

Project 1: Genetics of rare congenital brain diseases <i>1.Genetics of rare congenital brain diseases (2014- on going)</i> <i>2.Stormorken syndrome (2012-2019)</i>	Project owner(s) (project leaders organisation)	University of Oslo, Oslo University Hospital
	Total budget and share allocated to research group	1.Total: 2011-2014, 3540000 NOK from South-Eastern Norway Regional Health Authority. Project: «Detailed molecular and clinical studies of patients with genomic diseases reveal unique biological knowledge» 2. Total: 2021-2022, 1200000 NOK, from the Norwegian National Advisory Unit on Rare Disorders.Project: «Translating transcriptomics into rare disease research and clinical diagnostics»
	Objectives and outcomes (planned or actual) and link to website	1.Studies of model organisms have provided information about the role genetics plays in conditions like neurological disease, heart disease, and cancer. Genomics technologies facilitate discoveries of the genetic underpinnings of monogenic diseases. The rare disease group aims to reveal the genetic mechanisms causing neurodevelopmental diseases or syndromes. When we identify potential pathogenic variants in genes not yet known to cause human diseases when mutated, we explore the functional consequences of the variants by <i>in vitro</i> and <i>in vivo</i> experiments. https://www.ous-research.no/frengen/ 2. The group has found that the multiorgan hereditary Stormorken syndrome is caused by dysfunction of the endoplasmic reticulum Ca ²⁺ sensor protein STIM1. A mouse line expressing the mutated protein has been established, Stim1 R304W. The findings highlight the importance of STIM1 in the development and homeostasis of the skeleton and the skeletal muscle. We further showed that a double mutant mouse line expressing STIM1 R304W and the deletion of Glu ²⁹⁶ <i>in cis</i> , showed completely reversal of the pathophysiological effects of the STIM1 R304W mutation. Our results have provided insight into the activation mechanism of STIM1 by clarifying the molecular basis of mutation-elicited protein dysfunction and pathophysiology. https://www.ous-research.no/frengen/?k=frengen%2FResearch+projects&aid=17297
Project 2: Genetics of Psychiatric Disorders <i>1.NORMENT Norwegian Centre for Mental Disorders</i>	Project owner(s) (project leaders organisation)	University of Oslo, Oslo University Hospital

<p>Research - Centre of Excellence (2013-2023)</p> <p>2.KG Jebsen Centre for neurodevelopmental disorders (2021-2025)</p> <p>3.HSØ: Development of a psychopharmacological screening platform for bipolar disorder using iPSC-derived cortical organoids – a personalized medicine approach (2022-2023)</p> <p>4. Molecular ethiology of bipolar disorder</p>	<p>Total budget and share allocated to research group</p> <p>Objectives and outcomes (planned or actual) and link to website</p>	<p>1. Total : 12.5 million per annum ; share allocated to res.group : 2.3 million per annum</p> <p>2. Total : 22.5 million; share allocated to res. group : 4.8 million</p> <p>3. Total : 1.5 million per annum; share allocated to res. group : 1.5 million per annum</p> <p>4. Total : 6 million; share allocated to res. group : 6 million</p> <p>1. The goal of the Psychiatric Molecular Genetics Group has been to develop a strong research environment in molecular genetics of psychiatric disorders. The group has been a part of CoE NORMENT, which is a major collaborative effort studying clinical characteristics, neurocognitive functioning and brain biology of psychotic disorders. https://www.med.uio.no/norment/english/</p> <p>2. The KG Jebsen Center for Neurodevelopmental disorders represents a cross-disciplinary effort to identify how genetic factors affect brain development and function. The objective of research group are to determine the interplay between common and rare variants in defining the variation in clinical characteristics. The project will reveal more details about the genetic architecture of NDs by combining data from population samples and clinical datasets with international collaborators. https://www.med.uio.no/klinmed/english/research/centres/kgj-neurodevelopmental-disorders/</p> <p>3. The main objective of this projectl is to improve the outcome of BD patients by early prediction of response to first line mood stabilizers (Li, VPA, and LTG) using a high-throughput screening pipeline with iPSCs-derived hCS to develop personalized therapeutics. Using patient iPSC-hCS followed by functional and transcriptional characterization will allow us to understand and predict treatment response with useful clinical application.</p> <p>HSØ</p> <p>4. Evaluation of the (i) molecular mechanisms of myelin maturation in the central nervous system and its disruption in bipolar disorder and (ii) oligodendroglial isoforms of ANK3 and their role in the etiology of bipolar disorder</p>
<p>Project 3: Cancer Genome variation</p> <p>1. DNK: The genetic „Make up“ and metabolic profile of</p>	<p>Project owner(s) (project leaders organisation)</p>	<p>University of Oslo, Oslo University Hospital</p>

<p><i>breast cancer patients; relation to clinical course and treatment response“ (2012-2024) (3x)</i></p> <p><i>2.KG Jebsen Centre for breast cancer (2012-2016)</i></p> <p><i>3.HSØ Time course dissection of the Immune Component of Breast Cancer during treatment with targeted- and chemotherapy&Harnes sing chromosomal instability (CIN) in relation to tumor progression and clinical outcome (2012-2023) (3x)</i></p> <p><i>4. RCN: 122772/310 Studier av interaksjoner mellom miljøfaktorer og genetiske faktorer, og deres betydning for brystkreftisiko (1x)</i></p> <p><i>5. Horison 2020 and EraNet RESistance Under Combinatorial Treatment in ER+ and ER- Breast Cancer, RESCUER</i></p>	<p>Total budget and share allocated to research group</p>	<p>1. Total : 3.5 million per annum ;</p> <p>2. Total : 18.5 million; share allocated to res. group : 4.0 million</p> <p>3. Total : 3.0 million per annum;</p> <p>4. Total : 3 million per annum;</p> <p>5. Total : 60 million; share allocated to res. group : 6 million</p>
	<p>Objectives and outcomes (planned or actual) and link to website</p>	<p>1. The three DNK projects to the Cancer Genome variation group were directed to study tumor initiation, progression and clinical presentation as a function of the genetic and biochemical environment – the entire body https://ous-research.no/kristensen/</p> <p>2. The KG Jebsen Center for Breast cancer developed validated stratification criteria based on validated phenotypic and genotypic stratification criteria for assessing individual response and prognosis in patients with breast cancer and identified molecular pathways and biomarkers predicting treatment response and/or resistance using cell lines and orthotopic xenograft models representing the various subgroups of breast cancer as well as molecular and imaging biomarkers from preclinical models into clinical trials by combining data from population samples and clinical datasets with international collaborators. https://www.ous-research.no/home/kgjebsen/Norsk/11537</p> <p>3. The three HSØ open projects in this period have focused on the increasing importance of immune constitution for the success of chemotherapy and targeted treatment, and the cross-talks between the different immune cell types and the tumor clones..</p> <p>4. The main objective of the NFR grant is to which variants convey the risk for breast cancer is a step forward, it is important to consider the variants or genes that are associated to breast cancer in their biological networks. Analyses that focus on how individual variants may act in concert in their genetic networks may uncover more biological processes involved in breast cancer risk. https://www.ous-research.no/kristensen/?k=kristensen%2FResearch+projects&aid=16930</p> <p>5. RECCUER aims to apply mathematical models to the study of resistance to treatment response and gathers interdisciplinary expertise from 12 European countries in the fields of surgery, pathology, oncology, molecular biology, bioinformatics, philosophy, mathematics and statistics. https://www.rescuer.uio.no/</p>
<p>Project 4: Genetics of Autoimmune Disorders Exploring the pathogenesis and</p>	<p>Project owner(s) (project leaders organisation)</p>	<p>AMG, UiO and OUS</p>

<p>treatment response in established and putative autoimmune disorders</p> <p>2012-ongoing</p>	<p>Total budget and share allocated to research group</p>	<p>4 researcher grants from NRC (project no 214280; 272681; 274718; 301536;); Helse Sør Øst (4 PhD grants), Kavli (1 PhD), Norwegian ME association, Norwegian Diabetes Association and smaller funds.</p> <p>Total budget 46,5 mill NOK, all allocated to the research group.</p>
	<p>Objectives and outcomes (planned or actual) and link to website</p>	<ol style="list-style-type: none"> 1. Assessment of the role of the thymic transcriptome in genetic predisposition to autoimmune diseases 2. The regulatory role of genetic risk factors for autoimmune diseases on thymic antigen-presenting cells and self-tolerance 3. Develop a multiomic understanding of the immune cells involved in rheumatoid arthritis and identify molecular signatures for prediction of treatment response to methotrexate 4. Understand the cell heterogeneity of the synovial joint in juvenile idiopathic arthritis with respect to clinical subgroups and TNF inhibitor response. 5. Genetic and molecular studies of ME/CFS to reveal the involvement of the immune system <p>OUTCOME: Seven PhD and 14 Master thesis; 141 publications, numerous scientific oral presentations and presentations to the general public through news papers, patient meetings, blogs, etc.</p> <p>Website: OUH - Genetics of Autoimmunity (Lie) (ous-research.no)</p>
<p>Project 5: Genomic Medicine -Implementation & innovation <i>Project title/Project period (year from – year to)</i> YEASTSEQ - 3D yeast colony genomics: A model for cancer progression and development of drug resistance in biofilms (2014-2017)</p>	<p>Project owner(s) (project leaders organisation)</p>	<p>DAG, ROBERT, GREGOR Gregor Gilfillan / Zdena Palkova (Charles University Prague) / Libuse Vachova (Charles University Prague)</p>
	<p>Total budget and share allocated to research group</p>	<p>Total: 988,000 EUR Share G. Gilfillan (OUS): 335,000 EUR (34%)</p>
	<p>Objectives and outcomes (planned or actual) and link to website</p>	<p>3D yeast colony genomics A model for cancer progression and development of drug resistance in biofilms (3dcolony.cz)</p>

Project 6: System Evolution 2015- ongoing	Project owner(s) (project leaders organisation)	Oslo university hospital and University of Oslo
	Total budget and share allocated to research group	18 mil NOK (3 NFR grants, 2 HSØ grants, 1 EDCTP, 2 Sci Fellows) 1 Centre of Excellence, Centre for Organ on a Chip-Technology: total 110 mill NOK, 3 mil NOK to the group
	Objectives and outcomes (planned or actual) and link to website	To develop computational tools to investigate how systems evolve in response to external influences <ol style="list-style-type: none"> 1. Type 2 diabetes. population specific variation in the non-coding genome and susceptibility 2. pathogen evolution: How do pathogens (e.g. tuberculosis and cytomegaloviruses) evolve in response to environment and drug treatment 3. How are scientific publications influenced by funding policies and public opinion? 4. Using game theory to model tumour evolution OUTCOMES. 5 postdocs, 1 PhD, 5 master theses Website: https://pinga.no OUH - Computational Biology: The role of non-coding RNAs in disease (Rayner) (ous-research.no)
Project 7: Genotype and phenotype in rare disorders <i>Case- and cohort-based identification and characterization of mutations:</i> <ul style="list-style-type: none"> • Intellectual deficit and congenital anomalies • Epilepsy, brain malformations and craniofacial disorders 	Project owner(s) (project leaders organisation)	Oslo University Hospital, University of Oslo
	Total budget and share allocated to research group	No separate budget. Clinical resources, internal and external collaborations

<ul style="list-style-type: none"> • Hereditary vascular connective tissue disorders • Disorders of sexual development <p><i>Cohort-based characterization of disease mechanisms:</i></p> <ul style="list-style-type: none"> • Characterization of molecular mechanisms in ciliopathies and brain malformations • Inflammation markers in hereditary aortic aneurysm and dissection <p><i>Cohort-based studies on surveillance and intervention</i>:</p> <ul style="list-style-type: none"> • Norwegian study of Marfan syndrome, 10 years follow-up (collaboration, radiological arm)/ 2012-2022 	<p>Objectives and outcomes (planned or actual) and link to website</p>	<p>Objective: Provide evidence-based basis for diagnosis and personalized treatment of rare genetic disorders. Outcomes: Identify genotype-phenotype correlations and elucidate genetic mechanisms as potential targets for treatment.</p> <p>https://www.ous-research.no/paus</p>
<p>Project 8: Hereditary cancer / 2012-2022</p>	<p>Project owner(s) (project leaders organisation)</p> <p>Total budget and share allocated to research group</p> <p>Objectives and outcomes (planned or actual) and link to website</p>	<p>Oslo University Hospital</p> <p>One grant from HSØ (open call, project number 340344), two grants from the Norwegian Cancer Society (Pink Ribbon Campaign, Krafttak mot kreft, project numbers 333600 and 333661), one PhD grant from Stiftelsen Dam (project number 334349). Grant from Anette and Brynjulf Skaugens Charity funds. Total budget 8.6 M.</p> <ul style="list-style-type: none"> • Improving the practice of genetic testing of breast cancer patients • Establish and evaluate personalized surveillance for early detection and prevention of pancreatic cancer in high risk individuals • Risk of pancreatic cancer in BRCA1/BRCA2 carriers • Uptake, consequences of and experiences with prophylactic surgery in women with hereditary predisposition to cancer.

<p>Project 9: Cardiac and Cardiovascular Disorders <i>Project title/Project period (year from – year to)</i> Unit for Cardiac and Cardiovascular Genetics, Cellular Cholesterol Metabolism (2012-2022)</p>	<p>Project owner(s) (project leaders organisation)</p>	<p>Unit for Cardiac and Cardiovascular Genetics, Cellular Cholesterol Metabolism Thea Bismo Strøm (PhD, research group leader) Martin Prøven Bogsrud (MD, PhD, unit leader)</p>
	<p>Total budget and share allocated to research group</p>	<p>1.Total:11M - Medinova; running costs, instruments, diagnostic and research positions (1xPhD, post-doc) (2012-2022) 2.Total:3M – Nasjonalforeningen for Folkehelsen; PhD position (2014-2017) 3.Total:3M – HSØ, PhD position (2020-2024) 4. Total:0.2M – Nasjonalforeningen for Folkehelsen; project grant: <i>Screening subjects with extreme lipid profiles to identify genetic causes of hyper- or hypolipidemia.</i> REK:142265. (2020-2021)</p>
	<p>Objectives and outcomes (planned or actual) and link to website</p>	<p>The Unit for Cardiac and Cardiovascular was formally established by Trond P. Leren (MD, PhD) in 1998 after several years of research. Since then, the combined diagnostic unit and research group has functioned as the national centre for genetic testing regarding hypercholesterolemia and other dyslipidemias in Norway, and performed extensive and focused research on lipid metabolism. The unit is internationally recognized and has a strong research environment with 5 completed PhDs and currently 3 ongoing PhD projects (finalized in 2024). The employees (medical doctors, researchers, engineers and genetic counsellors) are involved in both the diagnostics and research aspects of the unit, which enables a productive and high quality environment benefitting from both clinic and scientific research. Our main research objectives are establishing the diagnosis of our patients through case-based extended diagnostic analyses, functional assessment of genetic variants, establish new diagnostic tools and through basal research on lipid metabolism find new diagnostic and therapeutic strategies. In 2024 we will in collaboration with the National Advisory Unit on Familial Hypercholesterolemia engage in a project utilizing our patient cohort of >90.000 dyslipidemic patients to establish and evaluate transcriptome sequencing and autoimmunity analyses as potential extended diagnostic tools offered to this patient group. Further, the transcriptome methodology will be optimized in parallel with a project on premature paediatric mortality without known cause in collaboration with Department of Forensic Sciences, Department of Paediatric Cardiology and Department of Cardiology (OUS). By initiating these projects as research projects (HSØ PhD application: 37423) integrating our research and diagnostic unit, allows us to utilizing more flexible and extensive resources, and ensuring better health care for current and future patients referred to our unit. https://www.ous-research.no/strom</p>

<p>Project 10: Genetic diseases at single cell level <i>Project title/Project period (year from – year to)</i> 1. <i>NRC: The regulatory role of genetic risk factors for autoimmune diseases on thymic antigen-presenting cells and self-tolerance.</i> 2. <i>HSØ: Understanding the juvenile idiopathic arthritis joint at the cellular level to facilitate personalized treatment.</i> 3. <i>DNK. Single cell profilig of breast tumors at different time points of therapy.</i> 4. <i>Single-cell analysis in embryonic development</i> 5. <i>Single-cell analysis for the Bone Marrow Adiposity, in order to interpret GWAS</i> <i>Simon: Wuhan Institute of Virology, Chinese Academy of Sciences</i></p>	<p>Project owner(s) (project leaders organisation)</p> <p>Total budget and share allocated to research group</p> <p>Objectives and outcomes (planned or actual) and link to website</p>	<p>Oslo University Hospital, University of Oslo, PIs: Benedicte Lie (1,2), Xavier Tekpli (3) Timothy Hughs (4). Robert Lyle (5) Simon iyaner (6)</p> <p>1. Total : 8,55 mill NOK ; Norwegian Research Council 2. Total : 3,5 mill NOK; Helse Sør-Øst 3. Total : 22 mill NOK; the Norwegian Cancer society (project no 333672; 333680); Helse Sør Øst and OUS (Strategic Research Area grant). 4. Total : 3 million per annum; Norwegian Research Council 5. Total : .5 mill per year for 2 years</p> <p>1.Project aims to study the regulatory role of genetic risk factors for autoimmune diseases on thymic antigen-presenting cells and self-tolerance, and map the cell phenotypes and regulatory elements in human thymus to understand autoimmunity. 2. The goal is to elucidate the juvenile idiopathic arthritis joint at the cellular level to facilitate personalized treatment and obtain a cellular understanding of the arthritic joint in children with clinically distinct subtypes of juvenile idiopathic arthritis. 3. Profiles single cells of breast tumors at different time points of therapy to characterize which cells are resistant to treatment to examine how the stromal and immune microenvironments provide support to allow treatment-resistant cells to survive by studying the spatial organization of tumors. Further, investigate the role of T-cell receptor in recognizing neopeptides and its impact on treatment response to pave the way to T-cell based therapies https://ous-research.no/tekpli. 4. Studies the effect of medicament treatment during pregnancy on the fetus at epigenetic level 5. aims to main to improve the outcome of BD patients by early prediction of response to first line mood stabilizers (Li, VPA, and LTG) using a high-throughput screening pipeline with iPSCs-derived hCS to develop personalized therapeuticsHSØ project : https://forskningssprosjekter.ihelse.net/home/prosjekt/2022087</p> <p>6.Mouse Cytomegalovirus and mouse brain. Using Single Cell to investigate which brain cells in mouse embryos are disrupted by cytomegalovirus infection. This is a PhD project in collaboration with Wuhan Institute of Virology, Chinese Academy of Sciences.</p>