævra, Mphil., OUH
- Ketil Berg Olsen, MD, OUH
- Lars Etholm, MD/PhD, OUH
- Awais Mughal, MD/PhD, OUH

Research profile and aims

Main research aim is assessment of brain, medulla and peripheral nerve function and surgical treatment:

- Epilepsy surgery
- Deep brain stimulation
- Other electrical nerve tissue stimulation
- Assessment of brain function through EEG
- Stereotactic intracranial recording (SEEG)
- Function localization through intracranial recordings
- Clinical assessment through machine learning
- Drug effect prediction through machine learning in EEG

Ongoing projects

- Cognitive function assessment through SEEG
- Consciousness assessment
- Dynamics of large-scale cortical networks during general anesthesia
- Changes in brain connectivity during the Wada test
- Epilepsy surgery outcome
- Changes in connectivity in preterm children and prediction of long term outcome
- Adjuvant treatment with Cycloapron in surgical treatment of CSDH
- ProTLE – follow up study of newly diagnosed temporal lobe epilepsies
- Long QT-time and seizures
- Continues spike wave during sleep (CSWS)
- Source localization in epilepsy (E-epilepsy, EU-consortium)
- Antiepileptic drug use in Norway



- Quality assessment of intraoperative neuro-monitoring in spine surgery (IONM)
- NORSTIM – prospective study of DBS in STN in Parkinson disease
- DBS in tremor
- DBS in epilepsy
- Microbiota in Nuclius Subthalamicus and CSF in patients with Parkinson disease
- Predictors of VNS stimulation
- New treatment in chronic subdural haematomas
- EEG as predictor of Brivaracetam, Perampanel and levetiracetam effect
- Interictal EEG features as biomarkers in presurgical epilepsy work up
- Refractory status epilepticus
- Laser ablation in Epilepsy
- Genetic mapping in Moya Moya

Most important national and international collaborators

National

- Institute of Psychology, UiO
- Institute of Basic Medical Sciences, UiO
- Department of Neurology, OUH
- Department of Anesthesiology, OUH
- Children’s Department, UUS, OUH
- National Center for Epilepsy, OUH
- Department of Radiology, OUH
- Research laboratory, DNR, OUH
- Internal Medicine, OUH
- OsloMet
- Department of Engineering Cybernetics, NTNU

International

- Helene Wills institute, UC Berkeley, US
- Department of Neurology, Marburg, Germany
- Clinical Neurophysiology, Århus, Denmark
- Dianalund Epilepsy Center, Denmark
- Epilog

Funding

- AED effect prediction by EEG supported by Eisai
- More national and international funding through collaborators

Scientific production of the research group in 2020

Peer reviewed original research articles: 10

Invited lectures at international congresses: 1 lecture





Selected publications:

“Validation of a new approach for distinguishing anesthetized from awake state in patients using directed transfer function applied to raw EEG”

BE Juel, L Romundstad, JF Storm, PG Larsson. Journal of Clinical Monitoring and Computing, 1-14 2020

“Optimized set of criteria for defining interictal epileptiform EEG discharges”

MA Kural, H Tankisi, L Duez, VS Hansen, A Udupi, R Wennberg, ... Clinical Neurophysiology 131 (9), 2250-2254 3 2020

“An electrophysiological marker of arousal level in humans”

JD Lendner, RF Helfrich, BA Mander, L Romundstad, JJ Lin, MP Walker, ...Elife 9, e55092 14 2020



Movement, muscle and neurodegeneration



Group Leader

Mathias Toft, MD/PhD, Professor and Head of Section, Dept. of Neurology, UiO (mathias.toft@medisin.uio.no) and OUH (mtoft@ous-hf.no)

Group Members

- Espen Dietrichs, Prof MD PhD (PI Clinical movement disorders)
- Silje Bjerknes, MD
- Vidar Gundersen, Prof MD PhD
- Nadja Anette Myrvik Kvernmo, MD
- Inger Marie Skogseid, MD PhD
- Mathias Toft, Prof MD, PhD (PI Molecular studies of PD)
- Zafar Iqbal, PhD
- Kaja Nordengen, MD, PhD
- Victoria Berge-Seidl, MD
- Chiara Cappelletti, MSc
- Natasha Demic, MD
- Sandra Pilar Henriksen, MSc
- Lasse Pihlstrøm, MD, PhD (PI Huntington and neurodegenerative genomics)
- Manuela Tan, PhD
- Maren Stolp Andersen, MD
- Jon Anders Tunold, MD
- Ingeborg Haugesag Lie, MD
- Marleen van Walsem, PhD
- Kristin Ørstavik, MD PhD (PI Rare neuromuscular disorders)
- Trine Haug Popperud, MD PhD
- Magnhild Rasmussen, MD PhD
- Ellen Annexstad, MD
- Marianne Nordstrøm, Registered dietitian, PhD
- Sean Wallace, MD, PhD
- Aristomo Andries, MD, MSc
- Hanne Ludt Fossmo, MSc
- Gro Solbakken, MSc
- Angelina Maniaol, MD, PhD (PI Myasthenia and ALS)
- Marion Boldingh, MD, PhD
- Mathilde Kinge-Rasmussen, MD

Research profile and aims

The Movement, muscle and neurodegeneration group was founded in 2019, bringing together researchers studying a spectrum of chronic neurological disorders causing impaired motor function. Our areas of interest range across disorders affecting the planning and calibration of movements in the basal ganglia (Parkinson's disease, Huntington's disease, dystonia and tremor), diseases affecting the upper and lower motor neurons (amyotrophic lateral sclerosis and spinal muscular atrophy) and neuromuscular disorders (myasthenic syndromes and primary myopathies).



In a majority of the conditions we study, the etiology is neurodegenerative, genetic or both.

Our scientific approaches span from translational studies based largely on laboratory and bioinformatic methodologies to observational studies and clinical trials recruiting patients from the Department of Neurology.

The Movement, muscle and neurodegeneration group is a thematically overarching research group organized into five subgroups focused on specific diseases and methodologies:

- [Clinical studies of movement disorders](#)
- [Molecular studies of Parkinson's disease](#)
- [Huntington's disease and neurodegenerative genomics](#)
- [Rare Neuromuscular Disorders](#)
- [Myasthenia gravis and amyotrophic lateral sclerosis](#)

Ongoing projects

We perform clinical studies, including a prospective study of early-stage Parkinson's disease and clinical trials on the efficacy of deep brain stimulation for Parkinson's disease, dystonia, and tremors. Patients with Huntington's disease are included in international registries. Laboratory research is focusing on genetic and genomic studies of Parkinson's disease, and epigenetic studies of Parkinson's disease and Dementia with Lewy bodies. Furthermore, several projects are examining the role of inflammation in neurodegeneration.

The Rare Neuromuscular Disorders Project Group focuses on juvenile and adult neuromuscular disorders and the main objective is to contribute to early detection and diagnostics of disease, better treatment and multidisciplinary care for the people affected by the rare neuromuscular disorders and their relatives. The research is mainly clinical research related to myotonic dystrophy, Charcot-Marie Tooth, spinal muscular atrophy and Duchennes muscular dystrophy.

The last project group is focusing on clinical studies of myasthenia gravis and amyotrophic lateral sclerosis, and participates in national and international projects related to genetic studies, imaging and clinical trials.

Most important national and international collaborators

National

- Multiple other groups within UiO and OUH
- The other university hospitals in Norway, incl. NeuroSysmed in Bergen
- Prof. Ole Andreassen, UiO, DemGene – Genetics of Dementia
- Dept. of Cardiology, OUH
- Prof. Jan Frich, Dept. of Health Management and Health Economics, UiO
- Prof. S.O. Kolseth, Dept. of Nutrition, Inst. of Basic Medical Sciences, UiO
- Sunnaas Rehabilitation Hospital

International

- IPDGC (international Parkinson Disease Genetics Consortium)
- COURAGE-PD consortium
- Dr. Owen Ross, Mayo Clinic, USA
- GEO-PD consortium
- Dr Wilma van der Berg, VuMC University Hospital, Amsterdam, Netherlands
- Prof. Per Odin, Lund University, Sweden
- Prof. Henry Houlden, University College London, UK





Funding

Among others:

- The Research Council of Norway
- South-Eastern Norway Regional Health Authority
- DAM (Norwegian ExtraFoundation for Health and Rehabilitation)
- Michael J. Fox Foundation
- The Norwegian Health Association
- Sophies Minde Foundation

Scientific production of the research group in 2020

Peer reviewed original research articles: 14

Selected publications:

Bjerknes S, Skogseid IM, Hauge TJ, Dietrichs E, Toft M (2020)

“Subthalamic deep brain stimulation improves sleep and excessive sweating in Parkinson's disease”

NPJ Parkinsons Dis, 6, 29

DOI 10.1038/s41531-020-00131-0, PubMed 33083523

Krohn L, Wu RYJ, Heilbron K, Ruskey JA, Laurent SB, Blauwendraat C, Alam A, Arnulf I, Hu MTM, Dauvilliers Y, Högl B, Toft M, Bjørnarå KA, Stefani A, Holzknecht E, Monaca CC, Abril B, Plazzi G, Antelmi E, Ferini-Strambi L, Young P, Heidebreder A, Cochen De Cock V, Mollenhauer B, Sixel-Döring F, Pihlstrøm L, et al. (2020)

“Fine-Mapping of SNCA in Rapid Eye Movement Sleep Behavior Disorder and Overt Synucleinopathies”

Ann Neurol, 87 (4), 584-598

DOI 10.1002/ana.25687, PubMed 31976583

Andries A, van Walsem MR, Frich JC.

“Self-reported physical activity in people with limb-girdle muscular dystrophy and Charcot-Marie-Tooth disease in Norway”

BMC Musculoskelet Disord. 2020 Apr 13;21(1):235.

doi: 10.1186/s12891-020-03246-w. PMID: 32284057



Cerebrovascular diseases



Group Leader

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Group Members

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- Rajiv Advani, MD, PhD
- Helge Fagerheim Bugge MD, PhD-student
- Brian Enriquez, MD, PhD-student
- Erik Eriksen, MD
- Mona Guterud, paramedics, PhD-student
- Guri Hagberg MD, PhD
- Charlotta Hamre, PhD-student
- Gisle Berg Helland, PhD-student
- Maren Ranhoff Hov, MD, PhD, postdoc
- Jørgen Ibsen, MD, PhD-student
- Hege Ihle-Hansen, MD, PhD
- Svein Håkon Ingebretsen, MD
- Bjørn Jamtli, PhD-student
- Henriette Johansen, MD
- Mirza Jusufovic, MD, PhD
- Christina Kefaloykos, study coordinator
- Kristian Lundsgaard Kraglund, MD, PhD
- Karianne Larsen, MD, PhD-student
- Christian Lund, MD, PhD
- Ragnhild Munthe-Kaas, MD, PhD
- Terje Nome, MD
- Lasse Ormel, MD, PhD
- Barbara Ratajczak-Tretel, MD, PhD-student
- Stephen Ryan, MD, PhD-student
- David Russell, Professor emeritus
- Else Charlotte Sandset, MD, PhD, postdoc
- Therese Schørlien, MD
- Karolina Skagen, MD, PhD, postdoc
- Thor Skattør, MD
- Kristine Stø, MD, PhD-student
- Jesper Sømmark, MD
- Mahtab Zamani, MD, PhD-student
- Anna Tancinova, MD, PhD-student
- Lars Tveit, MD
- Georgios Vlachos, MD, PhD-student



Research profile and aims

The main goal is to conduct high-quality cerebrovascular research, leading to new knowledge and improved treatment of stroke patients. The main research areas are:

- **Pre-hospital and acute stroke.** The focus of this group is to improve and implement prehospital diagnostics and treatment of acute stroke patients. Subgroup leader: Else Charlotte Sandset
- **Acute stroke, inflammation and the gut-brain axis.** The main aim of this group is to study the role of inflammation in acute stroke, and the impact of gut microbiota on cerebrovascular disease. Subgroup leader: Karolina Skagen
- **Acute stroke treatment and atrial fibrillation.** The scientific research interest is acute stroke treatment, diagnostic workup in acute ischemic stroke and the relation between stroke and atrial fibrillation. Subgroup leader: Anne-Hege Aamodt
- **Stroke and cognition.** This group aims to quantify and measure levels of cognitive impairment after stroke and to identify biological and clinical markers associated with prognosis for cognitive disorders following incident stroke. Subgroup leader: Hege Ihle-Hansen

Ongoing projects

- MIST: Microbiota in Stroke Trial. The Gut and Oral bacteria in atherosclerosis and ischemic stroke
- Atherosclerosis, Inflammation and Ischemic Stroke Study
- Acute cerebral thrombi: mapping the immuno-thrombotic content -developing clinical tools for identifying the embolic source
- Advanced ultrasound methods in the assessment of carotid plaque instability
- BRIDGE study: Bridging pregnancy and fetal microchimerism with long-term maternal cardiovascular and neurovascular health (planned)
- STROKECLOSE, Prevention of stroke by left atrial appendage closure in atrial fibrillation patients after Intracerebral Hemorrhage. A multicenter randomized clinical trial
- OSCAR; The Oslo Acute Revascularization Stroke Study
- NOR-FIB 1; A Nordic multi-center prospective observational study of the occurrence of AF in patients with cryptogenic stroke / TIA
- TEN-CRAOS; A randomized controlled trial with tenecteplase in central retinal artery occlusion
- NorVis; Norwegian Vision in Stroke network
- TENSION; Efficacy and safety of thrombectomy in stroke with extended lesion and time window, a randomized, controlled trial
- Para-NASPP (Norwegian Acute Stroke Prehospital Project); Diagnostics and triage of acute stroke by the National Institute of Stroke Scale (NIHSS) by paramedics
- Treat-NASPP; Prehospital advanced diagnostics and treatment of acute stroke
- The rural CT-study. A case-control study with pre-hospital treatment with intravenous thrombolysis in acute stroke at "Sjukestugu Ål"
- NorCOAST; The Norwegian Cognitive impairment after Stroke study. A descriptive cohort study recruiting patients from five Norwegian hospitals
- Hidden impairment after stroke



- ACE 1950; The ACE 1950 Study is a prospective, population-based, cohort study of the cardio- and cerebrovascular health of all men and women born in 1950 in Akershus County, Norway
- NORTEST2: The Norwegian Tenecteplase Stroke Trial 2. To compare efficacy and safety of tenecteplase vs alteplase in acute ischemic stroke treatment
- ELAN: Earlt vs late initiation of DOAC in post-ischemic stroke patients with atrial fibrillation

Most important national and international collaborators

National

- Research Institute of Internal Medicine, OUH
- Norwegian Air Ambulance Foundation (NLA)
- Dept of Thoracic Surgery, OUH
- Dept of Ophthalmology, OUH, Prof. Morten C Moe
- Dept of Infectious Diseases, OUH
- Dept of Transplantation Medicine, OUH, Prof. Johannes Hov
- Division of Obstetrics and Gynaecology, OUH, Prof. Annetine Staff
- Akershus University Hospital , Dept of vascular and thoracic Surgery
- Østfold Hospital, Depts. of Cardiology and Neurology
- National Hospital of Epilepsy (SSE)
- Dep of Clinical and Molecular Medicine, NTNU, Prof. Terje Espevik
- Institute of Basic Medical Science, Dept of biostatistics, UiO

International

- University of Calgary, Canada, Prof. Mayank Goyal
- The George Insitute for Global Health, China and Australia, Professors Craig S. Anderson and Philip M. Bath
- Nottingham University, UK
- University Hospital Bern, Switzerland, Prof. Urs Fischer
- Greater Manchester Comprehensive Stroke Center, UK, Prof. Craig Smith
- University of Maastricht, Netherlands, Prof. Erik Biessen

Funding

- South-Eastern Norway Regional Health Authority
- The Research Council of Norway
- The Foundation Dam
- NLA, Norwegian Air Ambulance Foundation





Scientific production of the research group in 2020

Peer reviewed original research articles: More than 40

Invited lectures at International congresses:

EAN, ESO, WSO and other international and national conferences and meetings

Phd dissertation: Guri Hagberg; *“Long term effect of stroke on survival, cognition and amyloid brain pathology”*

Selected publications:

“No evidence for amyloid pathology as a key mediator of neurodegeneration post-stroke - a seven-year follow-up study”

Hagberg G, Ihle-Hansen H, Fure B, Thommessen B, Ihle-Hansen H, Øksengård AR, Beyer MK, Wyller TB, Müller EG, Pendlebury ST, Selnes P.

BMC Neurol. 2020 May 8;20(1):174. doi: 10.1186/s12883-020-01753-w. BMC Neurol. 2020. PMID: 32384876

“Sex differences in treatment, radiological features and outcome after intracerebral haemorrhage: Pooled analysis of Intensive Blood Pressure Reduction in Acute Cerebral Haemorrhage trials 1 and 2”

Sandset EC, Wang X, Carcel C, Sato S, Delcourt C, Arima H, Stapf C, Robinson T, Lavados P, Chalmers J, Woodward M, Anderson CS.

Eur Stroke J. 2020 Dec;5(4):345-350. doi: 10.1177/2396987320957513. Epub 2020 Sep 20. Eur Stroke J. 2020. PMID: 33598552

“Simulation Methods in Acute Stroke Treatment: Current State of Affairs and Implications”

Kurz MW, Ospel JM, Advani R, Sandset EC, Aamodt AH, Tennøe B, Ersdal HL, Fjetland L, Ajmi S, Kurz KD, Goyal M.

Stroke. 2020 Jul;51(7):1978-1982. doi: 10.1161/STROKEAHA.119.026732. Epub 2020 Jun 17. Stroke. 2020. PMID: 32568639



Epilepsy Research Group



Group Leader

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

Group Members

- Erik Taubøll, Consultant, Professor
- Kjell Heuser, Consultant/Postdoc. **Project leader**; TLE/translation
- Sigrid Svalheim, Section Head. **Project Leader**; side effects of AED
- Dag Aurlien, Consultant, Stavanger. **Project Leader**; epilepsy and cardiology
- Agnes Balint Bjørke, MD, PhD fellow; TLE
- Toni Berger, MD, PhD fellow ; Marie Curie programme, EU
- Alba Gonzalez; MD, PhD fellow; Epilepsy and cardiology
- Monika Mochol, PhD fellow; side effects of AED
- Helle Hermann, PhD fellow; deep brain stimulation for epilepsy
- Line Sveberg, Consultant; Women and epilepsy/autoimmune epilepsy
- Ketil Berg Olsen, Consultant; Status epilepticus
- Line Bedos Ulvin, MD, PhD fellow; Status epilepticus
- Hild F. Sødal, MD, PhD fellow; posttraumatic epilepsy project
- Ylva Østby, Neuropsychologist, TLE project

Associated Group Members

- Cecilie Nome, Phd candidate, TLE/translation, Letten Research Center
- Rune Enger, Head of Letten Research Center, Institute of Basic Medical Science, UiO
- Cecilie Bugge Bakketun, Phd candidate, Glia/epileptogenesis, Letten Research Center
- Bjørnar Hassel, Department of Neurohabilitation, UiO/OUH
- Leif Gjerstad, MD/PhD Prof. emeritus, OUH/UiO
- Pål Gunnar Larsson, Department of Neurosurgery, OUH

Research profile and aims

The Epilepsy Research Group in Department of Neurology (ERGO) has been active for about 25 years. Our research is currently focused on five main areas:

1) Epilepsy-Translational Research. This focuses on research on epileptogenesis, glial cells and genetic and clinical studies. The project leader is Kjell Heuser. The initial studies are basic research using several *in vivo* epilepsy models. In addition, larger patient trials are used in which the clinical, radiological (MRI), and neuropsychological development of TLE is monitored over time.

Recently, we have also started epigenetic studies investigating changes in DNA methylation and gene expression during epileptogenesis. (See publications Berger T et al, PloS-One 2019, Berger T et al, Frontiers in Neurology 2020 for the first results).



2) "Gender issues", endocrinology and long-term effects of AEDs. The leader is Sigrid Svalheim. "Gender issues" have 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 effects of epilepsy and antiepileptic drugs on inflammation parameters are now studied (see i.e. Mochol M et al, Seizure 2020).

3) Epilepsy and cardiology / SUDEP (sudden unexpected death in epilepsy patients). The leader is Dag Aurlien, who is presently based at Stavanger University Hospital. The project is a collaborative venture between Oslo University Hospital (OUS) and Stavanger University Hospital. Both clinical and basic animal research is ongoing (see i.e. González A, et al, Epilepsy Res 2020).

4) Status epilepticus (SE). OUS has a large population of patients who has experienced SE and epidemiological studies have recently been performed regarding underlying causes, treatment, outcome etc. We will now especially focus on possible predictors for outcome and study in more detail treatment of the super refractory cases (for 2020, see: Habhab SF et al, Epilepsy Behav 2020).

5) Traumatic brain injury and posttraumatic epilepsy. Studies to investigate possible predictors for posttraumatic epilepsy have recently been started, in collaboration with colleagues in Italy and USA. Primarily, factors of relevance to inflammation will be the focus of our studies.

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

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. Within this project the group has hosted a Special Issue in Frontiers of Neurology in 2020.

In extension to this study, we are now also investigating possible epigenetic changes taking place during epileptogenesis. This is done in collaboration with Dr. Kaja K. Selmer and her group in Research Group for Neurogenetics, Division of Clinical Neuroscience, OUS. Studying possible mechanisms involved in epileptogenesis may open new treatment strategies to prevent epilepsy, i.e. after stroke and brain injuries.
- Is epilepsy a progressive disease?
This long-term study focuses on changes in the clinical, radiological and neuropsychological picture in patients with temporal lobe epilepsy (Pro-TLE). Comprehensive investigations are conducted on patients with newly diagnosed temporal lobe epilepsy at various time points over a 10-year period. We are also performing a retrospective study (Retro-TLE) investigating MR changes over time before operation in patients with surgically verified hippocampal sclerosis.

- Long-term effects of AEDs.
Patients starting treatment with the AEDs levetiracetam and lamotrigine will be followed prospectively for 2-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. This project is supported with a 50 % PhD student from Østfold Hospital.

As part of this project, studies on the effect of AEDs on gene expression related to immune genes are also under way in collaboration with NMBU (Norwegian University of Life Sciences), and a study on the effect of AEDs on markers for inflammation in humans with epilepsy is performed together with collaborators in OUH.

- 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 epilepsy and cardiac arrhythmias like the long QT syndrome (LQTS) is studied. This is also of central importance for understanding sudden unexpected death in epilepsy (SUDEP). We are also studying the impact of several years of active epilepsy on cardiac function. In addition, experimental studies in mice have been performed and was published 2020.
- National registration of refractory status epilepticus.
We are collating national experiences on how patients with this condition are treated in Norway and how this can be improved. As there are only a few such patients at each centre, joint exchange of experiences is essential. Collection of data commenced in 2015. A national reference group for SE has been established.
- Deep brain stimulation (DBS) in epilepsy.
In this study, patients with hard-to-treat epilepsy are treated with DBS using a blinded study design. The clinical work is now completed and the first results published.
- Traumatic brain injury and posttraumatic epilepsy.
A project is now starting up (2021) to study the possible predictive value of different parameters, especially related to inflammation, measured immediately after traumatic brain injuries on the frequency of posttraumatic epilepsy.

Most important national and international collaborators

National

- Dept. of Cardiology, OUH, Prof Kristina Hermann Haugaa
- Kaja Selmer's research group, Div. of Clinical Neuroscience, OUH
- National Centre for Epilepsy
- Stavanger University Hospital
- Østfold Hospital Trust

International

- Institute of Cellular Neurosciences, Medical Faculty, University of Bonn, Germany (Prof. C. Steinhäuser)
- Pavel Klein, the CURE programme for post-traumatic epilepsy research, Washington, USA



- Institute of Basic Medical Science, Glia cells research group (GLIALAB), UiO, group leader Rune Enger
- Prof Erik Ropstad, NMBU (Norwegian University of Life Sciences)
- Prof Pål Aukrust, Research Institute of Internal Medicine, OUH
- Institute of Basic Medical Science, UiO, Prof Farrukh Chaudry
- Start 2021: Annamaria Vezzani, Department of Neuroscience, IRCCS – Mario Negri Institute for Pharmacological Research, Milan, Italy

Scientific production of the research group in 2020

Peer-reviewed original research articles: 6

Editor of journals: 1

Kjell Heuser as guest editor of a Special Issue in Frontiers of Neurology on Glia and epilepsy.

Abstracts: 1

International reviews: 1

National publications: 2

Selected publications:

Berger TC, Vigeland MD, Hjorthaug HS, Nome CG, Taubøll E, Selmer KK, Heuser K. *“Differential Glial Activation in Early Epileptogenesis-Insights From Cell-Specific Analysis of DNA Methylation and Gene Expression in the Contralateral Hippocampus”*

Front Neurol. 2020 Nov 16;11:573575. doi: 10.3389/fneur.2020.573575. eCollection 2020.

Mochol M, Taubøll E, Aukrust P, Ueland T, Andreassen OA, Svalheim S. *“Interleukin 18 (IL-18) and its binding protein (IL-18BP) are increased in patients with epilepsy suggesting low-grade systemic inflammation”*

Seizure. 2020;80:221-225. doi: 10.1016/j.seizure.2020.05.018.

González A, Nome CG, Bendiksen BA, Sjaastad I, Zhang L, Aleksandersen M, Taubøll E, Aurlien D, Heuser K. *“Assessment of cardiac structure and function in a murine model of temporal lobe epilepsy”*

Epilepsy Res. 2020;161:106300. doi: 10.1016/j.epilepsyres.2020.106300.

Funding

- The South-Eastern Norway Regional Health Authority, 1 PhD
- EU grant, 722053, Marie S Curie programme, 1 PhD
- Internal, 2 PhD (klin stip, D-still)
- Østfold Hospital Trust (0,5) PhD



Multiple Sclerosis (MS)



Group Leader

Elisabeth Gulowsen Celius, Professor and Consultant of Neurology (MD/PhD), Department of Neurology, OUH and Institute of Clinical Medicine, UiO (e.g.celius@medisin.uio.no/ uxelgu@ous-hf.no).

Group members

- Elisabeth Gulowsen Celius, MD/PhD, Professor, Department of Neurology, OUH/UiO
- Hanne Flinstad Harbo, MD/PhD/MHA, Professor, Department of Neurology, OUH/UiO
- Tone Berge, MSc/PhD, researcher FOU department, OUH, Professor, OsloMet
- Steffan D. Bos-Haugen, MSc/PhD, researcher, Department of Neurology, UiO
- Daniel Rinker, PhD, Department of Neurology, OUS and UiO (from December 2017)
- Pål Berg-Hansen, MD/PhD, consultant, Department of Neurology OUH
- Gro Owren Nygaard, MD/PhD, consultant, Department of Neurology OUH
- Sigrid Aune de Rodez Benavent, MD/PhD, Department of Ophthalmology, OUH
- Anna M. Eriksson, MSc/PhD fellow, Department of Neurology, UiO
- Ina S. Brorson, MSc/PhD fellow, Department of Neurology, OUH/UiO
- Einar August Høgestøl, MD/PhD, Department of Neurology, UiO/OUH, Associate Professor Department of Psychology UiO
- Cecilia Smith Simonsen, MD/PhD fellow, Drammen Hospital/OUH
- Heidi Øyen Flemmen, MD/PhD fellow, Skien Hospital/OUH
- Synne Brune, MD/PhD fellow, Department of Neurology, OUH
- Line Broch, MD, PhD fellow, Drammen hospital/OUH
- Chiara Cappelletti, MSc/PhD fellow, OsloMet
- Marte Wendel-Haga, MD/PhD, Kysthospitalet and Department of Neurology, OUH
- Lars L. Skattebøl, MD/PhD fellow, Department of Neurology, OUH, UiO
- Zakia Raja, BSc, Master student, OsloMet
- Oda Kråbøl, Bsc, Master Student, Norwegian University of Life Sciences
- Marie Strømstad, MSc, Research Assistant, OUH
- Martine Mesel Isom, MSc, Research Assistant, OUH
- Synne Johannesen, study nurse, FOU department, OUH
- Marton Kønig, MD/PhD, resident, Department of Neurology OUH
- Ingeborg H. Lie, MD, resident, Department of Neurology OUH

Associated Group Members

- Stine Marit Moen, MD/PhD, Head of research and development, MS Centre Hakadal
- Piotr Sowa, MD/PhD, Division of Radiology and Nuclear Medicine, OUH
- Mona K Beyer, MD/PhD, Professor, Division of Radiology and Nuclear Medicine UiO/OUH

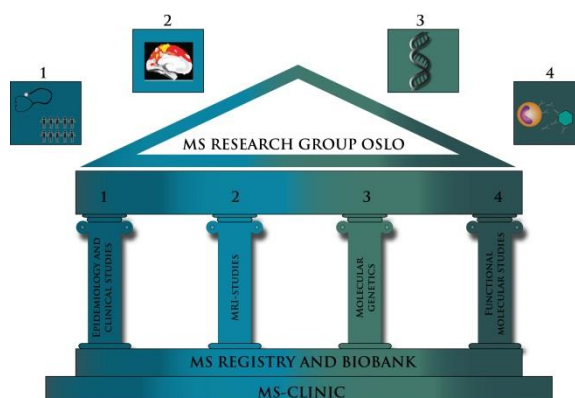
We have this year had 4 students connected to our group, writing student theses:

- Sakina Baqeri, medical student, UiO (Celius)
- Silje Espevik, medical student (Brean, Celius)
- Anniken K. Jørgensen, medical student (Celius)
- Silje Espevik, medical student (Brean, Celius)



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 Department of Ophthalmology) Supervisor: Elisabeth G. Celius, Co-supervisors: Emilia Kerty, Bruno Laeng and Liv Drolsum
- Tone Berge, researcher: Vitamin D responsive regulation of susceptibility genes for autoimmune diseases. In collaboration with Professor Lisa Barcellos at the University of California
- 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
- 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. Supervisor: Tone Berge, Co-supervisors: Hanne F. Harbo and Steffan D. Bos
- Ina S. Brorson, PhD fellow: Defining and characterizing molecular pathways in multiple sclerosis. Supervisor: Steffan D. Bos, Co-supervisors: Hanne F Harbo and Tone Berge
- Einar August Høgestøl, PhD fellow: MRI- and other biomarkers in multiple sclerosis. Supervisor: Hanne F Harbo, Co supervisors: Lars T Westlye and Gro O Nygaard
- Daniel Rinker, Postdoc from December 2017: Integrating genetic and MRI data in multiple sclerosis
- Cecilia Smith Simonsen, PhD fellow: 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: Socioeconomic factors as predictors for disease susceptibility and disease progression in Multiple sclerosis, Supervisor: Elisabeth Gulowsen Celius, Co supervisor: Pål Berg-Hansen
- Line Broch, PhD fellow: Fatigue in Multiple Sclerosis. Supervisor: Elisabeth Gulowsen Celius, Co-supervisor: Heidi Ormstad (start 1.1.19)
- Synne Brune: PhD fellow: MRI and Neurofilament as biomarkers in Multiple sclerosis. Supervisor: Hanne F Harbo, Co supervisors: Mona K Beyer and Pål Berg-Hansen



- Chiara Cappilletti, PhD fellow: Novel molecular mechanisms for severe brain disorders – a study using complex data analyses. Supervisor: Tone Berge, Co supervisor: Mathias Toft (start 1.1.19)
- Lars L Skattebøl, PhD fellow: Advanced MRI in the clinical study NOR-MS. Supervisors Gro Nygaard, Einar Høgestøl, Hanne F Harbo
- Zakia Raja (Master project): Vitamin D regulation of MS-associated genes in CD4+ T cells. Supervisors: Tone Berge and Ingvild Sørum Leikfoss
- Oda Kråbøl (Master project): Proteomics of T cells in MS. Supervisor: Tone Berge, co-supervisor: Chiara Cappilletti
- Anna M. Eriksson, Tone Berge: CLEC16A and other candidate genes
- Synne Brune, Einar A Høgestøl, Hanne F. Harbo, Sigrid A. de Rodez Benavent, Tone Berge: Neurofilament analysis in MS research and clinical practice. (Biogen Idec)
- 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, Elisabeth G Celius Mona Beyer, Einar A Høgestøl, Synne Brune, Goran Petrovski, Dragana Drobnjak Nes, Sigrid Aune de Rodez Benavent: MultipleMS - partner in EU Horizon 2020-project (Harbo Oslo PI)
- Hanne F Harbo, Einar A Høgestøl, Sigrid de Rodez Benavent, Steffan Bos, Tone Berge, Synne Brune, Elisabeth G Celius, Mona Beyer: Sys4MS- Biotek 2021/NFR Project. (Harbo Oslo PI)
- Einar A Høgestøl, Hanne F Harbo and others: Brain age in MS with Tobias Granberg, Karolinska Institute, Sweden
- Einar A Høgestøl, Hanne F. Harbo, Dan Rinker, Elisabeth Celius, Piotr Sowa, Mona K Beyer: MAGNIMS collaboration on various MRI projects
- Einar A Høgestøl, Hanne Harbo, Dan Rinker, Elisabeth Celius, Piotr Sowa, Mona K Beyer: NORMENT collaboration on various MRI projects
- Elisabeth G. Celius, Pål Berg-Hansen, Stine Marit Moen/MS Centre Hakadal 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)
- Elisabeth Gulowsen Celius: Lemtrada PASS, international observational study. EGC national investigator
- Elisabeth G. Celius, Stine Marit Moen/MS Centre Hakadal, Tone Berge and OsloMet: Use of functional near-infrared spectroscopy analyses for studies of neuroplasticity in MS patients – a pilot study
- Gro O. Nygaard, Hanne F Harbo and Oslo MS Research Group: NOR-MS. Norwegian multicenter study of cladribine and rituximab (NOR-MS)
- Gro O Nygaard, Marton Kønig, Elisabeth Gulowsen Celius, Hanne F Harbo, Ingeborg H Lie, Ingeborg Aaberge (FHI), Audun Aase (FHI), Åslaug R Lorentzen (SSHF), Lars L Skattebøl: Vaccine responses in MS patients
- Gro O Nygaard, Einar Høgestøl, Lars L Skattebøl, Piotr Sowa, Hanne F Harbo, Kristin Wesnes (St Olavs Hospital): 7T MRI in NOR-MS



Funding

- South-Eastern Norway Regional Health Authority
- The Research Council of Norway
- University of Oslo
- European Commission: EU Horizon 2020
- European Commission/The Research Council of Norway: Sys4MS - Biotek 2021
- Dam Foundation
- South-Eastern Norway Regional Health Authority grant
- Unrestricted research grants from Novartis, Biogen, Sanofi Genzyme, Merck
- Odd Fellow Foundation, Forsberg and Aulie, Ingrid and Fritz Nilsen, UNIFOR
- The Peder Saether Foundation
- Oslo MS foundation
- OsloMet



MS research group OUS-UiO

Most important national and international collaborators

National

- Mona Beyer, Rigmor Lundby, Piotr Sowa, Atle Bjørnerud and Tuva Hope, Div. of Radiology and Nuclear Med., OUH
- Stine Marit Moen, MS Centre Hakadal
- Benedicte A. Lie, Dept. of Medical Genetics, OUH /UiO
- Lars Westlye, Dept. of Psychology, UiO and NORMENT, OUH
- Anne Spurkland, Institute of Basic Medical Sciences, UiO
- Emilia Kerty, Dept. of Neurology, OUH/UiO
- Liv Drolsum, Dept. of Ophthalmology, OUH/UiO
- Ole A. Andreassen, Lars T. Westlye, Tobias Kaufman, Torbjørn Elvsåshagen, Dag Alnæs, NORMENT, OUH/UiO
- Trygve Holmøy, Dept. of Neurology, Akershus University Hospital
- Nils Inge Landrø and Bruno Laeng, Dept. of Psychology, UiO
- Ole Landsverk, Dept of Pathology, KLM, OUH
- Kristian Bernhard Nilsen and L. Etholm, Dept. of Neurophysiology, OUH
- Kjell-Morten Myhr and Jan Aarseth, Haukeland University Hospital
- Frode Berven, Dept. of Biomedicine, University of Bergen
- Åslaug Lorentzen, Dep. of Neurology, Sørlandet Sykehus
- Marieke Kuijjer, Center for Molecular Medicine, UiO
- Peyman Mirtaheri, Dept of Mechanical, Electronics and Chemical Engineering, OsloMet
- Mathias Toft, Dept of Neurology, UiO/OUH
- Heidi Ormstad, Universitetet Sør-Øst/OsloMet

International

- Ingrid Kockum, on behalf of the MultipleMS consortium
- Mara Rocca, on behalf of the MAGNIMS consortium
- An Goris, on behalf of the International MS Genetics Consortium
- Pablo Villoslada, Hospital Clinic of Barcelona, Spain, on behalf of the Sys4MS consortium
- 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
- Anders Dahle, University of California San Diego, US
- Jan Damoiseaux, Dept. of Neurology, Canisius Wilhelmina Hospital, Nijmegen, the Netherlands
- Joost Smolders, Dept. of Neurology, Canisius Wilhelmina Hospital, Nijmegen, Netherlands
- B. Wilhelm, Steinbeis Transfer-Centre for Biomedical Optics and Function Testing, Tübingen, Germany
- Nordic MS genetics consortium (Hillert, Olsson, Kockum, Oturai, Sørensen, Saareala)
- Pierre Antoine Gourraud, Hôpital St-Jacques - CHU de Nantes, France
- Tobias Granberg, Karolinska Institute, Stockholm, Sweden
- Kaj Blennow and Henrik Zetterberg, Sahlgrenska University Hospital, Gothenburg, Sweden





Scientific production of the research group in 2020

Peer reviewed original research articles: 13 (6 with group members as first author)

PhD theses:

Einar Høgestøl: *"MRI and Other Biomarkers in Early MS"* 27.10.20

Sigrid Aune de Rodez Benavent: *"An ophthalmic acumen - On symptoms and signs in early Multiple Sclerosis"* 24.11.20

Master thesis dissertations:

Zakia Raja: *"Optimalisering av vitamin D reseptor kromatin immunopresipitering for undersøkelse av vitamin D regulering av MS-assosierte gener i humane CD4⁺ T-celler"*

Oda Kråbøl: *"Protein Dysregulation in Immune Cells of Multiple Sclerosis Patients"*

Selected publications:

Simonsen, C. S., et al. (2020)

"The course of multiple sclerosis rewritten: a Norwegian population-based study on disease demographics and progression" Journal of Neurology

Brune, S., et al. (2020)

"LesionQuant for Assessment of MRI in Multiple Sclerosis—A Promising Supplement to the Visual Scan Inspection" Frontiers in Neurology 11(1700)

Brorson, I.S. et al. (2020)

"CD8 + T cell gene expression analysis identifies differentially expressed genes between multiple sclerosis patients and healthy controls" Mult Scler J Exp Transl Clin. 2020 Dec 9

Other publications (abstracts excluded):

Book chapter:

Oxford Textbook of Neurologic and Neuropsychiatric Epidemiology. Chapter 29: Multiple sclerosis: descriptive epidemiology and related neurobiology. Oxford University Press 2020. Elisabeth G. Celius

Blog Ekspertsykehuset OUS: Einar A. Høgestøl and Elisabeth G. Celius:

"Bedre forskning med brukere ved "det runde bord"

Blogs DagensMedisin: Einar A. Høgestøl:

«Utilpasset MS-behandling anno 2020»

«Virtuell bismak»

Invited lectures at international congresses:

Elisabeth G. Celius: Austrian Neurological Society 16.4.20: MS-Behandlung 2020

Elisabeth G. Celius: MS Masters Forum, Barcelona, Spain 27-28.3.20: Treatment with cladribine

Elisabeth G. Celius: Spanish Neurological Society 24.22.20 Treatment with cladribine





Social media:



God morgen Norge 12.11.20: Hanne F Harbo

Facebook: «Multipel Sklerose Forskningsgruppen Oslo» (863 followers)

Om

 [Oppgi sted](#)

 Oslo University Hospital (OUH) Multiple Sclerosis (MS) Research Group. Our official Facebook information-page. Keep track on our ongoing research and other interesting MS activities 

 Multiple Sclerosis (MS) research group at Oslo University Hospital (OUH) - University of Oslo (UiO) aims to identify characteristics and susceptibility factors of MS, 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. The MS research group is a member of the Neuroscience Research Unit (NRU). **Se mindre** 

 814 personer liker dette

 863 følgere

 <http://ous-research.no/ms/> 



NEMU – Neurological and musculoskeletal pain and genetics



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

Microneurography and mechanisms

- Ellen Jørum, Professor, UiO/OUH
- Lars Kristian Lunden, PhD fellow, OUH
- Dagrund Sagafos, PhD fellow, OUH
- Inge Petter Kleggetveit, MD/Postdoctoral fellow, OUH

Clinical trials

- Kjersti Storheim, PhD/Associate Professor, OUH/OsloMet
- Lars Christian Haugli Bråten, MD/PhD fellow, OUH
- Elisabeth Gjefsen, MD/PhD fellow, OUH
- Margreth Grotle, Professor, OUH/OsloMet
- Ida Løchting, Msc/Postdoctoral fellow, OUH
- Eira Ebbs, Msc/PhD fellow/research coordinator, OUH
- Astrid Lunestad, Research coordinator
- Ingrid Fjeldheim Bånerud, Msc/Administrative, OUH
- Håvard Furunes, MD/PhD fellow, Innlandet Hospital Trust
- Mads Peder Rolfsen, PhD fellow, OUH
- Amy Martinsen, PhD fellow/Research coordinator, OUH
- Marie Skovli Pettersen, Msc/Research coordinator, OUH
- Marianne Mørk, Msc/PhD fellow, OUH
- Gøril Brevik Melbye, Msc/Phd fellow, OUH
- Christer Mjåset, PhD fellow, OUH
- Monica Wigemyr, Msc/Research coordinator, OUH

Population genetics

- Bendik Winsvold, MD/ Senior researcher, OUH
- Amy Martinsen, PhD fellow/Research coordinator, OUH
- Sigrid Børte, MD/PhD fellow, OUH
- Ingrid Heuch, MD/Senior researcher, OUH
- Linda M. Pedersen, PhD/ Senior researcher, OUH
- Marie Udnesseter Lie, Msc/PhD fellow, OUH
- Synne Øien Stensland, MD/ Senior researcher, OUH
- Espen Saxhaug Kristoffersen, MD/PhD, associate professor, UiO



Group Members cont.

Neurogenetics

- Kaja Kristine Selmer, MD/ Senior researcher, OUH
- Kristina Gervin, Senior scientist, Dept. of Research and Innovation, OUH
- Sigrid Pedersen, PhD fellow, Dept. of Complex Epilepsy, OUH
- Fridny Heimisdottir, PhD fellow, Dept. of Complex Epilepsy, OUH
- Inger-Lise Mero, MD, PhD, Dept. of Medical Genetics, OUH
- Emilie Willoch Olstad, PhD fellow, Inst. of Pharmacology, UiO
- Ying Sheng, PhD, bioinformatician, Dept. of Medical Genetics, OUH
- Siri Rydning, MD, PhD, Dept. of Neurology, OUH
- Jeanette Koht, MD, PhD, Dept. of Neurology, OUH
- Chantal Tallaksen, MD, Prof. Emeritus, Dept. of Neurology, OUH
- Iselin Wedding, MD, PhD, Dept. of Neurology, OUH
- Magnus D. Vigeland, Mathematician, Dept. of Medical Genetics, OUH
- Tone Berge, PhD/Senior researcher, OUH - **Associated member**

Pain and neuropathies

- Kristian Bernhard Nilsen, MD/ Senior researcher, OUH
- Inge Petter Kleggetveit, MD/Postdoctoral fellow, OUH
- Daniel Gregor Schulze, MD/PhD fellow, OUH
- Marie Udnesseter Lie, Msc/PhD fellow, OUH
- Øystein Dunker, Msc/PhD fellow, OUH
- Sara Maria Allen, Msc, OUH
- Thomas Warvik, Msc, OUH
- Elena Petriu, Msc, OUH
- Maria Dehli Vigeland, Msc/PhD fellow, OUH
- Kristin Ørstavik, MD, Senior researcher, OUH
- Aristomo Andries, MD, OUH
- Ioannis Kitsos, MD/PhD fellow, OUH

Epidemiology

- Ingrid Heuch, MD/Senior Researcher, OUH
- Synne Øien Stensland, MD/ Senior researcher, OUH
- Linda M. Pedersen, PhD/ Senior researcher, OUH
- Maren Hjelle Guddal, Msc/PhD fellow
- Marianne Bakke Johnsen, PhD/Postdoctoral fellow, UiO
- Olaf Fjeld, MD/PhD fellow, OUH
- Vibeke Siewers, Research coordinator, OUH
- Helle Stangeland, PhD fellow, OUH
- Monica Baumann- Larsen, PhD fellow, OUH

Research profile and aims

The focus of our research group is to generate research based knowledge pathomechanisms (including molecular mechanisms as e.g. genetics), prevention, treatment and rehabilitation of pain, injuries and diseases in the musculoskeletal and nerve system, including headache and migraine.

Our work is highly interdisciplinary, including experts in clinical medicine, physiotherapy, psychology, physiology, genetics and molecular biology.

The subgroups of NEMU each have their specific areas and goals, as listed below.

Subgroups – their ongoing projects and collaboration partners

Microneurography and mechanisms



Headed by Ellen jørum

Ongoing projects

- Microneurography studies of neuropathic pain
- Complex regional pain syndrome: clinical features and possible mechanisms
- Pain mechanisms and genetic causes of insensitivity to pain

Collaboration

- Heidelberg University – Medical Faculty Mannheim

Clinical trials



Headed by Kjersti Storhein

Ongoing projects

- BackToBasic; TNF alfa blocker treatment of chronic low-back pain with Modic changes, a randomized double blind multicenter placebo controlled trial
- The AIM-study (Antibiotics In Modic changes); antibiotic treatment of chronic low-back pain with Modic 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
- 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)
- Spinal surgery in Norway. Trends, costs and regional differences
- Back Pain in Elderly (BACE). A prospective cohort study of older people visiting primary care with a new episode of back pain
- Neck surgery in Norway
- Cross cultural validation of outcome measurement tool and evaluation of treatment options for patients with plantar fasciopathy
- People with intellectual disabilities and vulnerabilities for harmful sexual behavior and abuse

Most important national and international collaborators

National

- University Hospital of North Norway (UNN)
- The Arctic University of Norway (UiT)
- Drammen Hospital
- St.Olavs Hospital
- The Hospital Østfold Kalnes
- Haukeland University Hospital
- University of Bergen (UiB)
- Stavanger University Hospital
- Norwegian University of Science and Technology (NTNU)
- OsloMet
- Norwegian Institute of Public Health (FHI)
- Diakonhjemmet Hospital

International

- Keele University, UK
- Karolinska Institutet, Sweden
- Sahlgrenska Academy, Sweden
- Linköping University, Sweden
- University of Southern Denmark, Denmark
- University of Oulu, Finland
- Ontario Tech University, Canada
- University of Sydney, Australia
- Monash University, Australia
- Erasmus MC, Rotterdam, the Netherlands
- Vrije Universiteit, Amsterdam, the Netherlands
- The low-back pain consortium
- the Disc4All consortium

Population genetics



Headed by Bendik Winsvold

Ongoing projects

- HUNT All-In Neuropsychiatry
- Decipher mechanisms and improve the treatment of chronic pain through large-scale genetic analysis (DecipherPain)
- Genetic aspects of chronic low back pain and its comorbidities
- Environmental and genetic causes of migraine in children and adolescents
- Genetic and environmental causes of migraine, a large-scale family-based analysis

Most important national and international collaborators

National

- KG Jebsen Center for Genetic Epidemiology, NTNU (Prof. Kristian Hveem)
- Norwegian Institute of Public Health (FHI) (Christopher Nielsen, Per Magnus)
- University Hospital of North Norway (Tore Solberg)

International

- Broad Institute of MIT and Harvard, USA (Prof Aarno Palotie, Prof Karestan Koenen)
- University of Michigan, USA (Prof. Cristen Willer)
- Yale School of Medicine, USA (Prof. Guido Falcone)
- King's College London, UK (Dr. Frances Williams)
- University College London (UCL), UK (Prof. Henry Houlden)
- Leiden University Medical Center (LUMC), The Netherlands (Prof. Arn van den Maagdenberg)
- Institute for Molecular Medicine Finland (FIMM), Finland (Prof. Maija Wessman, Matti Pirinen)
- Queensland University of Technology (Prof. Dale Nyholt), Australia
- Karolinska Institutet, Sweden (Prof. Andrea Belin)
- Danish Headache Center (Prof. Jes Olesen, Rigmor Jensen, Thomas Folkman Hansen), Denmark
- Université de Bordeaux, France (Prof. Stephanie Debette)
- The low-back pain consortium
- the Disc4All consortium

Consortium participations

- International Headache Genetics Consortium (IHGC) (www.headachegenetics.org)
- Genetics of Osteoarthritis (GO) (www.genetics-osteoarthritis.com)
- GWAS & Sequencing Consortium of Alcohol and Nicotine use (GSCAN) (gscan.sph.umich.edu)
- CHARGE consortium (www.chargeconsortium.com)
- Social Science Genetic Association Consortium (SSGAC) (www.thessgac.org)
- Psychiatric Genetics Consortium (PGC) (www.med.unc.edu/pgc)

Nerogenetics



Headed by Kaja Selmer

Ongoing projects

- Epilepsy in Children: The Impact of the Gut Microbiota and Epigenetics in Successful Dietary Treatment
- FORCE: Focal Refractory Childhood Epilepsy - A study of surgical treatment in Norway – aetiology and prognostic factors
- Pharmacokinetic interactions between ketogenic diet and anti-epileptic drugs in children
- Dietary treatment of adult patients with epilepsy
- Epigenetics of epilepsy development
- BIOJUME: Biology of Juvenile Myoclonic Epilepsy. Genetics and epigenetics of juvenile myoclonic epilepsy
- Clinical and molecular characterization of hereditary ataxia and hereditary spastic paraplegia
- Translational pharmaco-omics: A system biology approach to identify underlying mechanisms of variation treatment response in neurological disease
- TeraEpi: Teratogenicity of anti-seizure medication: the roles of epigenetics and folic acid supplements
- PharmaTOX: The PharmaTox Strategic Research Initiative aims to generate novel insight on effects of pharmaceuticals on human neurotoxicity and neurodevelopment

Most important national and international collaborators

National

- Bergen epilepsy research group; BERG (Haukeland University Hospital)
- Complex epilepsy research group (OUH)
- National Centre for Rare Epilepsy-Related Disorders (OUH)
- Epilepsy research group in Oslo; ERGO (OUH)
- Department of Microbiology (OUH)
- Depts. of neurology (NTNU, OUH)
- NervOUS1, neuropediatric research group (OUH)
- National Advisory Unit on Rare Disorders (OUH)
- Patient organizations: Norsk epilepsiforbund; Norsk forening for arvelig spastisk paraparese og ataksi: Rådet for muskelskjeletthelse.

International

- Bristol University, UK
- Filadelfia epilepsy hospital, Denmark
- University College London; UCL, UK
- The BIOJUME consortium
- The SPATAX network

Pain and neuropathies



Headed by Kristian Bernhard Nilsen

Ongoing projects

- Exploring the genetics of neuropathic pain
- Clinical and neurophysiological aspects of peripheral neuropathies
- Polyneuropathy in childhood cancer survivors
- Motor neurons – can they be counted?
- Digital gold mining in hospital data : Extrapolating neurophysiological reference values from historical records
- Sleep, inflammation and pain – cohort studies from Norway
- Prognostic factors for development of chronic pain after hospitalization for acute low back pain and/or sciatica
- Puccini: A randomized, placebo-controlled, double-blind, parallel-group, multicenter combined Phase
- 2a/2b study to assess the efficacy and safety of BAY 1817080 in patients with diabetic neuropathic pain
- Neuroscience registry and biobank

Most important national and international collaborators

National

- Stavanger University Hospital
- Haukeland University Hospital, Bergen
- St. Olav's University Hospital, Trondheim
- University Hospital of North Norway
- Diakonhjemmet Hospital
- The National Institute of Occupational Health in Norway; STAMI

International

- University of Oxford, UK
- University of Sydney, Australia
- McGill University, Canada
- Heidelberg University – Medical Faculty Mannheim, Germany
- Aarhus University Hospital, Denmark
- David Geffen School of Medicine at UCLA - Los Angeles, USA

Epidemiology



Headed by Ingrid Heuch and Synne Øien Stensland

Ongoing projects

Adults (Heuch):

- The Acute Low-Back Pain Study. Clinical, neurophysiological and genetic risk factors
- Risk factors for anterior cruciate ligament injuries in Norwegian adolescents and young adults: (the ACL/HUNT studies)
- RygGen
- Risk factors for development of chronic pain after hospitalization for acute low back pain and/or sciatica (RUKSAR)
- Childbirth, hormonal factors and low back pain - a prospective epidemiological survey

Children and adolescents (Stensland):

- Physical activity and sport participation during adolescence and musculoskeletal complaints in adulthood. A population based cohort study (PI: Storheim)
- Killing pain? Use of analgesic, sedative and anxiolytic medication and the development of psychiatric illness in adolescents ('Vold og helseplager hos ungdom') (PI: Stensland)

Most important national and international collaborators

National

- HUNT Research Centre/NTNU
- Norwegian University of Science and Technology; NTNU
- Norwegian Institute of Public Health; FHI
- OsloMet
- St. Olav's University Hospital, Trondheim
- The Change factory (Forandringsfabrikken)
- University of Bergen; UiB

International

- Keele University, UK

Scientific production of the research group in 2020

Dissertations

Lars Christian Bråten; *“Chronic low back pain with Modic changes -Antibiotic treatment and clinical characteristics”*

Sigrid Børte; *“Genetic and environmental causes of migraine. The HUNT Study”*

Peer reviewed original research articles: 65

Selected publications:

Børte S., Zwart J.A., Skogholt A.H., Gabrielsen M.E., Thomas L.F., Fritsche L.G., Surakka I., Nielsen J.B., Zhou W., Wolford B.N., Vigeland M.D., Hagen K., Kristoffersen E.S., Nyholt D.R., Chasman D.I., Brumpton B.M., Willer C.J., Winsvold B.S.

“Mitochondrial genome-wide association study of migraine - the HUNT Study”

Cephalalgia 2020 40: 625-634

Heuch I, Heuch I, Hagen K, Storheim K, Zwart JA.

“Associations between the number of children, age at childbirths and prevalence of chronic low back pain: the Nord-Trøndelag Health Study”

BMC Public Health. 2020 Oct 15;20(1):1556.

Castilla-Vallmanya L, Selmer KK, Dimartino C, (86 authors, Grinberg D, Amiel J, Urreiziti R, Gordon CT)

“Phenotypic spectrum and transcriptomic profile associated with germline variants in TRAF7”

Genet Med. 2020 Jul;22(7):1215-1226.

Funding

- South-Eastern Norway Regional Health Authority
- KLINBEFORSK
- The Research Council of Norway
- The Norwegian Fund for Post-Graduate Training in Physiotherapy
- UiO
- OUH
- Novo Nordic Foundation
- Stiftelsen DAM
- National Advisory Unit on Rare Disorders
- Norwegian Childhood Cancer Society
- The Norwegian Medical Association

Brain plasticity and neuropsychiatry



Group Leader

Torbjørn Elvsåshagen; M.D., PhD, Postdoc; 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/OsloMet
- 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
- Camilla R. Ystborg; M.D., OUH

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
- Torgeir Moberget; Ph.D., Postdoc; OUH
- Kristian Bernhard Nilsen; M.D., Ph.D., section leader; 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 examine the role of brainstem and thalamus regions in neuropsychiatric and neurological disorders





Ongoing projects

- Brainstem and thalamus volumes: genetic architectures and roles in neuropsychiatric and neurological disorders
- 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
- 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

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 and Dr. Tobias Kaufmann, 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. 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. Gaute Einevoll, NMBU/UiO

International

- ENIGMA groups (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
- Ass. prof. Mirjana Maletic-Savatic, Baylor College of Medicine, Houston, USA





Funding

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

Research grants in 2020:

South-Eastern Norway Regional Health Authority: *Translating the genetics of glutamatergic transmission and excitability to EEG and cortical organoids in severe mental disorders (EEGene)*; 9MNOK; PI: Elvsåshagen, T.

South-Eastern Norway Regional Health Authority: *Mapping genetic and environmental impacts on the cerebellum in developmental and psychiatric disorders – towards novel disease mechanisms*; 9MNOK; PI: Moberget, T.

Scientific production of the research group in 2020

Peer reviewed original research articles: 43

Selected publications:

Valstad, M., et al. "Experience-dependent modulation of the visual evoked potential: Testing effect sizes, retention over time, and associations with age in 415 healthy individuals." *Neuroimage*, 223, 117302. doi: 10.1016/j.neuroimage.2020.117302

Elvsåshagen, T., Bahrami, S., et al. "The genetic architecture of human brainstem structures and their involvement in common brain disorders". *Nat Commun*, 11(1), 4016. doi: 10.1038/s41467-020-17376-1

Voldsbekk, I., et al. "Evidence for wakefulness-related changes to extracellular space in human brain white matter from diffusion-weighted MRI." *Neuroimage*, 212, 116682. doi: 10.1016/j.neuroimage.2020.116682



Cognitive Health Research group (CoHR)



Group Leader

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

Group Members

- Vebjørn Anderson, BSc, stud.med., coordinator, OUH
- Lina Plataniti, MSc, Project Manager, OUH
- Cathrine Faye, Recruitment coordinator, OUH
- Aksel Erichsen, MD, PhD-candidate, OUH
- Christoffer Hatlestad, cand.psychol., PhD-candidate, OUH
- Reidar Jessen, cand.psychol., PhD-candidate, OUH
- Slawomir Wojniusz, PhD, physiotherapist, senior researcher, OUH/OsloMet
- Stefan Sütterlin, PhD, psychology, OUH/HiØF
- Patrick Riss, PhD, chemist, senior researcher, OUH/UiO
- Syed Nuruddin, PhD, VetMD, senior researcher, OUH/UiO

Research profile and aims

Our aims include contribution to development of novel and innovative methods for early detection, prevention, diagnostics and treatment of neurological diseases associated with cognitive health issues. Another branch of our research is concerned with environmental and biological factors in gender development, and qualitative research into subjective experiences of adolescence gender dysphoria.

Currently, our focus is primarily centered on the development of accessible functional biomarkers of neurodegeneration. Here, together with our collaborators in Spain, Finland, Italy, Netherlands, Estonia, Switzerland and the UK, we combine classical methods for cognitive estimation with artificial intelligence to provide new cutting-edge health solutions for the future. We especially focus on EEG-based network models with artificial intelligence methods to identify crucial features of the aging brain's functional integrity.

By winning No 964220 — AI-Mind — H2020-SC1-2020 Research and Innovation Grant in 2020 we were able to archive a 14 million Euro funding to develop artificial-intelligence-based dementia predictive tools, analyzing digitalized and automatized function brain network maps. For further information please join www.ai-mind.eu. We are an international group of researchers that comes from a variety of different educational backgrounds, including medicine, psychology, physiotherapy, 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.

Our broad research methods portfolio includes Electrophysiological (EEG) source reconstruction and network modelling; event-related potential (ERP) techniques; positron emission tomography (PET) and radiochemistry; neuropsychological assessment; in-depth qualitative interview techniques; and physiotherapeutical interventions.



Ongoing projects

- AI-Mind: Intelligent digital tools for screening of brain connectivity and dementia risk estimation in people affected by mild cognitive impairment
- Novel risk factor assay for Alzheimer's disease – Multi-parametric quantification of HPG/HPTaxis dysfunction (AIRDEM)
- 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

- Erik Taubøll, OUH
- Mona-Elisabeth Revheim, OUH
- Randi Borgen, OUH
- Anne-Rita Øksengaard, NF Folkehelse
- Geir Selbæk, Aldring og Helse
- Per Magnus, FHI
- Thor Audun Saga, NMS
- Uta Sailer, UiO
- Tormod Flatby, Ahus
- Eirik Næs Ulseth, PubGene AS
- Anne-Kristin Solbakk, UiO
- Erik Stänicke, UiO
- Reidun Torp, UiO
- Harry Hallock, DNV
- Marte Roa Syvertsen, Vestre Viken
- Anis Yazidi, OsloMet

International

- Fernando Maestu, Madrid, Spain
- Ricardo Bruña, Madrid, Spain
- Ernesto Pereda, Tenerife, Spain
- Paolo Maria Rossini, Rome, Italy
- Camillo Mara, Rome, Italy
- Americo Cicchetti, Rome, Italy
- José Maria Peña, London, UK
- Sonia Sousa, Tallinn, Estonia
- Jeanette Müller, Zurich, Switzerland
- James Rowe, Cambridge, UK
- Riita Samelini, Helsinki, Finland
- Samuel Kaski, Helsinki, Finland
- Hanna Renvall, Helsinki, Finland
- Walter Bockting, New York, USA
- Neil Evans, Glasgow, Scotland
- Jane Robinson, Glasgow, Scotland

Scientific production of the research group in 2020

Peer reviewed original research articles: 9 (indexed in Publika)

Selected publications:

Rygvoid TW, Hatlestad-Hall C, Elvsåshagen T, Moberget T, Andersson S (2020)

“Do visual and auditory stimulus-specific response modulation reflect different mechanisms of neocortical plasticity?”

Eur J Neurosci, 53 (4), 1072-1085

DOI 10.1111/ejn.14964, PubMed 32897598, WoS 000571076700001 Cristin 1839847 (Details)



Bekker RBW, Fjellaksel R, Hjernevik T, Nuruddin S, Rafique W, Hansen JH, Sundset R, Haraldsen IH, Riss PJ (2020)

“Discovery of a Lead Brain-Penetrating Gonadotropin-Releasing Hormone Receptor Antagonist with Saturable Binding in Brain”

ChemMedChem, 15 (17), 1624-1628

DOI 10.1002/cmdc.202000256, PubMed 32677155, WoS 000558541200001 Cristin 1823124

(Details)

Chen D, Strang JF, Kolbuck VD, Rosenthal SM, Wallen K, Waber DP, Steinberg L, Sisk CL, Ross J, Paus T, Mueller SC, McCarthy MM, Micevych PE, Martin CL, Kreukels BPC, Kenworthy L, Herting MM, Herlitz A, Haraldsen IRJH, Dahl R, Crone EA, Chelune GJ, Burke SM, Berenbaum SA, Beltz AM et al. (2020)

“Consensus Parameter: Research Methodologies to Evaluate Neurodevelopmental Effects of Pubertal Suppression in Transgender Youth”

Transgend Health, 5 (4), 246-257

DOI 10.1089/trgh.2020.0006, PubMed 33376803 Cristin 1900124 (Details)

Funding

- The Research Council of Norway
- South-Eastern Norway Regional Health Authority
- Horizon2020 - [H2020-EU.3.1.5. - Methods and data](#)
- The Human Brain Project - EBRAINS voucher call



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, OUH
- Jutta Rummel, MD, OUH
- Alma Sikiric, MD, OUH
- Daniel Dahlberg, MD, OUH
- Marleen van Walsem, PhD, OUH
- Emilie Kildal, Stud psychol, UiO

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 OsloMet 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
- Barriers to proper handling of persons with intellectual disability and harmful sexual behavior

Most important national and international collaborators

National

- Cecilie Morland, OsloMet/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
- Torgeir Bruun Wyller, Leiv Otto Watne and Nenad Bogdanovic, Dept. of Geriatrics, OUH
- Espen Mariussen and Øyvind Voie, Norwegian Defence Research Establishment, Kjeller
- Frode Rise, Inst. of Chemistry, UiO
- Farrukh Chaudry and Niels Christian Danbolt, Dept. of Anatomy, 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 2020

Peer reviewed original research articles: 9

Selected publications:

Zhou Y, Eid T, Hassel B, Danbolt NC.

“Novel aspects of glutamine synthetase in ammonia homeostasis”

Neurochem Int. 2020;140:104809. doi: 10.1016/j.neuint.2020.104809.

Qureshi T, Bjørkmo M, Nordengen K, Gundersen V, Utheim TP, Watne LO, Storm-Mathisen J, Hassel B, Chaudhry FA.

“Slc38a1 Conveys Astroglia-Derived Glutamine into GABAergic Interneurons for Neurotransmitter GABA Synthesis”

Cells. 2020;9(7):1686. doi: 10.3390/cells9071686.

Hope S, Naerland T, Høiland AL, Torske T, Malt E, Abrahamsen T, Nerhus M, Wedervang-Resell K, Lonning V, Johannessen J, Steen NE, Agartz I, Stenberg N, Hundhausen T, Mørkrid L, Andreassen OA.

“Higher vitamin B12 levels in neurodevelopmental disorders than in healthy controls and schizophrenia: A comparison among participants between 2 and 53 years”

FASEB J. 2020;34(6):8114-8124. doi: 10.1096/fj.201900855RRR.

Funding

- The Research Council of Norway
- Rebergs legat

Specialized medical rehabilitation – Sunnaas Rehabilitation Hospital



Group Leader

Frank Becker, MD/PhD, Associate Professor, Dept. of Physical Medicine and Rehabilitation, UiO/Sunnaas Rehabilitation Hospital (frank.becker@sunnaas.no)

Group Members

- Anne Catrine Trægde Martinsen, Professor, Director of Research, Sunnaas/OsloMet
- Johan K. Stanghelle, MD/PhD, Professor emeritus, Sunnaas/UiO
- Grethe Månnum, MD/PhD, Ass. Professor, Sunnaas/UiO
- Vegard Strøm, Cand. Scient/PhD, Sunnaas/Norwegian School of Sport Sciences
- Arve I. Opheim, PT/PhD, Sunnaas/Region Västra Götaland
- Marianne Løvstad, PSYCH/PhD, Professor, Sunnaas/UiO
- Emil Kostovski, MD/PhD, Postdoc, Sunnaas
- Svend Rand-Hendriksen, MD/PhD, Postdoc, Sunnaas
- Dag Brekke, MD/PhD, Sunnaas
- Tor Haugstad, MD/PhD, Sunnaas
- Anne-Kristine Schanke, PSYCH/PhD, Professor emeritus, Sunnaas/UiO
- Per Ola Rike, PSYCH/PhD, Sunnaas
- Sveinung Tornås, PSYCH/PhD, Sunnaas
- Solveig Hauger, PSYCH/PhD, Sunnaas
- Nina Marit Rohrer-Baumgartner, PSYCH/PhD, Sunnaas
- Birgitta Langhammer, PT/PhD, Professor, Sunnaas/OsloMet
- Kirsti Skavberg Roaldsen, PT/PhD, Ass. Professor, Sunnaas/ OsloMet/ Karolinska Institute
- Vivien Jørgensen, PT/PhD, Sunnaas
- Ellen Høyner, PT/PhD, Sunnaas
- Anne Lannem, PT/PhD, Sunnaas
- Matthijs Wouda, PT/PhD, Sunnaas
- Laila Skogstad, RN/PhD, Sunnaas/OsloMet
- Anne-Stine Bergquist Røberg, RN/PhD, Sunnaas
- Edel Jannecke Svendsen, RN/PhD, Sunnaas
- Ellen Berg, Cand Scient/PhD, Sunnaas/OsloMet
- Melanie Kirmess, ST/PhD, Ass. Professor, Sunnaas/UiO
- Gry Velvin, SW/PhD, Sunnaas

Guest professors:

- Fin Biering-Sørensen, MD/PhD, Professor, Copenhagen University
- Katharina Sunnerhagen, MD/PhD, Professor, Gothenburg University
- Lena Hartelius, ST/PhD, Professor, Gothenburg University
- Jennie Ponsford, PSYCH/PhD, Professor, Monash University, Melbourne
- Claire Glenton, Dr. philos, Norwegian Institute of Public Health



PhD fellows:

- MD: Thy Thy Vanem, Ingebjørg Irgens, Erlend Solberg Dørum, Hege Prag Øra, Svein Otto Fredwall, Kristine Marie M. Vege, Jelena Simic
- PSYCH: Daniel Løke, Knut Kolskår, Dani Beck, Ingvil Laberg Holthe
- RN: Anne Geard
- PT: Emelie Butler Forslund, Linda Rennie, Wiebke Höfers
- SW: Jannike K. Vikan
- ST: Maribeth C. Rivelsrud, Silje Merete Hansen
- OT: Anne-Marthe Sanders
- DIET: Hanne Bjørg Slettahjell

Research profile and aims

The overall aim of research in our group is to improve everyday living of people with physical and/or mental impairments. Our research activities within specialized rehabilitation, especially neurorehabilitation, concern all aspects of body functions, activities and participation that injury or disease may affect. Our research is organized in four groups:

- Acquired Brain injuries
- Spinal cord injuries
- Movement dysfunctions
- Rare disorders

Ongoing projects

A large number of studies are ongoing, most of them involving international collaboration:

- Specialized rehabilitation interventions for patients with acquired neurological injuries as stroke, spinal cord injury or traumatic brain injury
- Telerehabilitation
- Rehabilitation technology, e.g. gaming, exoskeletons, virtual reality
- Rehabilitation of acquired injuries in children and adolescents
- Movement disorders, spasticity, gait analysis
- Rare disorders as e.g. Marfan's syndrome, achondroplasia



Most important national and international collaborators

National

- Oslo University Hospital
- OsloMet
- Norwegian Sport High School
- Haukeland University Hospital
- St. Olav Hospital
- University Hospital of North Norway
- Beitostølen Health Sport Center
- Hospitals in the South-Eastern Norway Health Region

International

- Karolinska Institute, Stockholm, Sweden
- Gothenburg University, Sweden
- Copenhagen University, Denmark
- Monash University, Melbourne, Australia
- China Rehabilitation and Research Center, China
- Rusk Institute of Rehabilitation, NY, USA
- Policlinic no2, Petrozavodsk, Karelia, Russia
- Sheba Medical Center, Tel Aviv, Israel
- Bethlehem Arab Society for Rehabilitation, Palestine
- El Wafa Hospital, Gaza, Palestine
- Sahlgrenska University Hospital, Högsbo, Sweden
- Bayi 81 Rehabilitation Center, Sichuan, China
- Schweizer Paraplegiker-Forschung AG, Switzerland

Funding

- The Norwegian Research Council
- South-Eastern Norway Regional Health Authorities
- DAM – Norwegian ExtraFoundation for Health and Rehabilitation
- Sunnaas Rehabilitation Hospital
- Birgit og Rolf Sunnaas Minnefond

Scientific production of the research group in 2020

Dissertations:

Linda Rennie, UiO; *“Gait and gait variability in individuals with Parkinson’s disease –validity, reliability and long-term effects of intensive balance and gait training”*

Anu Piira, UiT; *“The ATLET study: Can subjects with long-standing motor incomplete spinal cord injury learn to walk? A randomized controlled trial”*





Peer reviewed original research articles: 61

Selected publications:

Fredwall, Svein Otto; Linge, Jennifer; Leinhard, Olof Dahlqvist; Kjønigsen, Lisa Jannicke; Eggesbø, Heidi Beate; Weedon-Fekjær, Harald; Lidal, Ingeborg Beate; Månnum, Grethe; Savarirayan, Ravi; Tonstad, Serena

“Cardiovascular risk factors and body composition in adults with achondroplasia”

Genetics in Medicine 2020 s. 1-8

Irgens, Ingebjørg; Hoff, Jana Midelfart; Jelnes, Rolf; Alexander, Marcalee; Stanghelle, Johan K; Thoresen, Magne; Rekand, Tiina

“Spinal cord injury and development of pressure injury during acute rehabilitation in Norway: a national retrospective cross-sectional study”

Spinal Cord 2020 ;Volum 58. s. 1069-1079

Øra, Hege Prag; Kirmess, Melanie; Brady, Marian C.; Partee, Iselin Anne Cecilia; Hognestad, Randi Bjor; Johannessen, Beate Bertheau; Thommessen, Bente; Becker, Frank

“The effect of augmented speech-language therapy delivered by telerehabilitation on post stroke aphasia – a pilot randomized controlled trial”

Clinical Rehabilitation 2020 ;Volum 34(3). s. 369-381





Publication list NVR research groups 2020

Aasdahl L, Marchand GH, Gismervik SØ, Myhre K, Fimland MS, Røe C (2020)
The Fear Avoidance Beliefs Questionnaire (FABQ) Does it Really Measure Fear Beliefs?
Spine (Phila Pa 1976), 45 (2), 134-140
DOI [10.1097/BRS.0000000000003188](https://doi.org/10.1097/BRS.0000000000003188), PubMed [31415468](https://pubmed.ncbi.nlm.nih.gov/31415468/)

Acharya RS, Tvetter AT, Grotle M, Khadgi B, Koju R, Eberhard-Gran M, Stuge B (2020)
Cross-Cultural Adaptation and Validation of the Nepali Version of the Pelvic Girdle Questionnaire
J Manipulative Physiol Ther, 43 (3), 257-265
DOI [10.1016/j.jmpt.2019.04.009](https://doi.org/10.1016/j.jmpt.2019.04.009), PubMed [32739042](https://pubmed.ncbi.nlm.nih.gov/32739042/)

Adams CJ, Wu SL, Shao X, Bradshaw PT, Gonzales E, Smith JB, Xiang AH, Bellesis KH, Chinn T, Bos SD, Wendel-Haga M, Olsson T, Kockum I, Langer-Gould AM, Schaefer C, Alfredsson L, Barcellos LF (2020)
Pregnancy does not modify the risk of MS in genetically susceptible women
Neurol Neuroimmunol Neuroinflamm, 7 (6)
DOI [10.1212/NXI.0000000000000898](https://doi.org/10.1212/NXI.0000000000000898), PubMed [33037103](https://pubmed.ncbi.nlm.nih.gov/33037103/)

Aguiar de Sousa D, van der Worp HB, Caso V, Cordonnier C, Strbian D, Ntaios G, Schellinger PD, Sandset EC, European Stroke Organisation (2020)
Maintaining stroke care in Europe during the COVID-19 pandemic: Results from an international survey of stroke professionals and practice recommendations from the European Stroke Organisation
Eur Stroke J, 5 (3), 230-236
DOI [10.1177/2396987320933746](https://doi.org/10.1177/2396987320933746), PubMed [33072876](https://pubmed.ncbi.nlm.nih.gov/33072876/)

Alme KN, Knapskog AB, Næss H, Naik M, Beyer M, Ellekjaer H, English C, Hansen HI, Kummeneje CS, Munthe-Kaas R, Saltvedt I, Seljeseth Y, Tan X, Thingstad P, Askim T (2020)
Is long-bout sedentary behaviour associated with long-term glucose levels 3 months after acute ischaemic stroke? A prospective observational cohort study
BMJ Open, 10 (11), e037475
DOI [10.1136/bmjopen-2020-037475](https://doi.org/10.1136/bmjopen-2020-037475), PubMed [33243789](https://pubmed.ncbi.nlm.nih.gov/33243789/)

Alves DE, Nilsen W, Fure SCR, Enehaug H, Howe EI, Løvstad M, Fink L, Andelic N, Spjelkavik Ø (2020)
What characterises work and workplaces that retain their employees following acquired brain injury? Systematic review
Occup Environ Med, 77 (2), 122-130
DOI [10.1136/oemed-2019-106102](https://doi.org/10.1136/oemed-2019-106102), PubMed [31907293](https://pubmed.ncbi.nlm.nih.gov/31907293/)

Andelic N, Forslund MV, Perrin PB, Sigurdardottir S, Lu J, Howe EI, Sveen U, Rasmussen MS, Sørberg HL, Røe C (2020)
Long-term follow-up of use of therapy services for patients with moderate-to-severe traumatic brain injury
J Rehabil Med, 52 (3), jrm00034
DOI [10.2340/16501977-2662](https://doi.org/10.2340/16501977-2662), PubMed [32179933](https://pubmed.ncbi.nlm.nih.gov/32179933/)

Andelic N, Lu J, Gutenbrunner C, Nugraha B, Gormley M, Sørberg HL, Sveen U, Anke A, Kirkevold M, Røe C (2020)
Description of health-related rehabilitation service provision and delivery in randomized controlled trials: A topic review
J Rehabil Med, 52 (8), jrm00093
DOI [10.2340/16501977-2726](https://doi.org/10.2340/16501977-2726), PubMed [32830278](https://pubmed.ncbi.nlm.nih.gov/32830278/)

Andelic N, Røe C, Brunborg C, Zeldovich M, Løvstad M, Løke D, Borgen IM, Voormolen DC, Howe EI, Forslund MV, Dahl HM, von Steinbuechel N, CENTER-TBI participants investigators (2020)
Frequency of fatigue and its changes in the first 6 months after traumatic brain injury: results from the CENTER-TBI study
J Neurol, 268 (1), 61-73
DOI [10.1007/s00415-020-10022-2](https://doi.org/10.1007/s00415-020-10022-2), PubMed [32676767](https://pubmed.ncbi.nlm.nih.gov/32676767/)





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BMC Musculoskelet Disord, 21 (1), 235
DOI [10.1186/s12891-020-03246-w](https://doi.org/10.1186/s12891-020-03246-w), PubMed [32284057](https://pubmed.ncbi.nlm.nih.gov/32284057/)
- Arango-Lasprilla JC, Zeldovich M, Olabarrieta-Landa L, Forslund MV, Núñez-Fernández S, von Steinbuechel N, Howe EI, Røe C, Andelic N, Center-Tbi Participants And Investigators (2020)
Early Predictors of Employment Status One Year Post Injury in Individuals with Traumatic Brain Injury in Europe
J Clin Med, 9 (6)
DOI [10.3390/jcm9062007](https://doi.org/10.3390/jcm9062007), PubMed [32604823](https://pubmed.ncbi.nlm.nih.gov/32604823/)
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Epilepsy and cannabidiol: a guide to treatment
Epileptic Disord, 22 (1), 1-14
DOI [10.1684/epd.2020.1141](https://doi.org/10.1684/epd.2020.1141), PubMed [32096470](https://pubmed.ncbi.nlm.nih.gov/32096470/)
- Austevoll IM, Gjestad R, Solberg T, Storheim K, Brox JI, Hermansen E, Rekeland F, Indrekvam K, Hellum C (2020)
Comparative Effectiveness of Microdecompression Alone vs Decompression Plus Instrumented Fusion in Lumbar Degenerative Spondylolisthesis
JAMA Netw Open, 3 (9), e2015015
DOI [10.1001/jamanetworkopen.2020.15015](https://doi.org/10.1001/jamanetworkopen.2020.15015), PubMed [32910195](https://pubmed.ncbi.nlm.nih.gov/32910195/)
- Aza A, Verdugo MÁ, Orgaz MB, Andelic N, Fernández M, Forslund MV (2020)
The predictors of proxy- and self-reported quality of life among individuals with acquired brain injury
Disabil Rehabil
DOI [10.1080/09638288.2020.1803426](https://doi.org/10.1080/09638288.2020.1803426), PubMed [32847433](https://pubmed.ncbi.nlm.nih.gov/32847433/)
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DOI [10.1038/s41588-020-00725-7](https://doi.org/10.1038/s41588-020-00725-7), PubMed [33199917](https://pubmed.ncbi.nlm.nih.gov/33199917/)
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Discovery of a Lead Brain-Penetrating Gonadotropin-Releasing Hormone Receptor Antagonist with Saturable Binding in Brain
ChemMedChem, 15 (17), 1624-1628
DOI [10.1002/cmdc.202000256](https://doi.org/10.1002/cmdc.202000256), PubMed [32677155](https://pubmed.ncbi.nlm.nih.gov/32677155/)
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Heart rate variability is associated with disease severity in psychosis spectrum disorders
Prog Neuropsychopharmacol Biol Psychiatry, 110108 (in press)
DOI [10.1016/j.pnpbp.2020.110108](https://doi.org/10.1016/j.pnpbp.2020.110108), PubMed [32946948](https://pubmed.ncbi.nlm.nih.gov/32946948/)





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Front Neurol, 11, 573575
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Quality of Life Improves with Alemtuzumab Over 6 Years in Relapsing-Remitting Multiple Sclerosis Patients with or without Autoimmune Thyroid Adverse Events: Post Hoc Analysis of the CARE-MS Studies
Neurol Ther, 9 (2), 443-457
DOI [10.1007/s40120-020-00191-7](https://doi.org/10.1007/s40120-020-00191-7), PubMed [32410147](https://pubmed.ncbi.nlm.nih.gov/32410147/)

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DOI [10.1111/epi.16726](https://doi.org/10.1111/epi.16726), PubMed [33165915](https://pubmed.ncbi.nlm.nih.gov/33165915/)

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Borgen IMH, Løvstad M, Andelic N, Hauger S, Sigurdardottir S, Sjøberg HL, Sveen U, Forslund MV, Kleffelgård I, Lindstad MØ, Winter L, Røe C (2020)
Traumatic brain injury-needs and treatment options in the chronic phase: Study protocol for a randomized controlled community-based intervention
Trials, 21 (1), 294
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Borgen IMH, Røe C, Brunborg C, Tenovuo O, Azouvi P, Dawes H, Majdan M, Ranta J, Rusnak M, Eveline JAW, Tverdal C, Jacob L, Cogné M, Steinbuechel NV, Andelic N, CENTER-TBI participants and investigators (2020)

Care transitions in the first 6 months following traumatic brain injury: Lessons from the CENTER-TBI study
Ann Phys Rehabil Med (in press)

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Bråten LCH, Grøvle L, Espeland A, Pripp AH, Grotle M, Hellum C, Haugen AJ, Froholdt A, Rolfsen MP, Nygaard ØP, Lutro O, Kristoffersen PM, Anke A, Schistad EI, Skouen JS, Brox JI, Zwart JA, Storheim K, AIM-study group (2020)

Clinical effect modifiers of antibiotic treatment in patients with chronic low back pain and Modic changes - secondary analyses of a randomised, placebo-controlled trial (the AIM study)

BMC Musculoskelet Disord, 21 (1), 458

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Bråten LCH, Schistad EI, Espeland A, Kristoffersen PM, Haugen AJ, Marchand GH, Vetti N, Pripp AH, Kadar TI, Skouen JS, Grotle M, Grøvle L, Zwart JA, Brox JI, Storheim K, AIM-study group (2020)

Association of Modic change types and their short tau inversion recovery signals with clinical characteristics- a cross sectional study of chronic low back pain patients in the AIM-study

BMC Musculoskelet Disord, 21 (1), 368

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