Oslo Diabetes Research Centre

Annual Report 2018

Oslo universitetssykehus

UiO : University of Oslo

NIPH
Norwegian Institute of Public Health

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New perspectives in diabetes treatment and research

Members of Oslo Diabetes Research Centre. Photo: Kjersti R. Normann

Today it is estimated that 382 million people in the world have diabetes and the number is expected to increase to 592 million in the next 20 years. In Norway, 12.000 people get diabetes every year, approximately 250.000 are diagnosed with the disease and a number of individuals are still undiagnosed. Diabetes is a serious disease. In Norway three out of four have at least one complication, one in five get serious eye complications, 500 suffer from amputations and nearly 100 need kidney transplantations every year. The risk of life threatening myocardial infarction and stroke is more than twofold increased compared to those without diabetes, and tenfold so in younger age groups.

A technical revolution is now ongoing, making it possible to obtain near normal blood glucose levels in type 1 diabetes. Reliable glucose sensors are becoming a basic tool, and painful finger pricking can be omitted. The combination of glucose sensor and smart insulin pumps gives unique possibilities. We know that improved glucose control will reduce the rate of severe late complications in the future, and investment in a fast introductions of new technologies to all patients is outmost important to save big expenditures in the future - and to save lives and human suffering. More research funds should be allocated to these issues, and we have the people and the competence to perform such studies.

Oslo Diabetes Research Center has a strong clinical basis and is the only center in Norway covering the whole life-span of diabetes, from the fetus, through childhood and adolescence to early and late adult life. This life-course approach to diabetes attempts to capture the complex influence of factors operating at different points in life integrating both early-life and adult lifestyle models into a wider framework through an extensive collaboration between our ten established research groups and their internal and external collaborators. In the life-course perspective to diabetes we aim to assess how the effect of factors operating at different stages of life, from in utero to late adulthood, might accumulate and interact to determine development of diabetes and its complications later in life. Our ultimate aim is to contribute substantially to prevent diabetes - and in the meantime - its complications.

Our center has 10 research groups spread throughout the Oslo University Hospital, University of Oslo and Norwegian Institute of Public Health. All the three institutes at the Faculty of Medicine are represented; the Institute of Clinical Medicine, the Institute of Health and Society, and the Institute of Basic Medical Sciences. Our center covers nearly all diabetes related research in the Oslo region. In this annual report you may count nearly hundred researchers involved and it describes close to 80 different defined research projects. It include basic science and advanced new laboratory analysis. We are turning from pure clinical research into more mechanistic studies, trying to understand the cause and pathogenesis of diabetes and its complications. This applies to both type 1 and type 2 diabetes and other rare forms of diabetes. We also bring this basic science research back to the clinic. We are running 15 randomized, clinical trials, aiming to discover new therapies, and improve known therapies.

Major achievements in the field of type 2 diabetes research has been the publication of several large, register-based, epidemiological studies in high impact journals and the launching of the large DIA-SA-study program that received 18 MNOK from the Norwegian Research Council. We would this year like to congratulate Christine Sommer who received a career development grant from The Norwegian Research Council and Gunn Helen Moen who received an NRC mobility grant and at present is at Professor David Evans' lab. in Brisbane, Australia. We were also lucky to get funding from the University to engage professor Evans as guest professor to our Center for 2019. The research in gestational diabetes is still expanding, mainly based on the pivotal STORK and STORK-Groruddalen studies. These studies still generate numerous research papers and follow-up studies are running and planned.

Also the type 1 diabetes research groups are expanding. We are now involved in a broad international network aiming to establish a vaccine to prevent type 1 diabetes. The DiViD Intervention Trial has started recruitment to test whether antiviral treatment may save endogenous insulin production in newly diagnosed children with type 1 diabetes. Recently Juvenile Diabetes Research Foundation (JDRF) awarded 5 MNOK to this study. It is fantastic that parents of children in the USA collect money to our research - a true sign of international recognition.

In the EU-project INNODIA (www.innodia.eu) close relatives to patients with type 1 diabetes are recruited to find persons with prediabetes having high risk of developing the disease, and also trying to establish new preventive treatment for these relatives.

Thus 2018 was again a successful year for the Oslo Diabetes Research Centre. The center is steadily improving its' international reputation. We produced more than 100 international peer reviewed publications. In this year's annual report you may notice many publications in the highest ranked diabetes related scientific journals.

The centre has no difficulties in attracting young talents for diabetes research. In 2018 we had the highest number (8) of Ph.D. dissertation in the history of the Center: Shadab Abadpour, Anne B. Bærug, Åse Ruth Eggemoen, Susanna E. Hanvold, Maia Blomhoff Holm, Ane Moe Holme, Kristine Kloster-Jensen, Niels Gunnar Juel. We thank and acknowledge them, and are looking forward to include many of them for further research within our center.

Now it is a pleasure to me to transfer the office as leader of the research center to Kåre Birkeland.

In this report you see that the ambitions of each research group are high, and will bring diabetes research in Oslo a big step forward. We work hard to increase funding, and the spirit and enthusiasm is there, never to give in, before getting closer to the targets of prevention and a cure for diabetes.

Knut Dahl-Jørgensen
Chairman, Professor, MD, PhD

LEADER	WORK PLACE	RESEARCH AREA	E-MAIL
Knut Dahl-Jørgensen (Chairman)	Pediatric Department, Oslo University Hospital	Childhood diabetes	knut.dahl-jorgensen@medisin.uio.no
Kåre I. Birkeland (Vice Chairman)	Department of transplantation medicine, University of Oslo and Oslo University Hospital	Type 2 diabetes and metabolism	k.i.birkeland@medisin.uio.no
Tore Julsrud Berg	Department of Endocrinology, Oslo University Hospital	Diabetic late complications	t.j.berg@medisin.uio.no
Geir Joner	Pediatric Department, Oslo University Hospital	Childhood diabetes and diabetes epidemiology	geir.joner@medisin.uio.no
Anne Karen Jenum	Department of General Practice, University of Oslo	Diabetes and related health issuses in primary care	a.k.jenum@medisin.uio.no
Elisabeth Qvigstad	Department of Endocrinology, Morbid Obesity and Preventive Medicine, Oslo University Hospital	Diabetes and pregnancy	eqwigsta@ous-hf.no
Trond Jenssen	Department of Nephrology, Oslo University Hospital	Diabetic nephropaty and transplantation	trond.jenssen@rikshospitalet.no
Benedicte Lie	Department of Medical Genetics, Oslo University Hospital	Immunogenetics of autoimmune diseases	b.a.lie@medisin.uio.no
Jens Petter Berg	Department of Biochemistry, Oslo University Hospital	Biomarkers in endocrinology and metabolism	j.p.berg@medisin.uio.no
Torild Skrivarhaug	Pediatric Department, Oslo University Hospital	The Norwegian Childhood Diabetes Registry	torild.skrivarhaug@medisin.uio.no

RESEARCH GROUP

Childhood Diabetes

Group Leader: Professor Knut Dahl-Jørgensen

GROUP MEMBERS

Aida Simeunovic
MD, PhD student

Ida Maria Mynarek
MD,PhD student

Therese Weider
MD, PhD student

Kristin Namtvedt Tuv
MD, PhD student

Lars Krogvold
MD, PhD, Assoc. Professor, paediatrician, postdoc

Hanna Dis Margeirsdottir
MD, PhD, paediatrician, postdoc

Martin Heier
MD, PhD, paediatrician, postdoc

Line Wisting
PhD, M.Psychol. postdoc

Dag Helge Frøisland
MD, PhD, paediatrician, postdoc

Sara Hammerstad
MD, PhD, endocrinologist, postdoc

Unni Mette Køpp
MD, PhD, paediatrician, postdoc

Nina Veiby Taarnhøy
MD, PhD, postdoc

Trine Roald
Research nurse

June Engebretsen
Research nurse

Jon Haug
Dr.Philos, clinical psychologist.

Kari Anne Sveen
MD, PhD, consultant (together with Tore Julsrud Berg's group)

Research focus

The group has four main research areas. The first is the etiology and prevention of type 1 diabetes and autoimmune diseases, especially focusing the role of viruses and the interaction with the immune system in pancreatic and thyroid tissue samples. The last years we have succeeded in detecting a low grade persistent enterovirus infection in the insulin producing pancreatic islets of patients with newly diagnosed type 1 diabetes, and also in the thyroid of patients with newly diagnosed Graves' Disease. This strongly indicates that viruses are important for the development of autoimmune diseases.

The DiViD study has got worldwide attention for its unique collection of pancreatic biopsies in live young adult patients at the onset of type 1 diabetes. We have signed material transfer and research collaboration contracts with 15 international, highly recognized laboratories, and we recently arranged group meetings in Miami in conjunction with the nPOD meeting (www.jdrf.org) to discuss the results and the next steps. Much focus has been on the role of enteroviruses, the insulitis and the role of innate immune system. The last year we have identified several viral "footprints" in the pancreatic islets. We also detected that 43% of the T-cells in the inflamed islets (insulitis) were "resident T-cells", indicating a previous infection. So the evidences for a role of viruses in triggering and driving the process killing the beta-cells are steadily increasing. Also interesting results of increased ER stress and increased proinsulin/insulin ratio in the islets add new aspects to the pathogenesis of type 1 diabetes.

We were granted NOK 9 mill from the Health Region South East in 2016 to start a Scandinavian multicentre, randomized trial (The DiViD Intervention Trial) to study the effect of antiviral treatment aiming to preserve endogenous insulin production at diagnosis, as measured by C-peptide. In addition to standard mixed meal tolerance tests, we will perform filterpaper blood tests for C-peptide monitoring at home. We started recruiting patients end August 2018 and so far 38 of total 96 patients are enrolled in the trial.

The second research area of our group is diabetes late complications. We have long term clinical studies on microvascular complications and the influence of glycemic control and advanced glycation. Recently the risk of early atherosclerosis in childhood onset type 1 diabetes has been the focus in several of our studies, with measurement of vessel wall thickness (IVUS, IMT, MRI) and vessel elasticity, and biochemical markers, as well as clinical data and risk factors. Increased arterial stiffness was reported. Martin Heier has been a postdoc in San Francisco as part of the EU Scientia Fellow Program, studying HDL Cholesterol function, and demonstrated decreased function in children and adolescents with type 1 diabetes. He has now returned to Oslo, planning exciting developments in this (and related) fields. The 10 years follow up of the prospective study "Atherosclerosis in Childhood Diabetes" is now completed, and statistical analysis started. This also included eye examinations and assessment of retinal vessel calibre added by oxymetry. The project aims to develop a new risk score for CVD in childhood onset type 1 diabetes. We now plan to study patients with combined diagnosis of type 1 diabetes and familiar hypercholesterolemia.

In our large, nationwide clinical studies, now as part of the Childhood Diabetes Registry, we focus on important issues as intensified insulin treatment and pumps, diabetic nephropathy, diet, physical activity, quality of life and psychosocial problems and eating disturbances (together with Skrivarhaug's group).

We became partners in the EU project INNODIA (An innovative approach towards the understanding and arresting type 1 diabetes) www.innodia.eu. This is a broad network of clinical centres and excellent basic research laboratories in Europe. As clinical centre we will recruit newly diagnosed patients with type 1 diabetes, and first degree family members, for systematic follow up and make ready for future intervention trials. Such trials aim to prevent diabetes in at risk persons and to preserve endogenous insulin production in newly diagnosed cases. The DiViDInt trial is affiliated to INNODIA. We have now started the recruitment of first degree relatives.

Projects

Etiology and prevention of type 1 diabetes and autoimmune diseases:

1. Diabetes Virus Detection Project (DiViD)
2. Diabetes Virus Detection and Intervention trial (DiViDInt)
3. Viruses, genetics and autoimmunity in thyroiditis. A biopsy study.
4. INNODIA study

Diabetes late complications

5. Atherosclerosis in Childhood Diabetes – a population-based, prospective study.
6. Long term vascular changes in type 1 diabetes – Clinical aspects and biological markers – 30 years follow-up of the Oslo Study
7. Advanced glycation of proteins and vascular complications in childhood diabetes
8. HDL cholesterol function in type 1 diabetes

Clinical diabetes

9. Collaboration with the Norwegian Childhood Diabetes Registry (see page 32). A nationwide prospective population-based study for research and quality improvement by means of benchmarking.
10. Children and adolescents with diabetes - present state and future possibilities - A population-based study of factors affecting competences and treatment results in children and adolescents with Type I diabetes.
11. Eating disturbances in childhood diabetes.

Obesity and type 2 diabetes:

12. Pathways contributing to childhood weight development and overweight in Norway. Substudy of the Mother and Child National Cohort.

Achievements 2018

Detection of a low grade persistent enterovirus infection and antiviral tissue responses in the insulin producing islets of Langerhans at diagnosis of type 1 diabetes. Started the DiViDInt, a randomized controlled multicenter trial of antiviral treatment in newly diagnosed type 1 diabetes patients aiming to maintain and restore endogenous insulin production. Completed the 10 years follow-up of the "Atherosclerosis in Childhood Diabetes Study".

Ambitions 2019–2020

Finalizing the recruitment of the DiViDInt Trial. In-depth studies of pancreatic tissue biopsies and the pathogenetic mechanisms in type 1 diabetes. Developing a new risk score for the development of early atherosclerosis in childhood diabetes. Finalizing recruitment of first degree relatives in INNODIA study.

RESEARCH GROUP

Type 2 diabetes and metabolism

Group Leader: Kåre I. Birkeland

GROUP MEMBERS 2018–2019

Kåre I. Birkeland
Professor, MD, PhD

Anne Karen Jenum
Professor, MD, PhD

Anne-Marie Aas
Associate Professor, PhD

Anh Thi Tran
MD, PhD, postdoc

Anne-Pernille Ofstad
MD, PhD

Archana Sharma
MD, PhD student

Cecilie Wium
MD, PhD, consultant, postdoc

Christine Sommer
PhD, postdoc

Christin W. Waage
PhD, postdoc

Eline Birkeland
PhD student

Elisabeth Qvigstad
MD, PhD, consultant

Gunn-Helen Moen
MSc, PhD student

Hanne Løvdal Gulseth
MD, PhD, senior researcher

Hilde Risstad
MD, PhD

Ingvild K. Blom-Høgestøl
MD, PhD student

Julia Onsrud Opsahl
Forskerlinjen, Faculty of Medicine

Kirsti Bjerkan
MSc

Line Sletner
MD, PhD, researcher

Ole Elvebak
MD, PhD student

Paz Lopez-Doriga Ruiz
MD, PhD student

Sedegheh Gharagzlian
PhD

Sindre Lee-Ødegaard
Forskerlinjen, Faculty of Medicine

Susanna E. Hanvold
MSc, PhD

Åse Ruth Eggemoen
MD, PhD, postdoc

Åse Halsne
research nurse

Kjersti Gjems Vanberg
master student, UiO

Kristine Duus Molven
master student, UiO

Oda Kristine Smestu Holm
master student UiO

Sander Rismyr
master student UiO

Nadia Kiryushchenko
master student UiO

May-Helen Nyland Espenes
medical student project, UiO

Anne Marthe Brobakk Hansen
medical student project, UiO

Hilde Gjesdalen
medical student project, UiO

Research focus

We focus on epidemiological studies, clinical observational studies, randomized clinical trials and translational research in obesity, prediabetes, gestational diabetes, metabolic syndrome and type 2 diabetes. We design and conduct our own studies, but also participate in international multi-center studies, both researcher initiated and studies sponsored by pharmaceutical companies, (phase II-IV studies).

Our aim is to contribute to prevention and improved therapy for diseases related to overweight and physical inactivity, primarily type 2 diabetes and its complications. To achieve this, we search for etiological factors in disease development through hypothesis-generating epidemiological and observational studies and seek to test the hypotheses in mechanistic and randomized, controlled clinical trials. We aim to publish our results in internationally well recognized scientific journals, and present at national and international meetings. We also engage in popular scientific publishing to increase knowledge in the public about our own and other group's research. We collaborate closely and partly overlap with Anne Karen Jenum's group on the STORK-Groruddalen studies, with Elisabeth Qvigstad/Tore Henriksen/Jens Bollerslev's group on the STORK-Rikshospitalet studies and with Cecilie Wium's group at the Lipid Clinic.

Our greatest achievements in 2018

- 28 publications and several in high ranked journal
- Two PhD defenses – Åse Ruth Eggemoen and Susanna E. Hanvold
- Career grant for Christine Sommer from Helse Sør-Øst
- Mobility grant from the Norwegian Research Council for Gunn-Helen Moen for 3 years
- Postdoc grant from the Regional South East Health Authority

Our special focus for the coming years will be on

- genetics and epigenetics in gestational diabetes
- diabetes in immigrants
- molecular mechanisms for insulin resistance related to adiposity, inflammation and the effect of physical exercise and diet
- large register-based epidemiological studies in type 2 diabetes

Projects

1. Metaflammation – transition from healthy to unhealthy obesity
2. The The FIBERDIA project – a randomized controlled trial of the effects of probiotics on glucose metabolism
3. The DIASA (Diabetes in South Asians) research program
4. The DAPHNE- , DISCOVER- and DIAFLU studies focusing on large epidemiological register studies of type 2 diabetes in Norway and a substudy of the HUNT-study focusing on anthropometric indices and cardiovascular end-points
5. Genetic and epigenetic sub-projects under the STORK and STORK-Groruddalen studies
6. The 4B study: The effect of bariatric surgery on bone marrow fat and glucose metabolism in subjects with type 2 diabetes and morbid obesity
7. The MyoGlu-study – molecular mechanisms for the insulin sensitizing effects of exercise
8. 10 year follow up of subjects after bariatric surgery with focus on the prevalence of diabetes and metabolic risk factors

Ambitions 2019–20

- To publish at least 20 papers each year from the group, also aiming for some in the highest ranked journals
- To visualize our research to a higher degree to the public
- To recruit and obtain financial support for at least 1 new PhD or Postdoc each year and for one large project every 2–3 year

RESEARCH GROUP

Diabetic late complications

Group Leader: Tore Julsrud Berg

GROUP MEMBERS

Tore Julsrud Berg
MD, PhD, Associate Professor

Kristine B. Holte
MD, PhD student

Niels Gunnar Juel
MD, research fellow

Anne Karin Molvær
RN, PhD student

Kari Anne Sveen
MD, PhD, Scientia postdoc fellow

Kristina B. Slåtsve
MD, PhD student

Kristian F. Hanssen
MD, PhD Senior Professor

Research focus

Late complications of type 1 diabetes.

Projects

The DIALONG study: A study of long-term survivors with more than 45 years of type 1 diabetes. A large clinical and biochemical study focusing on macrovascular disease, skin and joint complications and quality of life.

One Dr Phil thesis has been defended and one PhD has been submitted. One PhD student is now doing her work in this study and one PhD is using the study as a part in her PhD. The study shows a high prevalence of undiagnosed coronary heart disease, adhesive capsulitis and shoulder arthrosis.

Kari Anne Sveen holds a post.doc on a study of low grade inflammation against AGEs and inflammatory response in atherosclerosis in diabetes in the DIALONG- and OSLO study in collaboration with Professor Jan Nilsson, Malmø.

In collaboration with Valeriya Lyssenko and her group we analyze metabolomics, mRNA expression from biopsies and gene associations as part of the PROLONG study.

Tore Julsrud Berg is part of the steering committee of the ROSA 4 study (See report from "Diabetes and related health issues in primary care"). Kristina B. Slåtsve is working on her PhD project: "Prevalence and quality if diabetes care in Salten".

Kristian F. Hanssen has published a paper on preeclampsia and type 1 diabetes.

Achievements 2018

- Niels Gunnar Juel defended his thesis for Dr. Phil.
- Publication of four papers from the DIALONG study
- One PhD thesis has been submitted

Ambitions 2019

- Publication of at least five papers from the DIALONG study and two from the ROSA 4 Salten study

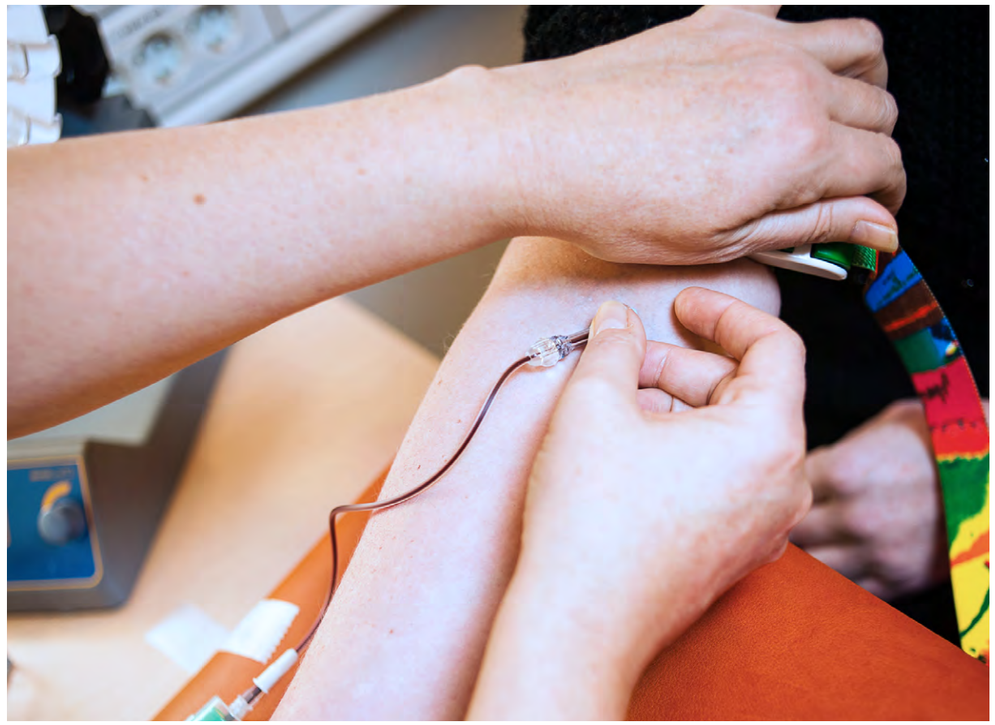

Photo: Øystein Horgmo, UiO

RESEARCH GROUP

Childhood Diabetes and Diabetes Epidemiology

Group Leader: Geir Joner

GROUP MEMBERS

Geir Joner,
Professor MD, PhD

Lars Christian Stene
PhD, senior researcher

Torild Skrivarhaug
MD, PhD, Director, Norwegian Childhood Diabetes Registry

Vibeke Gagnum
MD, PhD student

Ingvild Menes Sørensen
MD, PhD, paediatric endocrinology

German Tapia
PhD, researcher/postdoc

Nicolai Lund-Blix
cand. scient, PhD, postdoc

Maria C. Magnus
PhD, researcher

Paz Ruiz
MD, research fellow

Maryam Saeed
MD, research fellow

Research focus

Diabetes epidemiology, causes of type 1 diabetes and prevention, diabetes complications and mortality. Special emphasis on risk factors for type 1 diabetes using epidemiological approaches, including studies of infectious, dietary and other environmental factors, and potential gene-environment interactions. Research to prevent complications and premature death by studying of risk factors is also central in the group's work. The long-time goal is to reduce the incidence of type 1 diabetes in children and reduce the impact of complications of diabetes in children that already have the disease. The most important source for research is the Norwegian Childhood Diabetes Registry with biobank with > 90% of new cases of diabetes below 15 years included, the MOBA-study with biobank and other registers.

Projects:

1. The PAGE study (Prediction of Autoimmune diabetes and celiac disease in childhood by Genes and perinatal Environment): Studies of risk factors for type 1 diabetes and for celiac disease in The Norwegian Mother and Child Cohort (MOBA) linked to the Norwegian childhood diabetes registry (PI: Lars Chr. Stene).
2. Cardiovascular and end-stage renal disease in type 1 diabetes with onset before 15 years of age and long duration. PhD project, research fellow Maryam Saeed, MD.
3. Early nutrition and risk of islet autoimmunity and type 1 diabetes. Postdoc project, Nicolai Lund-Blix, PhD.

Achievements 2018

The PAGE-study is still going on producing novel results with focus on early risk factors for type 1 diabetes and for celiac disease and has reached more than 25 publications and several in high-ranked journals.

Early nutrition and risk of islet autoimmunity and type 1 diabetes, postdoc project by Nicolai Lund-Blix, is in its second year and four papers has been accepted and 2–3 more are in the pipeline. Nicolai had the opportunity to work with Professor Jill Norris and her group at Barbara Davies Center for Childhood Diabetes, University of Colorado, Anschutz Medical Campus, August 2017-July 2018 and the collaboration will continue.

The project "Cardiovascular disease and end-stage renal disease in type 1 diabetes with onset before 15 years of age and long duration" started in June 2017 and is based on a very ambitious plan of long-time follow up of all persons with t1d in the NCDR by linkage between high-quality health registers. It has been a tremendous struggle to get all registers to accept our plan, but in December 2018 we at last had received the major part of the data.

Ambitions 2019–2020

To be a leading group in epidemiological studies on genetic and environmental risk factors in the etiology of type 1 diabetes in children and adolescents.

To publish more exciting scientific results from the PAGE study and the postdoc project on early nutrition related to risk of type 1 diabetes.

To start the analysis of data in "Cardiovascular disease and end-stage renal disease in type 1 diabetes with onset before 15 years of age and long duration" and publish the first papers on the risk of major cardiovascular disease in young persons with type 1 diabetes compared with the background population.

Photo: Øystein Horgmo, UiO

RESEARCH GROUP

Diabetes and related health issues in primary care

Group Leader: Anne Karen Jenum

GROUP MEMBERS

Anne Karen Jenum
Professor, MD, PhD, MPH

Line Sletner
senior researcher, MD, PhD

Per Lagerløv
pediatrician, Professor, PhD

Idunn Brekke
Professor, PhD

Kåre Rønn-Richardsen
PhD

Christin Wiegels Waage
PhD, postdoc

Anh Thi Tran
MD, PhD, postdoc

Bjørn Gjelsvik
MD, PhD

Tore Julsrud Berg
ass. prof, MD, PhD

Esben Selmer Buhl
MD, PhD

Åse Ruth Eggemoen
MD, PhD, postdoc

Anne B. Bærug
PhD

Nilam Shakeel
PhD student (submitted her thesis on January 11th)

Ingun Toftemo
PhD student

Marthe-Lise Næss-Andresen
PhD student

Kjersti Nøkleby
PhD student

Kristina Slåtsve
PhD student

Astrid Torbjørnsen
PhD student

Walaa Metwally Ali Abdalaah Abuelmagd
PhD student

Elias Nosrati
(Cambridge)

Anam Shakil Rai
(PhD funded from 2019)

Mehadi Hasan Bappy
(Master student)

Research focus

We apply a life course approach when studying the causation, care and prevention of type 2 diabetes and cardiovascular complications, and the social and ethnic differences in health. The group members have a diverse professional background, facilitating synergies and convergence in research. We have performed cross-sectional and cohort studies, qualitative studies, an RCT using new technology, systematic reviews and meta-analyses, and are involved in developing culturally sensitive interventions in primary care. The group covers two main areas of research:

1. The Diabetes Care group – working with type 2 diabetes, its complication, quality of diabetes care in a multiethnic society and strategies for prevention
2. The Mother and Child Health group – working with the developmental origin of health and disease, not least gestational diabetes and type 2 diabetes, in a Norwegian mother, father and child multiethnic cohort

Projects

The Diabetes Care Group

1. **Cardiovascular disease, diabetes and ethnicity, and the quality of diabetes care in a multiethnic general practice population (ROSA 4).** Our multiregional Norwegian research group collected data from primary care from 2014 from about 11 500 patients in five counties: Oslo, Akershus, Rogaland, Hordaland and Nordland, linked with data from Statistics Norway, and data from hospitals in the same areas. One postdoc (Anh Thi Tran, UiO) and three PhD students Kjersti Nøkleby (UiO), Kristina Slåtsve (UiT/UiO) and Åsne Bakke (UiB) are using these data, and we are now working with plans for new projects and for linkages with National registers.
2. **Innovative Prevention Strategies for type 2 Diabetes in South Asians Living in Europe** – the EuroDHYAN project, is an EU-funded effort to target the excessive risk for T2D in South Asian populations in Europe, with partners from Amsterdam, The Netherlands, Edinburgh, Glasgow and Norway (UiO; Jenum; NAKMI) www.eurodhyan.eu/. Jenum has submitted a paper with a systematic review and individual data meta-analysis of the findings from relevant behavioural intervention studies, based on all the six eligible trials that were identified, and we have critically evaluated dietary goals employed in current interventions. The final report is now approved by EU.
3. **The Norwegian study in Renewing Health:** Stimulating self-management in patients with Type 2 diabetes mellitus through telecare with the Few Touch application and health counseling - a randomized controlled tria, was developed by Faculty of Health Sciences, Oslo and Akershus University College as part of an EU-funded project. Torbjørnsen has published 4 papers and will soon submit her thesis.
4. **Follow-up after 16 years of the Romsås in Motion study**. Together with partners at Western Norway University of Applied Sciences, Faculty of Education, Arts and Sports, we have applied for linkages with several Norwegian Health Registers to study the incidence of cardiovascular disease and diabetes, and will develop new projects in 2019.
5. **Effectiveness of a nurse-coordinated multidisciplinary follow-up program in general practice: protocol of a mixed-method complex intervention trial among people with chronic conditions and multi-morbidity (T2DM, prediabetes, overweight, frailty or COPD)** (postdoc project, Marit Graue PI, Jenum member of Steering committee) was funded in 2018.
6. **The need for drug information about diabetes among Pakistani females in Norway**. PhD student Walaa Metwally Ali Abdalaah Abuelmagd plans to submit her thesis in 2019, based on qualitative studies about drug use for diabetes in non-Western women (School of Pharmacy, Faculty of Mathematics and Natural Sciences.
7. **Modernizing the GP scheme: towards sustainable health policy.** PI Prof Oddvar Martin Kaarbøe (Helsam). New project funded by NFR from 2019, AKJ involved in one work package.

The Mother and Child Health group

8. **The STORK-Groruddalen cohort study** investigates the role of ethnicity and a range of environmental determinants on the prevalence and development of primarily gestational diabetes (GDM) and intrauterine and childhood growth, www.med.uio.no/helsam/forskning/prosjekter/stork-groruddalen/. Data from 823 pregnant women (59% ethnic minorities), were collected 2008–2011. Ten PhD projects are based on these data; 7 have finished dissertations, one in 2018 (Eggemoen) and others have used these data for one paper in their PhD (2018: Anne Bærug). Four have received postdoc grants (Sletner, Sommer, Eggemoen and Waage). Sletner later received a four-year researcher grant. Further, three PhD projects for general practitioners funded by the Norwegian Medical Association are ongoing (Shakeel (thesis submitted 2019), Toftemo and Næss-Andresen).
9. **Facilitating targeted community prevention of type 2 diabetes – using information from pregnancy and postpartum to identify women at high risk** is a follow-up study of STORK G-1 women 10 years after the index pregnancy, funded in 2018 (postdoc Waage). Data collection will hopefully start in May 2019.
10. **Prediction of gestational diabetes from four Norwegian studies (PreGeDiab4N).** We have established a new Consortium and after approvals from Regional Ethics Committees linked individual participant data from four Norwegian pregnancy cohorts, first with the aim to develop prediction models to improve screening strategies for gestational diabetes, balancing benefits and harms for women and health care (PhD project Shakil Raj, funded 2018). Second, we will use this data set to develop new sub-projects with other outcomes.

Achievements 2018

We have increased the number of subprojects and further strengthened our national and international collaboration. Importantly, in 2018 we achieved funding for one new postdoc (Waage, Extra-stiftelsen) for a follow-up of the STORK Groruddalen women 10 years after deliviry, and one PhD (Shakil Raj (HSØ)). The STORK Groruddalen study and the ROSA 4 study are now part of the Primary Health Care Research Centre at Helsam. Two PhD students finished their dissertation in 2018 (Eggemoen and Bærug). We have published 13 papers in peer-reviewed journals, and four are in press. Jenum was a guest professor in Tampere, Finland, and has been strongly involved with the EU project EuroDHYAN study, which ended late 2018. Sletner has finished her one year visit to our collaborators in Southampton, UK, and has funding for about three more years as a researcher with a project studying macroscopic and epigenetic changes in placental tissue in Stork G.

Ambitions 2019–2020

First, beside the planned progress of the ongoing projects, we will prioritize the recently funded follow-up study of mothers in STORK G, which has a large potential for more PhD and postdoc projects as we will collect data on a range of important health outcomes besides the incidence of T2D and "prediabetes". Second, we will refine our plans and work for funding of a follow-up of the children in Stork G as well. Third, Sletner is currently performing a pilot study on the stored placenta samples in Stork G, to test their feasibility for epigenetic analyses, and if so plan for further projects. Forth, we will apply for approvals for linkages of ROSA 4 with national registers to study clinical outcomes using a cohort design.

RESEARCH GROUP

Diabetes and Pregnancy

Group Leader: Elisabeth Qvigstad

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Anne Helbig
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Anne Kaasen
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Research focus

The nutritional and environmental conditions under which an individual develops from the one cell stage at conception to birth is now known to have major impact on the future health of the newborn child. Inadequate nutrition in the fetal period of life increases the risk of cardiovascular diseases, diabetes, overweight and certain cancers.

The association between the developmental condition of the fetus and future health of the newborn is conceptualized in the term DOHaD (Developmental Origins of Health and Disease or "The Barker hypothesis"). As pointed out in recent international surveys the most effective way of preventing major cardiovascular diseases, diabetes and some forms of cancer is to optimize the developmental environment of the fetus and of early childhood. A variety of factors may influence the condition under which a fetus develops, including maternal obesity and other malnutritional states, infections, preeclampsia with placental dysfunction and exposure to toxic compounds. Worldwide maternal obesity has now become a main risk factor for pregnancy complications and fetal development. In Norway around 20% of young women (mothers to be) are now obese (BMI >30 kg/m2), and obesity has surpassed smoking as a risk factor in pregnancy.

The reason that obesity has adverse effects on pregnancy is primarily not high BMI per se, but the profound changes in metabolism, endocrinology and inflammation that accompany adiposity. The result is obesity-induced metabolic dysfunction that has large impact on the environment in which the fetus develops. Many of the factors that may cause adverse fetal environments are preventable. However, in order to establish effective preventive measures it is fundamental to understand how a fetus may become exposed to inadequate nutrition and other adverse developmental conditions.

A main project in our group has been the StorK project /study period 2002–2008, with follow up at 5 years after delivery. This study focuses on nutritional, metabolic, neuroendocrine and vascular aspects of the interplay between mother and child with regard to the growth and development of the fetus. The mother's metabolic status is investigated by the following parameters: overweight/obesity measures, endocrine and inflammatory parameters, plasma levels of lipids and glucose and gene regulation/transcription.

The main early findings were: Independent modifiable determinants of birth weight are BMI, fasting plasma glucose and low pregestational level of physical activity, these determinants are all related to maternal nutritional and metabolic state. Determinants of percentage body fat at birth are BMI and fasting glucose. The findings are in accordance with the HAPO study, but we can add information on fetal growth and the role of placenta. Hence more recent work demonstrated that modifiable maternal determinants of fetal growth are BMI and gestational weight gain, but not glucose. Adding placental mass as a proxy for functional capacity reduces the above effects, indicating a central role for placenta in regulating the effects of maternal metabolic factors on fetal growth, weight and fat mass at birth. We have also found that inflammatory factors may affect birthweight, probably by modifying placental function.

Ongoing projects from the STORK cohort

1. **Healthy and unhealthy overweight in pregnancy**
   A longitudinal study of metabolic status and body mass index (BMI) in relation to pregnancy complications. The STORK cohort enables us to analyze subgroups of obese pregnant women with respect to the relation between metabolic profiles and pregnancy outcome. This project is highly relevant in terms of selecting obese women for special pregnancy follow up.
2. **Genetic studies**
   The last few years we have also worked with genetic methods, recently genetic risk scores (GRS) were made, after genotyping 529 Norwegian pregnant women and constructing GRS from known genome-wide significant variants and associated with FG, 2hG, BMI and T2D. Shape information from glucose curves during an oral glucose tolerance test was also used. The genetic risk score for fasting glucose explained similar variance during pregnancy as in the non-pregnant population, whereas GRS for BMI and T2D variants explained up to 1.3% of the variation in the glucose traits. The results suggest overlap in the genetic aetiology of FG in pregnant and non-pregnant individuals, but this is less apparent with 2h glucose levels. This work has been done in close collaboration with the Stork Groruddalen study, with Professor K. Birkeland and postdoc C. Sommer and Lund University Diabetes Centre, Malmø with senior postdoc R. Prasad and Professor L. Groop. We hope to replicate these findings in the Norwegian Mother and Child study. Furthermore the genotyping has led to collaborations with an international GDM and birth weight consortium in Sweden
3. **"Gestational diabetes: Correct identification is necessary to improve future health of pregnant women and offspring" (Collaboration).**
   After the WHO decision to recommend new screening criteria for GDM, there is an acute need for more knowledge from studies with universal OGTT about GDM prevalence by different criteria in the Nordic countries, addressing the challenge of balancing adequate detection with the potential problem of over-diagnosis. This project is a response to needs identified during the revision of the clinical guideline, also to evaluate the performance of the new strategy to correctly diagnose GDM, with substantially lower thresholds for age and BMI than the traditional risk factor strategies, should be. There is also a need to study if easily available biological markers in early pregnancy can be used to predict later GDM, and eventually rule out women not in need for OGTT. This project is based on a new consortium based on four Norwegian pregnancy cohorts (STORK, STORK Groruddalen, Fit for delivery, The TRIP study (NTNU), enabling us to use individual participant data in this PhD project.
4. **Post Stork – the 5 year follow up.**
   Maternal health post pregnancy has been the focus of Tove Lekvas postdoctoral work, among the topics are studies of adipokine levels relative to metabolic dysfunction and later cardiovascular disease. Leptin/adiponectin ratios were higher in GDM women both during pregnancy and follow-up compared to non-GDM women, and during pregnancy associated with cardiovascular risk. Furthermore circulating adipokines and monocyte/macrophage markers were dysregulated in GDM and at 5-year follow-up in GDM women, and these

levels were independent of BMI and other GDM risk factors. Thus, activation of monocytes/macrophages may be an important event in the early development of GDM. Furthermore we have also identified that poor β-cell function in the second and/or third trimester is a predictor of pre-diabetes during long-term follow-up. Declining β-cell function already in the first trimester was associated with increased risk for pre-diabetes at 5-years postpartum.

5. **Lipids in cardiovascular function in StorK offspring:**
   The atherosclerotic process is driven by increased cholesterol levels in combination with an enhanced inflammatory response. Hypercholesterolemia is primarily lifestyle induced or it may be caused by a genetic disposition such as familial hypercholesterolemia. Women with FH have been shown to experience very high levels of plasma lipids, in particular LDL cholesterol and they develop a prothrombotic and proinflammatory phenotype during pregnancy compared to non-hypercholesterolemic women. The significance of elevated cholesterol levels and prothrombotic "in utero" environment in relation to markers of risk in offspring has not been thoroughly investigated. Six to 13-year-old children were recruited, their mothers attended StorK, and had high or low cholesterol in pregnancy. CVD risk factors in the children were investigated, and demonstrated that women with elevated LDL-C during early pregnancy have offspring with higher LDL-C already at the age of 6–13 years. There was no difference in birthweight or any other clinical or biochemical CVD risk factors or dietary intake between the children at 6–13 years. This indicates that the affected children may be at increased cardiovascular risk.
6. **Fertility in prediabetes**
   Most publications on assisted reproductive therapy (ART) focus on preconceptional metabolic health, or on the outcome (ie live births). The data collected in the STORK study makes comparisons of anthropometric and metabolic parameters possible in the participants, where approximately 70 women ART.
   We aim to investigate the influence of ART on metabolic features during pregnancy and on pregnancy outcomes, in comparison to women with GDM and healthy pregnant women in the STORK cohort, and furthermore investigate the influence of ART on maternal risk factors for cardiovascular disease between these three groups, using the 5 year follow up data from the STORK cohort.
7. **Stork-3**
   The fetal liver is central in the energy use and metabolism of nutrients during fetal development. This project studies how blood flow in the umbilical vein (coming from placenta) is (re-)distributed between the liver and heart (ducus venosus) at different stages in the fetal development, and is led by Professor G. Haugen. Two group members collaborate with the "Dia Doppler" project at Haukeland University hospital, where shifts in fetal liver flow patterns are associated with maternal BMI and hyperglycemia in pregestational diabetes.

Achievements 2018

Gunn-Helen Moen has submitted her thesis: "Genetic and environmental etiology of glucose metabolism and cardiometabolic traits during pregnancy and in later life" and will defend it in February 2019. She has received a postdoc grant from the Norwegian Research Board for three years, including 2 years abroad.

The merging of files and data analysis from the four pregnancy cohorts "Gestational diabetes: Correct identification is necessary to improve future health of pregnant women and offspring" started in 2018, and is satisfactory regarding completeness. The further analysis continues in 2019 as a PhD project. Tove Lekva continued her characterization of the 5 year follow up in STORK, and published 2 articles from this cohort on GDM prediction, and adipokines and macrophage markers in GDM.

Genetic data are also in use in the StorK offspring (hypercholesterolemia) cohort: Serum Omega-6 Fatty Acids and Immunology-Related Gene Expression in Peripheral Blood Mononuclear Cells, by J. J. Christensen, and will be published in 2019.

Ambitions 2019–2020

Gunn-Helen Moen currently works closely with C. Sommer, S. Lee-Ødegård, N. Kiryushchenko and J. Opsahl on two epigenetic projects in pregnant multiethnic women, on BMI and glucose effects, which will be completed the coming spring. In her postdoc project she will work on GWAS from the HUNT study and the genetic effects on birthweight. We will continue investigation of BMI influences on pregnancy health and outcomes, continue the work in the GDM consortia and collaborations, both nationally and internationally. Tove Lekva continues her work with the 5-year follow data.

We will furthermore complete analysis of the effect of physical activity on metabolic parameters in the StorK cohort and work in and extend collaborations beyond Oslo, eg. with the Bergen scientists in Dia Doppler, Haukeland University Hospital.

Photo: Øystein Horgmo, UiO

RESEARCH GROUP

Diabetic Nephropathy and Transplantation

Group Leaders: Trond Jenssen, Svein O. Kolset, Hanne Scholz

GROUP MEMBERS

Trond Jenssen
Professor OUS RH

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Rasmus Kirkeskov Carlsen
PhD student, University of Oslo

Research focus

The Diabetic Nephropathy and Transplantation research group assembles the research activity of three senior researchers and their respective research groups. There is an extensive collaboration between these research groups.

Research focus

- Trond Jenssen. Cardiovascular disease and diabetes after organ transplantation. Clinical pancreas and islet transplantation.
- Svein O. Kolset. Extracellular matrix changes in the diabetic kidney.
- Hanne Scholz. Islet cell transplantation: Improvement and optimization of islet isolation, transplantation and clinical outcome.

Projects

Trond Jenssen

1. Posttransplant diabetes mellitus (PTDM). Occurrence, pathogenesis, risk factors, follow-up and treatment.
2. Improvement of kidney graft and patient survival in renal transplant patients.
3. Clinical outcome and improvement of beta cell replacement therapy (pancreas and islet transplantation).

Svein O Kolset

1. Studies on early markers of kidney changes in patients with hyperglycemia (type 1 diabetes) and restored normoglycemia (pancreas transplantation). Studies on syndecan shedding and changes in renal proteome and matrisome.
2. Syndecans as disease markers in population-based studies. Extracellular matrix changes due to experimental diabetic conditions in human glomerular endothelial cells.

Hanne Scholz

1. Improvements of pancreatic islet isolation techniques and evaluation of isolated human islets.
2. Cellular intervention to improve beta cell replacement.
3. Regenerative/repair of the endocrine compartment of the pancreas using adult stem cells.
4. Development of 3D bioprinting of biomimetic pancreas to treat diabetes.

At present (2018/2019) 6 PhD candidates, 3 postdoc fellows and 1 master student are directly involved in the projects. The group published 22 papers in peer reviewed journals in 2018.

Achievements in 2018

Ongoing research grants are upheld.
PTDM and pancreas transplantation group (Trond Jenssen): Completion of a researcher initiated, non-sponsered placebo-controlled, randomized clinical trial (SGLT2 inhibition in renal recipients with posttransplant diabetes mellitus). Last patient out (out of 46 patients) was completed June 2018, and the paper has been accepted for publication (Diabetes Care). Renal biopsy sample package for microdissection analysis in kidneys from PTDM patients is completed. We are awaiting the analyses to be finished. A PhD grant for Rasmus Kirkeskov Carlsen was obtained from Helse SørØst to pursue the possible impact of hypomagnesemia on development of PTDM. Several publications have occurred from our renal transplant registry.

Diabetic nephropathy group (Svein O Kolset): The collection of kidney-graft biopsies from transplanted patients with T1DM has been completed. LC-MS/MS analysis has been performed and the proteome from KA and SPK-recipients compared using Scaffold. Analysis of syndecan-1 and syndecan-4 expression in 1300 participants from the Tromsø study has been completed. The experiments for the project on glomerular endothelial cells in culture have been finalized.

Islet transplantation group (Hanne Scholz): The group has continued to improve the isolation and transplantation method. This year the group has in collaboration with Uppsala University obtained more efficient isolation by adjusting the calcium concentration during isolation and published the results in Cell Transplantation. In collaboration with the GI surgery department we are offering islet autotransplantation (TPIAT) after total pancreatectomy for selected patients with chronic or acute recurrent pancreatitis. We performed 9 clinical islet transplantations in 2018 (3 as autologous). PhD candidate Kristine Kloster-Jensen MD defended her thesis "Functional in vitro studies of immunosuppressive agents in human pancreatic islets" in June 2018 and PhD candidate Shadab Abadpour defended her thesis "Strategies to prevent islet cell damage by targeting micro-environmental stress - Implication for clinical islet transplantation" in November 2018. A postdoc grant was obtained from Helse SørØst to continue the investigation of adult stem cells as a new and important modulator in clinical islet transplantation for type 1 diabetes. Dr. Scholz is councilor of the International Islet and Pancreas Transplantation Association (IPITA) (2017–2021). Dr. Scholz is a group leader at the Centre of Excellence - Hybrid Technology Hub at Institute of Basic Medical Sciences, UiO aiming to create functional mini-pancreas for "organ on a chip" platform.

Ambitions for 2019–2020

Trond Jenssen: One candidate is expected to complete his thesis in 2019. Results on microdissection studies from tubular cells from transplanted kidneys will be disclosed. The RCT on SGLT2 inhibition in patients with PTDM is to be published (Diabetes Care). Main results from the ORENTRA trial (an investigator initiated randomized clinical trial on omega-3 substitution in renal transplant recipients and graft function) is accepted for publication in 2019 in American Journal of Transplantation. Studies on hypomagnesemia in patients with PTDM will be performed.

Svein O. Kolset: Role of inflammation in kidney biopsies from transplanted kidneys in diabetic and non-diabetic humans will be a main project. Microdissection of kidney biopsies for proteome and matrisome studies are carried out. Furthermore, we will link inflammation and fibrosis through mechanistic studies.

Hanne Scholz: One candidate is expected to complete his thesis in 2019. The group will focus on refinement of methods for islet isolation and to develop new strategies for cell-based engineering technology to improve the outcome of islet transplantation using adult stem cells. In addition, the group will investigate and develop an organoid model of pancreas (islets).

Selected for monthly cover picture for Abadpour S et.al J Mol Endocrinol.January 2018 (I.F 3.6)

RESEARCH GROUP

Immunogenetics of autoimmune diseases

Group Leader: Benedicte A. Lie

GROUP MEMBERS

Benedicte A. Lie
Professor

Marte K. Viken
postdoc

Mario Saare
postdoc (01.04.2019)

Fatemeh Kaveh
postdoc (until 01.02.2018)

Ingvild Gabrielsen
PhD student (until 18.03.2019)

Kari Guderud
PhD student

Line Sunde
PhD student

Fatima Heinicke
PhD student

Maria Dehli Vigeland
PhD student

Asgeir Lande
PhD student

Riad Hajdarevic
PhD student

Marte Heimli
PhD student (from 01.02.2019)

Sofie Andersen
Master student

Anne Rydland
Medical Laboratory Scientist

Siri Flåm
Medical Laboratory Scientist

Research focus

Our main research focus is to identify and functionally characterize genetic factors that predispose to type 1 diabetes and other autoimmune diseases. The genetic risk factors have to a large extent been connected to gene expression and gene regulation of immune cells. To get a deeper understanding of such aspects, we are studying different layers of genomic information; e.g. transcriptome, methylation and microRNA across a wide spectrer of immune cells both from blood and thymus. These regulatory profiles are investigated against autoimmune genetic risk loci (revealed through genome-wide association studies), and analyzed against response to treatment

Projects

1. Characterization of the transcriptome of various immune cells in thymus and profiling of expression of tissue restricted autoantigens.
2. Exploring genetic, epigenetic and environmental risk factors, and their interactions, in rheumatoid arthritis, an autoimmune disease sharing many risk factors with type 1 diabetes.
3. Epigenetic profiling of immune cells from rheumatoid arthritis patients and their correlation with treatment response.
4. Quantification of the expression levels of HLA alleles, the main genetic determinant for autoimmune diseases, on different immune cells from thymus and blood.

Achievements 2018

- Characterized the transcriptome of antigen-presenting cells and T cells from thymus and unraveled the expression profile of risk genes for type 1 diabetes and other autoimmune diseases
- Discover methylation signatures of $CD4$ T cells (naïve and memory) that are associated with rheumatoid arthritis and the effect of methotrexate treatment
- Explored the HLA association in autoimmune diseases and established a pipeline for quantitatively measure the HLA allelic expression levels

Ambitions 2018–2019

- Quantitatively measure the expression of different HLA alleles, including type 1 diabetes susceptibility and protective variants, in thymus
- Test the hypothesis that the immune system is involved in the development
- of myalgic encephalopathy and chronic low back pain, based on our knowledge from immune genetic studies of established autoimmune diseases like type 1 diabetes
- miRNA profiling of immune cells from rheumatoid arthritis patients and their correlation with treatment response
- Characterize the developmental hierarchy of immune cell populations in human thymus
- Autoimmune risk variants influencing binding of transcription factors important for tissue restricted antigen (e.g. insulin) presentation in thymus

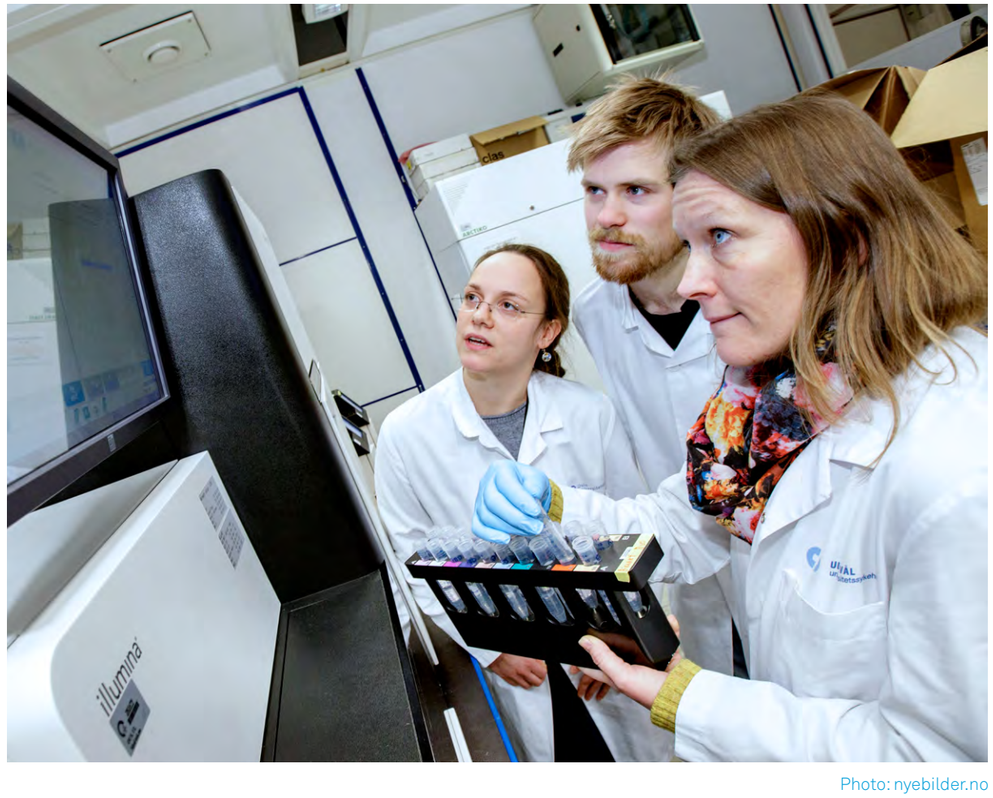

Photo: nyebilder.no

RESEARCH GROUP

Biomarkers in endocrinology and metabolism

Group Leader: Jens P. Berg

GROUP MEMBERS

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Anne Nærby
B.Sc

Research focus

One of the research aims of our group is to increase the understanding of mechanisms leading to and metabolic consequences of increased blood glucose by studies of small molecule metabolite profiles (metabolomics). Projects at the Hormone Laboratory study the mechanisms leading to β-cell dysfunction and aim to identify adequate biomarkers to assess changes in β-cell health and function. In addition we focus on the use, quality control, and interpretation of measures of glycemic control.

Projects

- Prediction of early metabolite biomarkers in serum of autoimmune diabetes.
- Effects of vitamin D on pancreatic-cell mass function.
- Studies of metabolic profiles in gestational diabetes.
- Posttranslational modification of proteins and late complications of diabetes.

Achievements 2018

Our research group has been involved in studies of autoimmunity in type 2 diabetes in the HUNT study. The study demonstrated signs of autoimmune activity in some individuals who were later diagnosed and classified as having type 2 diabetes. This subgroup had an earlier onset of diabetes possibly because of lower β-cell function compared with other individuals who were diagnosed with type 2 diabetes.

We have also been involved in a study showing association between a macrophage chemo-attractant in mid-pregnancy and childhood risk of type 1 diabetes.

The group leader has been involved in the national decision to change HbA1c result unit from % to mmol/mol.

Ambitions 2019

Continue studies of proteomic analysis of insulin secreting cells. We will also study the effects of vitamin D on insulin secretion of human β-cells.

The group plans to establish and perform studies of clinical samples to evaluate the performance of additional markers of glucose homeostasis such as glycated albumin, fructosamine and 1,5-anhydroglucitol.

Photo: Fredrik Naumann/Felix Features

RESEARCH GROUP

The Norwegian Childhood Diabetes Registry (NCDR)

Group Leader: Torild Skrivarhaug

GROUP MEMBERS

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Kristin Andersen Bakke
MD

Yusman Kamaleri
PhD, statistician

Research focus

The main research focus in this population-based, nationwide childhood-onset diabetes registry:

1. Epidemiology in childhood-onset diabetes, focusing on incidence, prevalence, classification of childhood-onset diabetes in Norway, ethnicity and long-term complications and mortality.
2. Quality in childhood diabetes care – a nationwide prospective population-based study for research and quality improvement by means of benchmarking.
3. Clinical childhood diabetes, especially focusing on quality of life, diabetes treatment, co-morbidity, eating disorders and the transition from paediatric to adult diabetes care.

Ongoing studies

1. How do young people with T1DM experience transition from pediatric to adult health care? Classification of childhood-onset diabetes in Norway. To assess the epidemiology of different forms of diabetes and to classify incident cases on the basis of family history, clinical data, C-peptide, autoantibodies and HLA-genotypes.
2. The incidence of severe hypoglycaemia in children with T1D in Norway and in the Nordic countries.
3. The PAGE study (Prediction of Autoimmune diabetes and celiac disease in childhood by Genes and perinatal Environment).
4. Hypoglycemia in children and adolescents with T1D. To determine the prevalence of IAH (Impaired Awareness of Hypoglycemia). Population-based, nationwide study.
5. International HbA1c benchmarking in T1D: Do we need HbA1c variation in addition to average Hb1Ac values? International joint project.
6. Prevalence of monogenic diabetes in NCDR estimated by targeted deep sequencing. Treament implications?
7. The EURODIAB collaborative group established in 1988, 44 centers representing most European countries and Israel. To study the epidemiology of childhood-onset T1D in Europe.
8. Cardiovascular disease and end-stage renal disease in type 1 diabetes with onset before 15 years of age and long duration.
9. Developing and validation of a Norwegian PREM tool for childhood onset T1D.
10. Incidence of diabetes ketoacidosis at the onset of childhood onset T1D in children in the Nordic countries in the period 2010–2014.
11. Long-Term Sulfonylurea Response in KCNJ11 Neonatal Diabetes (SuResponsKIR)
12. Do different treatment options influence clinical parameters in childhood diabetes? An observational study based on data from the Norwegian Childhood Diabetes Registry.
13. Children and adolescents with type 1 diabetes and ADHD.
14. EU-IMI 2. NCDR is part of the INNODIA consortium.

At present 3 PhD students and 1 postdoc are directly involved in the projects.

Achievements 2018

Conducted two national survey of Patient Reported Experience Measure:

1. Parents to all children with T1D in NCDR were included. Report published.
2. All children with T1D age 12 years +, registered in NCDR and attending diabetes care at Oslo University Hospital, Haukeland University Hospital, Akershus University Hospital and Vestre Viken Hospital were included.

Ambitions 2019–2020

- One of the candidates will finish his PhD thesis in 2018.
- To publish data on incidence of severe hypoglycemia in children with T1D in Norway.
- To publish data on incidence of DKA at the onset of childhood onset T1D in children in the Nordic countries in the period 2010–2014.
- To engage a new PhD student in the project "Mortality in childhood-onset type 1 diabetes", to assess the relationship between socioeconomic status and mortality in T1D.

Photo: Fredrik Naumann/Felix Features

Theses 2018

SHADAB ABADPOUR Strategies to prevent islet cell damage by targeting micro-environmental stress - Implication for clinical islet transplantation, University of Oslo 2018.

ANNE B. BÆRUG Breastfeeding support: What works? A population-based pragmatic trial and a multi-ethnic cohort study, University of Oslo 2018.

ÅSE RUTH EGGEMOEN Vitamin D and pregnancy. Vitamin D deficiency and associations with gestational diabetes and neonatal body composition in a multi-ethnic population, University of Oslo 2018.

SUSANNA E. HANVOLD Health benefits two years after Roux-en-Y gastric bypass surgery and the effect of lifestyle intervention two to four years after surgery on weight regain and metabolic disturbances, University of Oslo 2018.

MAIA BLOMHOFF HOLM Placental transfer of proteogenic amino acids and taurine in healthy term pregnancies: a human in vivo study, University of Oslo 2018.

ANE MOE HOLME Studies of the human placenta in vivo - The role of the placenta in glucose transfer and secretion of anti-angiogenic factors, University of Oslo 2018.

KRISTINE KLOSTER-JENSEN Functional in vitro studies of immunosuppressive agents in human pancreatic islets, University of Oslo 2018.

NIELS GUNNAR JUEL Shoulder and hand diagnoses, stiffness and associated disability of the upper extremities in patients with type 1 diabetes for more than 45 years. The Dialong study, University of Oslo 2018.

Publications 2018

International Publications

Low-Frequency and Rare-Coding Variation Contributes to Multiple Sclerosis Risk. Cell 2018; 175:1679-1687.e1677

Abadpour S, Halvorsen B, Sahraoui A, Korsgren O, Aukrust P, Scholz H. Interleukin-22 reverses human islet dysfunction and apoptosis triggered by hyperglycemia and LIGHT. J Mol Endocrinol 2018; 60:171-183

Anquetil F, Mondanelli G, Gonzalez N, Rodriguez Calvo T, Zapardiel Gonzalo J, Krogvold L, Dahl-Jorgensen K, Van den Eynde B, Orabona C, Grohmann U, von Herrath MG. Loss of IDO1 Expression From Human Pancreatic beta-Cells Precedes Their Destruction During the Development of Type 1 Diabetes. Diabetes 2018; 67:1858-1866

Baerug A, Sletner L, Laake P, Fretheim A, Loland BF, Waage CW, Birkeland KI, Jenum AK. Recent gestational diabetes was associated with mothers stopping predominant breastfeeding earlier in a multi-ethnic population. Acta Paediatr 2018; 107:1028-1035

Bakke A, Tran AT, Dalen I, Cooper JG, Lovaas KF, Jenum AK, Berg TJ, Madsen TV, Nokleby K, Gjelsvik B, Claudi T, Skeie S, Carlsen S, Sandberg S, Thue G. Population, general practitioner and practice characteristics are associated with screening procedures for microvascular complications in Type 2 diabetes care in Norway. Diabet Med 2018;

Birkebaek NH, Kahlert J, Bjarnason R, Drivvoll AK, Johansen A, Konradsdottir E, Pundziute-Lycka A, Samuelsson U, Skrivarhaug T, Svensson J. Body mass index standard deviation score and obesity in children with type 1 diabetes in the Nordic countries. HbA1c and other predictors of increasing BMISDS. Pediatr Diabetes 2018; 19:1198-1205

Birkeland KI, Bodegard J, Norhammar A, Kuiper JG, Georgiado E, Beekman-Hendriks WL, Thuresson M, Pignot M, Herings RMC, Kooy A. How representative of a general type 2 diabetes population are patients included in cardiovascular outcome trials with SGLT2 inhibitors? A large European observational study. Diabetes, obesity & metabolism 2018;

Birkeland KI, Grill V, Wium C, McQueen MJ, Lopez-Jaramillo P, Lee SF, Gerstein HC. The association of basal insulin treatment versus standard care with outcomes in anti-GAD positive and negative subjects: A post-hoc analysis of the ORIGIN trial. Diabetes, obesity & metabolism 2019; 21:429-433

Bjertnaes O, Iversen HH, Skrivarhaug T. A randomized comparison of three data collection models for the measurement of parent experiences with diabetes outpatient care. BMC Med Res Methodol 2018; 18:95

Blom-Hogestol IK, Stubhaug A, Kristinsson JA, Mala T. Diagnosis and treatment of chronic abdominal pain 5 years after Roux-en-Y gastric bypass. Surg Obes Relat Dis 2018; 14:1544-1551

Bogsrud MP, Langslet G, Wium C, Johansen D, Svilaas A, Holven KB. Treatment goal attainment in children with familial hypercholesterolemia: A cohort study of 302 children in Norway. J Clin Lipidol 2018; 12:375-382

Bowman P, Sulen A, Barbetti F, Beltrand J, Svalastoga P, Codner E, Tessmann EH, Juliusson PB, Skrivarhaug T, Pearson ER, Flanagan SE, Babiker T, Thomas NJ, Shepherd MH, Ellard S, Klimes I, Szopa M, Polak M, Iafusco D, Hattersley AT, Njolstad PR. Effectiveness and safety of long-term treatment with sulfonylureas in patients with neonatal diabetes due to KCNJ11 mutations: an international cohort study. The lancet Diabetes & endocrinology 2018; 6:637-646

Cavender MA, Norhammar A, Birkeland KI, Jorgensen ME, Wilding JP, Khunti K, Fu AZ, Bodegard J, Blak BT, Wittbrodt E, Thuresson M, Fenici P, Hammar N, Kosiborod M. SGLT-2 Inhibitors and Cardiovascular Risk: An Analysis of CVD-REAL. J Am Coll Cardiol 2018; 71:2497-2506

Cejvanovic V, Kjaer LK, Morup Bergholdt HK, Henriksen T, Weimann A, Ellervik C, Poulsen HE. RNA oxidation and iron levels in patients with diabetes. Free Radic Biol Med 2018; 129:532-536

Charalampopoulos D, Hermann JM, Svensson J, Skrivarhaug T, Maahs DM, Akesson K, Warner JT, Holl RW, Birkebaek NH, Drivvoll AK, Miller KM, Svensson AM, Stephenson T, Hofer SE, Fredheim S, Kummernes SJ, Foster N, Hanberger L, Amin R, Rami-Merhar B, Johansen A, Dahl-Jorgensen K, Clements M, Hanas R. Exploring Variation in Glycemic Control Across and Within Eight High-Income Countries: A Cross-sectional Analysis of 64,666 Children and Adolescents With Type 1 Diabetes. Diabetes Care 2018; 41:1180-1187

Colli ML, Hill JLE, Marroqui L, Chaffey J, Dos Santos RS, Leete P, Coomans de Brachene A, Paula FMM, Op de Beeck A, Castela A, Marselli L, Krogvold L, Dahl-Jorgensen K, Marchetti P, Morgan NG, Richardson SJ, Eizirik DL. PDL1 is expressed in the islets of people with type 1 diabetes and is up-regulated by interferons-alpha and-gamma via IRF1 induction. EBioMedicine 2018; 36:367-375

Eggemoen AR, Waage CW, Sletner L, Gulseth HL, Birkeland KI, Jenum AK. Vitamin D, Gestational Diabetes, and Measures of Glucose Metabolism in a Population-Based Multiethnic Cohort. Journal of diabetes research 2018; 2018:8939235

Eich T, Stahle M, Gustafsson B, Horneland R, Lempinen M, Lundgren T, Rafael E, Tufveson G, Zur-Muhlen BV, Olerud J, Scholz H, Korsgren O. Calcium: A Crucial Potentiator for Efficient Enzyme Digestion of the Human Pancreas. Cell Transplant 2018; 27:1031-1038

Eide IA, Dorje C, Svensson M, Jenssen T, Hammarstrom C, Scott H, Bjerve KS, Christensen JH, Schmidt EB, Hartmann A, Asberg A, Reisaeter AV, Reinholt FP. Development of Kidney Transplant Fibrosis Is Inversely Associated With Plasma Marine Fatty Acid Level. J Ren Nutr 2018; 28:118-124

Elvebakk O, Tronstad C, Birkeland KI, Jenssen TG, Bjorgaas MR, Froslie KF, Godang K, Kalvoy H, Martinsen OG, Gulseth HL. Evaluation of Hypoglycaemia with Non-Invasive Sensors in People with Type 1 Diabetes and Impaired Awareness of Hypoglycaemia. Sci Rep 2018; 8:14722

Engebretsen KV, Blom-Hogestol IK, Hewitt S, Risstad H, Moum B, Kristinsson JA, Mala T. Anemia following Roux-en-Y gastric bypass for morbid obesity; a 5-year follow-up study. Scand J Gastroenterol 2018; 53:917-922

Eriksen BO, Smabrekke S, Jenssen TG, Mathisen UD, Norvik JV, Schei J, Schirmer H, Solbu MD, Stefansson VTN, Melsom T. Office and Ambulatory Heart Rate as Predictors of Age-Related Kidney Function Decline. Hypertension 2018; 72:594-601

Foss S, Nordheim E, Sorensen DW, Syversen TB, Midtvedt K, Asberg A, Dahl T, Bakkan PA, Foss AE, Geiran OR, Fiane AE, Line PD. First Scandinavian Protocol for Controlled Donation After Circulatory Death Using Normothermic Regional Perfusion. Transplantation direct 2018; 4:e366

Gagnum V, Saeed M, Stene LC, Leivestad T, Joner G, Skrivarhaug T. Low Incidence of End-Stage Renal Disease in Childhood-Onset Type 1 Diabetes Followed for Up to 42 Years. Diabetes Care 2018; 41:420-425

Guderud K, Maehlen MT, Nordang GBN, Viken MK, Andreassen BK, Molberg O, Flam ST, Lie BA. Lack of Association among Peptidyl Arginine Deiminase Type 4 Autoantibodies, PADI4 Polymorphisms, and Clinical Characteristics in Rheumatoid Arthritis. J Rheumatol 2018; 45:1211-1219

Heier M, Espeland CN, Brunborg C, Seljeflot I, Margeirsdottir HD, Hanssen KF, Fugelseth D, Dahl-Jorgensen K. Preserved endothelial function in young adults with type 1 diabetes. PLoS One 2018; 13:e0206523

Heier M, Stensaeth KH, Brunborg C, Seljeflot I, Margeirsdottir HD, Hanssen KF, Dahl-Jorgensen K. Increased arterial stiffness in childhood onset diabetes: a cardiovascular magnetic resonance study. Eur Heart J Cardiovasc Imaging 2018; 19:694-700

Heldal TF, Ueland T, Jenssen T, Hartmann A, Reisaeter AV, Aukrust P, Michelsen A, Asberg A. Inflammatory and related biomarkers are associated with post-transplant diabetes mellitus in kidney recipients: a retrospective study. Transpl Int 2018; 31:510-519

Henriksen T, Jenum AK, Thordarson HB, Holm HO, Gudim HB, Hanssen KF. Tidsskr Nor Laegeforen 2018; 138

Holm LJ, Krogvold L, Hasselby JP, Kaur S, Claessens LA, Russell MA, Mathews CE, Hanssen KF, Morgan NG, Koeleman BPC, Roep BO, Gerling IC, Pociot F, Dahl-Jorgensen K, Buschard K. Abnormal islet sphingolipid metabolism in type 1 diabetes. Diabetologia 2018; 61:1650-1661

Holm MB, Kristiansen O, Holme AM, Bastani NE, Horne H, Blomhoff R, Haugen G, Henriksen T, Michelsen TM. Placental release of taurine to both the maternal and fetal circulations in human term pregnancies. Amino Acids 2018; 50:1205-1214

Horwitz E, Krogvold L, Zhitomirsky S, Swisa A, Fischman M, Lax T, Dahan T, Hurvitz N, Weinberg-Corem N, Klochendler A, Powers AC, Brissova M, Jorns A, Lenzen S, Glaser B, Dahl-Jorgensen K, Dor Y. beta-Cell DNA Damage Response Promotes Islet Inflammation in Type 1 Diabetes. Diabetes 2018; 67:2305-2318

Iversen HH, Helland Y, Bjertnaes O, Skrivarhaug T. Parent experiences of diabetes care questionnaire (PEQ-DC): reliability and validity following a national survey in Norway. BMC Health Serv Res 2018; 18:774

Juel NG, Brox JI, Hellund JC, Holte KB, Berg TJ. The prevalence of radiological glenohumeral osteoarthritis in long-term type 1 diabetes: the Dialong shoulder study. Scand J Rheumatol 2018; 47:325-330

Juel NG, Brox JI, Hellund JC, Merckoll E, Holte KB, Berg TJ. Radiological glenohumeral osteoarthritis in long-term type 1 diabetes. Prevalence and reliability of three classification systems. The Dialong shoulder study. Skeletal Radiol 2018; 47:1245-1251

Kelly CB, Hookham MB, Yu JY, Jenkins AJ, Nankervis AJ, Hanssen KF, Garg SK, Scardo JA, Hammad SM, Menard MK, Aston CE, Lyons TJ. Subclinical First Trimester Renal Abnormalities Are Associated With Preeclampsia in Normoalbuminuric Women With Type 1 Diabetes. Diabetes Care 2018; 41:120-127

Kjaer LK, Oellgaard J, Henriksen T, Gaede P, Pedersen O, Poulsen HE. Indicator of RNA oxidation in urine for the prediction of mortality in patients with type 2 diabetes and microalbuminuria: A post-hoc analysis of the Steno-2 trial. Free Radic Biol Med 2018; 129:247-255

Kosiborod M, Birkeland KI, Cavender MA, Fu AZ, Wilding JP, Khunti K, Holl RW, Norhammar A, Jorgensen ME, Wittbrodt ET, Thuresson M, Bodegard J, Hammar N, Fenici P. Rates of myocardial infarction and stroke in patients initiating treatment with SGLT2-inhibitors versus other glucose-lowering agents in real-world clinical practice: Results from the CVD-REAL study. Diabetes, obesity & metabolism 2018; 20:1983-1987

Kosiborod M, Cavender MA, Fu AZ, Wilding JP, Khunti K, Holl RW, Norhammar A, Birkeland KI, Jorgensen ME, Thuresson M, Arya N, Bodegard J, Hammar N, Fenici P. Response by Kosiborod et al to Letters Regarding Article, "Lower Risk of Heart Failure and Death in Patients Initiated on Sodium-Glucose Cotransporter-2 Inhibitors Versus Other Glucose-Lowering Drugs: The CVD-REAL Study (Comparative Effectiveness of Cardiovascular Outcomes in New Users of Sodium-Glucose Cotransporter-2 Inhibitors)". Circulation 2018; 137:989-991

Kuric E, Krogvold L, Hanssen KF, Dahl-Jorgensen K, Skog O, Korsgren O. No Evidence for Presence of Mucosal-Associated Invariant T Cells in the Insulitic Lesions in Patients Recently Diagnosed with Type 1 Diabetes. Am J Pathol 2018; 188:1744-1748

Lande A, Andersen I, Egeland T, Lie BA, Viken MK. HLA -A, -C, -B, -DRB1, -DQB1 and -DPB1 allele and haplotype frequencies in 4514 healthy Norwegians. Hum Immunol 2018; 79:527-529

Langslet G, Bogsrud MP, Wium C, Johansen D, Svilaas A, Holven KB. Some children with a familial hypercholesterolemia mutation may exhibit persistent low LDL levels. J Clin Lipidol 2018; 12:1327-1328

Lee S, Norheim F, Gulseth HL, Langleite TM, Aker A, Gundersen TE, Holen T, Birkeland KI, Drevon CA. Author Correction: Skeletal muscle phosphatidylcholine and phosphatidylethanolamine respond to exercise and influence insulin sensitivity in men. Sci Rep 2018; 8:7885

Lee S, Norheim F, Gulseth HL, Langleite TM, Aker A, Gundersen TE, Holen T, Birkeland KI, Drevon CA. Skeletal muscle phosphatidylcholine and phosphatidylethanolamine respond to exercise and influence insulin sensitivity in men. Sci Rep 2018; 8:6531

Lee S, Olsen T, Vinknes KJ, Refsum H, Gulseth HL, Birkeland KI, Drevon CA. Plasma Sulphur-Containing Amino Acids, Physical Exercise and Insulin Sensitivity in Overweight Dysglycemic and Normal Weight Normoglycemic Men. Nutrients 2018; 11

Lekva T, Godang K, Michelsen AE, Qvigstad E, Normann KR, Norwitz ER, Aukrust P, Henriksen T, Bollerslev J, Roland MCP, Ueland T. Prediction of Gestational Diabetes Mellitus and Pre-diabetes 5 Years Postpartum using 75 g Oral Glucose Tolerance Test at 14-16 Weeks' Gestation. Sci Rep 2018; 8:13392

Lindahl JP, Horneland R, Nordheim E, Hartmann A, Aandahl EM, Grzyb K, Haugaa H, Kjosen G, Asberg A, Jenssen T. Outcomes in Pancreas Transplantation With Exocrine Drainage Through a Duodenoduodenostomy Versus Duodenojejunostomy. Am J Transplant 2018; 18:154-162

Magnus MC, Olsen SF, Granstrom C, Lund-Blix NA, Svensson J, Johannesen J, Fraser A, Skrivarhaug T, Joner G, Njolstad PR, Stordal K, Stene LC. Paternal and maternal obesity but not gestational weight gain is associated with type 1 diabetes. Int J Epidemiol 2018; 47:417-426

Magnus MC, Tapia G, Olsen SF, Granstrom C, Marild K, Ueland PM, Midttun O, Svensson J, Johannesen J, Skrivarhaug T, Joner G, Njolstad PR, Stordal K, Stene LC. Parental Smoking and Risk of Childhood-onset Type 1 Diabetes. Epidemiology 2018; 29:848-856

Majak GB, Reisaeter AV, Weedon-Fekjaer H, Henriksen T, Michelsen TM. The Effect of Pregnancy on the Long-term Risk of Graft Loss, Cardiovascular Disease, and Death in Kidney Transplanted Women in Norway: A Retrospective Cohort Study. Transplantation 2018; 102:e391-e396

Mala T, Hogestol I. Abdominal Pain After Roux-En-Y Gastric Bypass for Morbid Obesity. Scand J Surg 2018; 107:277-284

Melsom T, Solbu MD, Schei J, Stefansson VTN, Norvik JV, Jenssen TG, Wilsgaard T, Eriksen BO. Mild Albuminuria Is a Risk Factor for Faster GFR Decline in the Nondiabetic Population. Kidney international reports 2018; 3:817-824

Moen GH, LeBlanc M, Sommer C, Prasad RB, Lekva T, Normann KR, Qvigstad E, Groop L, Birkeland KI, Evans DM, Froslie KF. Genetic determinants of glucose levels in pregnancy: genetic risk scores analysis and GWAS in the Norwegian STORK cohort. Eur J Endocrinol 2018; 179:363-372

Moen GH, Qvigstad E, Birkeland KI, Evans DM, Sommer C. Are serum concentrations of vitamin B-12 causally related to cardiometabolic risk factors and disease? A Mendelian randomization study. Am J Clin Nutr 2018; 108:398-404

Muilwijk M, Nicolaou M, Qureshi SA, Celis-Morales C, Gill JMR, Sheikh A, Sattar N, Beune E, Jenum AK, Stronks K, van Valkengoed IGM. Dietary and physical activity recommendations to prevent type 2 diabetes in South Asian adults: A systematic review. PLoS One 2018; 13:e0200681

Nordheim E, Birkeland KI, Asberg A, Hartmann A, Horneland R, Jenssen T. Preserved insulin secretion and kidney function in recipients with functional pancreas grafts one year after transplantation. Eur J Endocrinol 2018;

Nordheim E, Horneland R, Aandahl EM, Grzyb K, Aabakken L, Paulsen V, Midtvedt K, Hartmann A, Jenssen T. Pancreas transplant rejection episodes are not revealed by biopsies of the donor duodenum in a prospective study with paired biopsies. Am J Transplant 2018; 18:1256-1261

Nosrati E, Jenum AK, Tran AT, Marmot SM, Peter King L. Ethnicity and place: the geography of diabetes inequalities under a strong welfare state. Eur J Public Health 2018; 28:30-34

Persson F, Bodegard J, Lahtela JT, Nystrom T, Jorgensen ME, Jensen ML, Gulseth HL, Thuresson M, Hoti F, Nathanson D, Norhammar A, Birkeland KI, Eriksson JG, Eriksson JW. Different patterns of second-line treatment in type 2 diabetes after metformin monotherapy in Denmark, Finland, Norway and Sweden (D360 Nordic): A multinational observational study. Endocrinology, diabetes & metabolism 2018; 1:e00036

Qvigstad E. The diversity of gestational diabetes: a therapeutic challenge. Eur J Endocrinol 2018; 178:C1-c5

Reddy S, Krogvold L, Martin C, Holland R, Choi J, Woo H, Wu F, Dahl-Jorgensen K. Distribution of IL-1beta immunoreactive cells in pancreatic biopsies from living volunteers with new-onset type 1 diabetes: comparison with donors without diabetes and with longer duration of disease. Diabetologia 2018; 61:1362-1373

Ruiz PLD, Stene LC, Bakken IJ, Haberg SE, Birkeland KI, Gulseth HL. Decreasing incidence of pharmacologically and non-pharmacologically treated type 2 diabetes in Norway: a nationwide study. Diabetologia 2018; 61:2310-2318

Ruiz PLD, Stene LC, Gulseth HL, Tapia G, Trogstad L, Bakken IJ, Haberg SE. Pandemic Influenza A H1N1 Vaccination and Subsequent Risk of Type 1 Diabetes in Norway. Epidemiology 2018; 29:e6-e8

Ruiz PLD, Tapia G, Bakken IJ, Haberg SE, Hungnes O, Gulseth HL, Stene LC. Pandemic influenza and subsequent risk of type 1 diabetes: a nationwide cohort study. Diabetologia 2018; 61:1996-2004

Schuetz C, Anazawa T, Cross SE, Labriola L, Meier RPH, Redfield RR, 3rd, Scholz H, Stock PG, Zammit NW. beta Cell Replacement Therapy: The Next 10 Years. Transplantation 2018; 102:215-229

Schwettmann L, Berg JP, Sandberg S. Tidsskr Nor Laegeforen 2018; 138

Shakeel N, Richardsen KR, Martinsen EW, Eberhard-Gran M, Slinning K, Jenum AK. Physical activity in pregnancy and postpartum depressive symptoms in a multiethnic cohort. J Affect Disord 2018; 236:93-100

Shakeel N, Sletner L, Falk RS, Slinning K, Martinsen EW, Jenum AK, Eberhard-Gran M. Prevalence of postpartum depressive symptoms in a multiethnic population and the role of ethnicity and integration. J Affect Disord 2018; 241:49-58

Skaare H, Svensson M, Jenssen T, Asberg A, Schmidt EB, Chandra A, Ueland T, Mollnes TE, Hartmann A, Eide IA. Plasma n-6 Polyunsaturated Fatty Acid Levels and Survival in Renal Transplantation. J Ren Nutr 2018; 28:333-339

Skrivarhaug T, Stordal K, Stene LC. [What can be done to prevent delayed diagnosis of type 1 diabetes in children?]. Tidsskr Nor Laegeforen 2018; 138

Sletner L, Mahon P, Crozier SR, Inskip HM, Godfrey KM, Chiesa S, Bhowruth DJ, Charakida M, Deanfield J, Cooper C, Hanson M. Childhood Fat and Lean Mass: Differing Relations to Vascular Structure and Function at Age 8 to 9 Years. Arterioscler Thromb Vasc Biol 2018; 38:2528-2537

Sokolova M, Sahraoui A, Hoyem M, Ogaard J, Lien E, Aukrust P, Yndestad A, Ranheim T, Scholz H. NLRP3 inflammasome mediates oxidative stress-induced pancreatic islet dysfunction. Am J Physiol Endocrinol Metab 2018; 315:E912-e923

Solbu MD, Kolset SO, Jenssen TG, Wilsgaard T, Lochen ML, Mathiesen EB, Melsom T, Eriksen BO, Reine TM. Gender differences in the association of syndecan-4 with myocardial infarction: The population-based Tromso Study. Atherosclerosis 2018; 278:166-173

Sommer C, Lee S, Gulseth HL, Jensen J, Drevon CA, Birkeland KI. Soluble Leptin Receptor Predicts Insulin Sensitivity and Correlates With Upregulation of Metabolic Pathways in Men. J Clin Endocrinol Metab 2018; 103:1024-1032

Sorgjerd EP, Asvold BO, Thorsby PM, Grill V. Individuals Fulfilling Criteria for Type 2 Diabetes Rather Than LADA Display Transient Signs of Autoimmunity Preceding Diagnosis With Possible Clinical Implications: The HUNT Study. Diabetes Care 2018; 41:e161-e163

Stefansson VTN, Schei J, Solbu MD, Jenssen TG, Melsom T, Eriksen BO. Metabolic syndrome but not obesity measures are risk factors for accelerated age-related glomerular filtration rate decline in the general population. Kidney Int 2018; 93:1183-1190

Stordal K, McArdle HJ, Hayes H, Tapia G, Viken MK, Lund-Blix NA, Haugen M, Joner G, Skrivarhaug T, Marild K, Njolstad PR, Eggesbo M, Mandal S, Page CM, London SJ, Lie BA, Stene LC. Prenatal iron exposure and childhood type 1 diabetes. Sci Rep 2018; 8:9067

Tapia G, Stordal K, Marild K, Kahrs CR, Skrivarhaug T, Njolstad PR, Joner G, Stene LC. Antibiotics, acetaminophen and infections during prenatal and early life in relation to type 1 diabetes. Int J Epidemiol 2018; 47:1538-1548

Thorsen SU, Marild K, Olsen SF, Holst KK, Tapia G, Granstrom C, Halldorsson TI, Cohen AS, Haugen M, Lundqvist M, Skrivarhaug T, Njolstad PR, Joner G, Magnus P, Stordal K, Svensson J, Stene LC. Lack of Association Between Maternal or Neonatal Vitamin D Status and Risk of Childhood Type 1 Diabetes: A Scandinavian Case-Cohort Study. Am J Epidemiol 2018; 187:1174-1181

Thuresson M, Cavender MA, Fu AZ, Wilding JP, Khunti K, Holl RW, Norhammar A, Birkeland KI, Jorgensen ME, Wittbrodt E, Hammar N, Fenici P, Kosiborod M. Comment on Suissa. Lower Risk of Death With SGLT2 Inhibitors in Observational Studies: Real or Bias? Diabetes Care 2018;41:6-10. Diabetes Care 2018; 41:e106-e108

Toftemo I, Jenum AK, Lagerlov P, Juliotausson PB, Falk RS, Sletner L. Contrasting patterns of overweight and thinness among preschool children of different ethnic groups in Norway, and relations with maternal and early life factors. BMC Public Health 2018; 18:1056

Torbjornsen A, Smastuen MC, Jenum AK, Arsand E, Ribu L. Acceptability of an mHealth App Intervention for Persons With Type 2 Diabetes and its Associations With Initial Self-Management: Randomized Controlled Trial. JMIR mHealth and uHealth 2018; 6:e125

Torbjornsen A, Smastuen MC, Jenum AK, Arsand E, Ribu L. The Service User Technology Acceptability Questionnaire: Psychometric Evaluation of the Norwegian Version. JMIR human factors 2018; 5:e10255

Tran AT, Bakke A, Berg TJ, Gjelsvik B, Mdala I, Nokleby K, Shakil Rai A, Cooper JG, Claudi T, Lovaas K, Thue G, Sandberg S, Jenum AK. Are general practitioners characteristics associated with the quality of type 2 diabetes care in general practice? Results from the Norwegian ROSA4 study from 2014. Scand J Prim Health Care 2018; 36:170-179

Vecchio F, Lo Buono N, Stabilini A, Nigi L, Dufort MJ, Geyer S, Rancoita PM, Cugnata F, Mandelli A, Valle A, Leete P, Mancarella F, Linsley PS, Krogvold L, Herold KC, Elding Larsson H, Richardson SJ, Morgan NG, Dahl-Jorgensen K, Sebastiani G, Dotta F, Bosi E, Battaglia M. Abnormal neutrophil signature in the blood and pancreas of presymptomatic and symptomatic type 1 diabetes. JCI insight 2018; 3

Vedal TSJ, Steen NE, Birkeland KI, Dieset I, Reponen EJ, Laskemoen JF, Rodevand L, Melle I, Andreassen OA, Molden E, Jonsson EG. Response: Are thyroid abnormalities only related to antipsychotic treatment in patients with severe mental disorders? J Psychiatr Res 2018;

Vedal TSJ, Steen NE, Birkeland KI, Dieset I, Reponen EJ, Laskemoen JF, Rodevand L, Melle I, Andreassen OA, Molden E, Jonsson EG. Free thyroxine and thyroid-stimulating hormone in severe mental disorders: A naturalistic study with focus on antipsychotic medication. J Psychiatr Res 2018; 106:74-81

Vistnes M, Tapia G, Marild K, Midttun O, Ueland PM, Viken MK, Magnus P, Berg JP, Gillespie KM, Skrivarhaug T, Njolstad PR, Joner G, Stordal K, Stene LC. Plasma immunological markers in pregnancy and cord blood: A possible link between macrophage chemo-attractants and risk of childhood type 1 diabetes. Am J Reprod Immunol 2018; 79

von During ME, Jenssen T, Bollerslev J, Godang K, Hartmann A, Asberg A. Arterial stiffness is associated with visceral fat mass in kidney transplanted patients-A nationwide cohort study. Clin Transplant 2018; 32:e13341

Wisting L, Skrivarhaug T, Dahl-Jorgensen K, Ro O. Prevalence of disturbed eating behavior and associated symptoms of anxiety and depression among adult males and females with type 1 diabetes. Journal of eating disorders 2018; 6:28

Accepted papers

Bornstedt ME, Gjerlaugsen N, Pepaj M, Bredahl MKL, Thorsby PM. Vitamin D Increases Glucose Stimulated Insulin Secretion from Insulin Producing Beta Cells (INS1E). International journal of endocrinology and metabolism 2019; 17:e74255

Brekke I, Richardsen KR, Jenum AK. Sickness absence in pregnancy and sedentary behavior: a population-based cohort study from Norway. BMC Public Health 2019; 19:71

Chandra A, Svensson M, Asberg A, Schmidt EB, Bjerve KS, Jenssen T, Hartmann A, Ueland T, Eide IA. Trans-fatty Acids and Survival in Renal Transplantation. J Ren Nutr 2019; 29:169-180

Cinek O, Kramna L, Mazankova K, Kunteova K, Chuda K, E CJC, Stene LC, Tapia G. Virus genotyping by massive parallel amplicon sequencing: adenovirus and enterovirus in the Norwegian MIDIA study. J Med Virol 2019; 91:606-614

Davies TT, Graue M, Igland J, Tell GS, Birkeland KI, Peyrot M, Haltbakk J. Diabetes prevalence among older people receiving care at home: associations with symptoms, health status and psychological well-being. Diabet Med 2019; 36:96-104

Eide IA, Reinholt FP, Jenssen T, Hartmann A, Schmidt EB, Asberg A, Bergan S, Brabrand K, Svensson M. Effects of marine n-3 fatty acid supplementation in renal transplantation: A randomized controlled trial. Am J Transplant 2019; 19:790-800

Heier M, Ofstad AP, Borja MS, Brunborg C, Endresen K, Gullestad L, Birkeland KI, Johansen OE, Oda MN. High-density lipoprotein function is associated with atherosclerotic burden and cardiovascular outcomes in type 2 diabetes. Atherosclerosis 2019; 282:183-187

Kinnunen TI, Richardsen KR, Sletner L, Torgersen L, Sommer C, Waage CW, Mdala I, Jenum AK. Ethnic differences in body mass index trajectories from 18 years to postpartum in a population-based cohort of pregnant women in Norway. BMJ open 2019; 9:e022640

Korsmo-Haugen HK, Brurberg KG, Mann J, Aas AM. Carbohydrate quantity in the dietary management of type 2 diabetes: A systematic review and meta-analysis. Diabetes, obesity & metabolism 2019; 21:15-27

Michelsen TM, Henriksen T, Reinhold D, Powell TL, Jansson T. The human placental proteome secreted into the maternal and fetal circulations in normal pregnancy based on 4-vessel sampling. FASEB J 2019; 33:2944-2956

Michelsen TM, Holme AM, Holm MB, Roland MC, Haugen G, Powell TL, Jansson T, Henriksen T. Uteroplacental Glucose Uptake and Fetal Glucose Consumption: A Quantitative Study in Human Pregnancies. J Clin Endocrinol Metab 2019; 104:873-882

Moore TM, Zhou Z, Cohn W, Norheim F, Lin AJ, Kalajian N, Strumwasser AR, Cory K, Whitney K, Ho T, Ho T, Lee JL, Rucker DH, Shirihai O, van der Bliek AM, Whitelegge JP, Seldin MM, Lusis AJ, Lee S, Drevon CA, Mahata SK, Turcotte LP, Hevener AL. The impact of exercise on mitochondrial dynamics and the role of Drp1 in exercise performance and training adaptations in skeletal muscle. Molecular metabolism 2019; 21:51-67

Naess-Andresen ML, Eggemoen AR, Berg JP, Falk RS, Jenum AK. Serum ferritin, soluble transferrin receptor, and total body iron for the detection of iron deficiency in early pregnancy: a multiethnic population-based study with low use of iron supplements. Am J Clin Nutr 2019; 109:566-575

Patterson CC, Harjutsalo V, Rosenbauer J, Neu A, Cinek O, Skrivarhaug T, Rami-Merhar B, Soltesz G, Svensson J, Parslow RC, Castell C, Schoenle EJ, Bingley PJ, Dahlquist G, Jarosz-Chobot PK, Marciulionyte D, Roche EF, Rothe U, Bratina N, Ionescu-Tirgoviste C, Weets I, Kocova M, Cherubini V, Rojnic Putarek N, deBeaufort CE, Samardzic M, Green A. Trends and cyclical variation in the incidence of childhood type 1 diabetes in 26 European centres in the 25 year period 1989-2013: a multicentre prospective registration study. Diabetologia 2019; 62:408-417

Tapia G, Marild K, Dahl SR, Lund-Blix NA, Viken MK, Lie BA, Njolstad PR, Joner G, Skrivarhaug T, Cohen AS, Stordal K, Stene LC. Maternal and Newborn Vitamin D-Binding Protein, Vitamin D Levels, Vitamin D Receptor Genotype, and Childhood Type 1 Diabetes. Diabetes Care 2019; 42:553-559

Ueland T, Michelsen AE, Aukrust P, Henriksen T, Bollerslev J, Lekva T. Adipokines and macrophage markers during pregnancy-Possible role for sCD163 in prediction and progression of gestational diabetes mellitus. Diabetes Metab Res Rev 2019; 35:e3114

von Zur-Muhlen B, Lundgren T, Bayman L, Berne C, Bridges N, Eggerman T, Foss A, Goldstein J, Jenssen T, Jorns C, Morrison Y, Ryden M, Schwieger T, Tufveson G, Nilsson B, Korsgren O. Open Randomized Multicenter Study to Evaluate Safety and Efficacy of Low Molecular Weight Sulfated Dextran in Islet Transplantation. Transplantation 2019; 103:630-637

Invited speaker / oral presentations / poster presentations

Invited speaker

Jenssen, T. Insulin secretion and immunosuppression related pathogenesis of PTDM. 55th ERA-EDTA Congress, May 24–27, 2018, Copenhagen, Denmark.

Jenssen, T. How do we follow a Fabry patient? 55th ERA-EDTA Congress, May 24–27, 2018, Copenhagen, Denmark.

Jenssen, T. Old and new therapeutic strategies for new onset diabetes after transplantation. Spanish Society of Transplantation, Madrid, Spain.

Oral and poster presentations

Abadpour S et.al (Shadab Abadpour won the AIDPIT&EPITA award for oral presentation) GPR44 inhibition enhances function and survival of isolated human islets after transplantation. 8th EPITA Symposium & 37th AIDPIT Workshop Innsbruck, January 2018, Austria.

Abadpour S et.al (Shadab Abadpour won Best student Presentation award). Bioprinting of biomimetic pancreas. 15th Annual Norwegian Stem Cell Networking Meeting, UiO, September 2018, UiO, Oslo.

Abadpour S et.al. Poster presentation for the Abstract: 3D Bioprinting of biomimetic pancreas. Scandinavian Society for Biomaterials 2018, Gothenburg, Sweden.

Cherubini V, Hermann J, Åkesson K, Birkebæk NH, Cinek O, Dovc K, Gesuita R, Gregory JW, Hanas R, Hofer S, Holl R, Jefferies C, Joner G, King BR, Mayer-Davis EJ, Pena AS, Rami-Merhar B, Schierloh U, Skrivarhaug T, Sumnik Z, Svensson J, Warner JT, Bratina N, Dabelea D. DKA at onset of paediatric type 1 diabetes across the world: results from a Joint International. 44th Annual Conference of the International Society for Pediatric and Adolescent Diabetes, October 11 - 14, 2018, Hyderabad, India.

Cinek O, Kramna L, Kunteova K, Mazánková K, Chudá K, Tapia G, Stene LC. Genotyping of enterovirus and adenovirus using next generation amplicon sequencing: one tenth of gut infections in the Norwegian MIDIA study are caused by two or more serotypes. abstract ID 3243 for the 28th European Congress of Clinical Microbiology and Infectious Diseases (ECCMID)2018, Vienna, Austria.

Cinek O, Kramna L, Tapia G, Mazankova K, Stene LC, Ronningen KS. Gut virome in infants and young children developing islet autoimmunity. Abstract. Poster presentation at the Immunology of Diabetes Society (IDS) conference, Oct 25–29, 2018, London, UK.

Gulseth H, Nordheim F, Lee-Ødegård S, Langleite T, Drevon C, Birkeland K. Beneficial effects of three months exercise on plasma adipokines levels and inflammation-related gene expression in subcutaneous adipose tissue in men with prediabetes. 54th EASD Annual Meeting of the European Association for the Study of Diabetes, 1–5 October 2018, Berlin, Germany.

Hatle H, Bjørgo M, Skrivarhaug T, Rø T. Prevalence and Predictors of Impaired Awareness of Hypoglycemia in a contemporary pediatric Type 1 diabetes population – The Norwegian Childhood Diabetes Registry (NCDR). 44th Annual Conference of the International Society for Pediatric and Adolescent Diabetes, October 11 - 14, 2018, Hyderabad, India.

Jenum AK, Brekke I, Mdala I, Muilwijk M, Ramachandran A, Kjøllesdal M, Andersen E, Richardsen KR, Douglas A, Cezard G, Sheikh A, Celis-Morales CA, Gill JMR, Sattar N, Bhopal, R.S., Beune EJA, Stronks K, Vandvik PO, van Valkengoed IGM. Effects of dietary and physical activity interventions on the risk of type 2 diabetes in South Asians: individual participant data meta-analysis of randomised controlled trials. 54th EASD Annual Meeting of the European Association for the Study of Diabetes, 1–5 October 2018, Berlin, Germany.

Kinnunen TI, Richardsen KR, Sommer C, Sletner L Waage CW, Mdala I, Torgersen L, Jenum AK. Ethnic differences in body mass index trajectories from 18 years to 3 months postpartum in a cohort in Norway. Poster, The 1st World Congress on Migration, Ethnicity and Health, 17.-19. May 2018, Edinburgh, UK.

Krogvold L. Exploring CXCL10 expression pattern in pancreatic islets in autoimmune diabetes: a new role for alpha-cells in lymphocytes recruitment? 44th Annual Conference of the International Society for Pediatric and Adolescent Diabetes, October 11–14, 2018, Hyderabad, India.

Kummernes SJ, Drivvoll AK, Skrivarhaug T. Use of real-time continuous glucose monitoring (RT-CGM) and bolus-calculator gave better metabolic control - The Norwegian Childhood Diabetes Registry (NCDR). 44th Annual Conference of the International Society for Pediatric and Adolescent Diabetes, October 11–14, 2018, Hyderabad, India.

Kvitne K.E., Halden T.A.S., Åsberg A., Midtvedt K., Hartmann A., Jenssen T. Efficacy and safety with empagliflozin in renal transplant recipients with post-transplant diabetes mellitus. American Transplantation Congress (ATC), June 2–6, 2018, Seattle, USA.

Lee-Ødegård S, Refsum H, Langleite T, Gulseth H, Drevon C, Birkeland K. Plasma branched-chain amino acids predict change in insulin sensitivity after exercise training. 54th EASD Annual Meeting of the European Association for the Study of Diabetes, 1–5 October 2018, Berlin, Germany.

Lund-Blix NA, Mårild K, Tapia G, Norris JM, Joner G, Stene LC, Størdal K. Gluten intake in early childhood and risk of celiac disease: A nationwide cohort study.", Abstract presentation at the Pediatric Academic Societies (PAS) 2018 Meeting, May 5–8, in Toronto, Canada.

Lund-Blix NA, Dong F, Mårild K, Seifert J, Baron A, Waugh KC, Joner G, Størdal K, Tapia G, Stene LC, Johnson RK, Rewers MJ, Norris JM. Gluten Intake and Risk of Islet Autoimmunity and Progression to Type 1 Diabetes in Children at Increased Risk of Disease. Oral presentation at the American Diabetes Association (ADA) 78th Scientific Sessions, June 2018, Orlando, Florida, USA.

Magnus MC, Tapia G, Olsen SF, Granstrom C, Mårild K, Ueland PM, Midttun Ø, Svensson J, Johannesen J, Skrivarhaug T, Joner G, Njølstad PR, Størdal K, Stene LC. Parental smoking and risk of childhood-onset type 1 diabetes. Oral abstract presentation at European Diabetes Epidemiology Group (EDEG) annual meeting, April 21–24, 2018, Helsinore, Denmark.

Nordheim, E., et al. Donor- derived Strongyloidiasis after organ transplantation in Norway. Congress of the Scandinavian Transplant Society, Mai 2018, Oslo.

Nordheim E, et al. Preserved insulin secretion and kidney function one year after successful pancreas transplantation. Congress of the Scandinavian Transplant Society, Mai 2018, Oslo.

Nordehim E, et al. Velbevart insulinsekresjon og nyrefunksjon 1 år etter vellukka pankreastransplantasjon. Vårmøtet til Norsk Nyremedisinsk forening, Juni 2018, Bodø.

Persson F, Thuresson M, Soendergaard J, Nilsson DM, Lindh A, Knudsen S, Jørgensen ME, Gulseth H, Furuseth K, Bodegard J, Birkeland K, Alvarsson M. Proportion of patients reaching HbA1c targets related to second-line treatment initiation: a Nordic observational study comparing type 2 diabetes management in primary care. 54th EASD Annual Meeting of the European Association for the Study of Diabetes, 1–5 October 2018, Berlin, Germany.

Ruiz PLD, Gulseth HL, Tapia G, Bakken IJ, Håberg SE, Stene LC. Pandemic influenza vaccination coverage in people with diabetes in Norway. Abstract (poster presentation) at European Diabetes Epidemiology Group (EDEG) annual meeting, April 21–24, 2018, Helsinore, Denmark.

Størdal K, McArdele H, Hayes H, Tapia G, Viken MK, Lund-Blix NA, Haugen M, Joner G, Skrivarhaug T, Mårlid K, Njølstad P, Lie BA, Stene LC. Prenatal iron exposure and risk of childhood type 1 diabetes. Abstract presentation at the Pediatric Academic Societies (PAS) 2018 Meeting, May 5–8, in Toronto, Canada.

Svensson J, KreinerS, Møller Sildorf S, Bøjstrup J, Skrivarhaug T, Hanberger L, Åkesson K, Frøisland DH, Chaplin J. The DISABKIDS Generic and Diabetes Modules are valid, but despite cross-cultural development results are not directly comparable in Denmark, Sweden and Norway. 44th Annual Conference of the International Society for Pediatric and Adolescent Diabetes, October 11–14, 2018, Hyderabad, India.

Tapia G, Mårild K, Dahl SR, Lund-Blix NA, Viken MK, Lie BA, Njølstad PR, Joner G, Skrivarhaug T, Cohen AS, Størdal K, Stene LC. Maternal and newborn vitamin D-binding protein, vitamin D levels, vitamin D receptor genotype, and childhood Type 1 diabetes. Abstract. Poster presentation at the Immunology of Diabetes Society (IDS) conference, Oct 25–29, 2018, London, UK.

Tapia G, Mortimer G, Ye J, Gillard B, Chipper-Keating S, Mårild K, Viken MK, Lie BA, Joner G, Skrivarhaug T, Njølstad PR, Størdal K, Gillespie KM, Stene LC. Maternal microchimerism in cord blood and risk of childhood-onset type 1 diabetes. Abstract. Poster presentation at the Immunology of Diabetes Society (IDS) conference, Oct 25–29, 2018, London, UK.

Tapia G, Mårild K, Dahl SR, Lund-Blix NA, Viken MK, Lie BA, Njølstad PR, Joner G, Skrivarhaug T, Cohen AS, Størdal K, Stene LC. Maternal and newborn vitamin D-binding protein, vitamin D levels, vitamin D receptor genotype, and childhood Type 1 diabetes. Abstract. Oral presentation at the Norwegian Epidemiological Association (NOFE) annual conference, Nov 14-15, 2018, Trondheim.

Tran AT, Gjelsvik B, Berg TJ, Nøkleby K, Cooper JG, Bakke Å, Claudi T, Sandberg S, Thue G, Jenum AK. The influences of ethnicity on the quality of type 2 diabetes care in Norwegian general practice. 54th EASD Annual Meeting of the European Association for the Study of Diabetes, 1–5 October 2018, Berlin, Germany.

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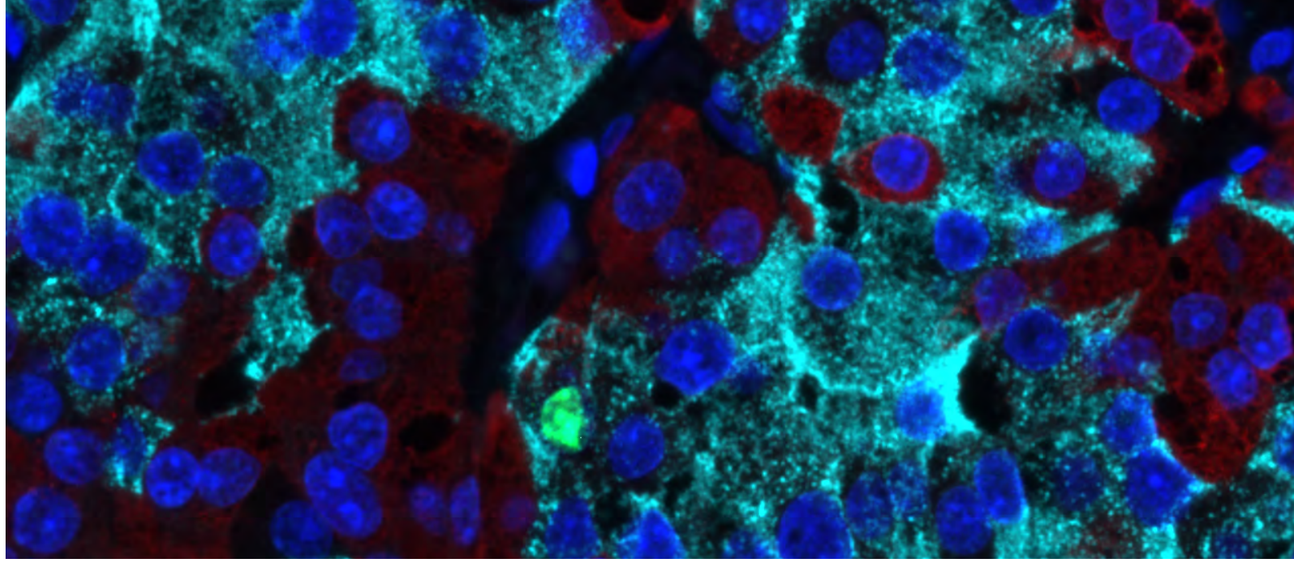

Beta cell signaling. Photo: Pia Leete, University of Exeter

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