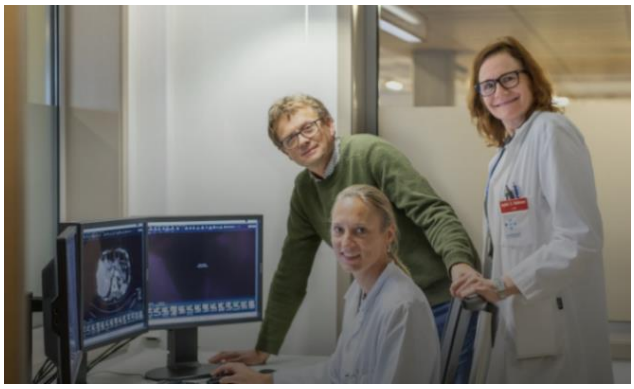
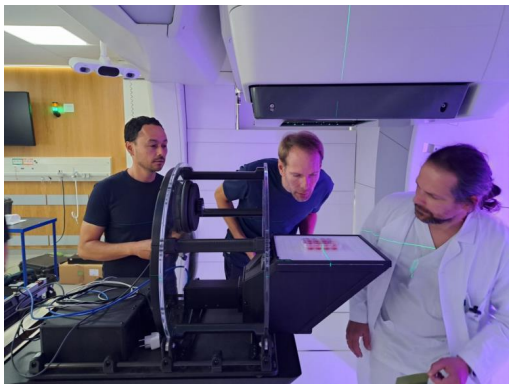
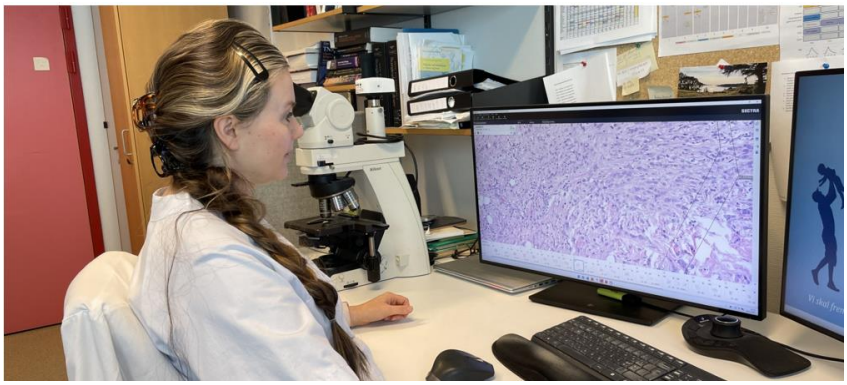



HAUKELAND CCC

Scientific report

Cancer research

2025

The third C in CCC

The development of Haukeland Comprehensive Cancer Centre (Haukeland CCC) is driven by quality, insight, and continuous scientific progress. As the third C in CCC, research is central to our mission, linking research to better diagnostics, treatment, and patient outcomes.

As part of the OECI self-assessment, we gained valuable insight into our research structures, strengths, and the areas where further development is needed. Benchmarking against leading European centres has sharpened our focus, especially on increasing the number of clinical trials and patient inclusion.

The establishment of the CCC Research Council in April 2025 has strengthened coordination of research priorities, improved our overview of research groups, and supported cross-disciplinary collaboration and visibility.

One of the main priorities for the CCC Cancer Board has been to guide the CCC accreditation process. As the board has developed, we have also reviewed its composition and strengthened our collaboration with the University of Bergen. We have therefore invited Silje Skrede, Vice Dean of Research, Doctoral Education and Innovation, to join the board. Her participation helps ensure that research, education and innovation are closely connected to the clinical work and that we continue to develop the board's role as a shared platform for advancing cancer care. This adds on to the already established and strong collaboration between HUS and the academic institutions in our region.

This Scientific Report highlights the progress achieved across our research environments and reflects a growing culture of scientific quality, collaboration, and ambition.

On behalf of the Cancer Board

Oddbjørn Straume

Director of the Cancer Clinic

Chair of the Cancer Board at Haukeland CCC

Content

CCC Research Council

The CCC Research Council at Haukeland University Hospital was formally constituted in April 2025 and consists of 13 members, including a patient representative. The Council is dedicated to strengthening and advancing cancer research across the entire spectrum—from fundamental discoveries to patient-centred innovation. Its overarching goal is to position Haukeland CCC as a national hub of excellence in highly specialized cancer care, as well as in basic, translational, and clinical cancer research. This integrated approach supports the development of cutting-edge care, research, and education across all areas of the cancer field.

Working in close alignment with the CCC Cancer Board, the Research Council provides strategic advice and supports the overall direction of cancer research at the hospital. Throughout 2025, the Council held monthly meetings and established a shared situational awareness of ongoing research activity, infrastructure needs, and barriers to growth in clinical and translational research. In addition to responding to tasks assigned by the Cancer Board, the Research Council initiated and drove forward activities within defined strategic focus areas—particularly those related to clinical trials, research visibility, and cross-disciplinary collaboration.

The main focus in 2025 was on strengthening clinical and translational cancer research and enabling conditions for increased clinical trial activity. Key activities and contributions included:

- **Active participation in the hospital's Self-assessment process for OECI CCC accreditation**
  The Council contributed analyses and input related to research structure, strategic priorities, and support functions, with particular attention to clinical research capacity and readiness.
- **Mapping of cancer research groups across the hospital**
  The CCC Research Council initiated a structured mapping of cancer research groups to improve overview, identify strengths and gaps, support strategic prioritization, and strengthen internal collaboration and external visibility.
- **Establishment of CCC research webpages**
  The CCC Research Council contributed to the development of an improved digital platform to present research activity, research groups, and strategic focus areas, supporting transparency, recruitment, and collaboration.
- **Proposal for an external Scientific Advisory Board (SAB) for Haukeland CCC**
  The CCC Research Council proposed recommendations for external SAB representatives and meeting structure for the external SAB, aiming to ensure external strategic guidance, scientific quality input, and alignment with the CCC mission and strategy.
- **Comprehensive dialogue with clinical departments managing cancer patients**
  The CCC Research Council visited all relevant clinical departments to gain insight into their research strategies and portfolios. Based on these meetings, the CCC Research Council provided concrete input to the CCC Cancer Board on how the hospital can further increase the number of clinical trials, strengthen cross-disciplinary cooperation, and improve internal support functions that enable efficient study initiation and conduct.
- **Planning of a public event to showcase cancer research**
  The CCC Research Council initiated an open, outreach-oriented event aimed at increasing public awareness, strengthening patient and community engagement, and enhancing visibility of ongoing cancer research at Haukeland CCC. The event is scheduled for January 20th 2026

Across these activities, the CCC Research Council maintained a clear strategic orientation consistent with the CCC mission and strategy, including the need to improve structures for clinical trials, develop platforms within precision medicine and advanced therapies, strengthen systems for biobanking, and

facilitate interdisciplinary arenas for patient-centred research. The CCC Research Council also emphasized the importance of building national and international networks and systematically developing partnerships with patients and advocacy groups to ensure research remains aligned with patient needs and priorities.

In summary, 2025 was a foundational year in which the CCC Research Council established an effective meeting structure, delivered several core strategic contributions, and created strong momentum for future-oriented cancer research and care at Haukeland University Hospital—advancing scientific excellence while delivering value to patients and society.

Overview of cancer research groups at Haukeland CCC

(alphabetical order)

Anaesthesia and Surgical Services

- Research Group for Palliative care

Cancer Clinic

- ART-FORSEE – Network in adaptive radiotherapy for novel treatment strategies
- Brain Tumour Research group
- Bergen radiotherapy research group
- Cancer Caregiver Research Group
- The Norwegian Cancer Origin Research Group (NorCORG)
- Melanoma research group
- Mohn Cancer Research Laboratory
- Mohn Cancer Research Laboratory – Digestive High-Grade Neuroendocrine Neoplasms
- Sarcoma group Haukeland University Hospital

Children and Youth Clinic

- Oral Late Effects after Childhood Cancer Treatment Research Group
- Pediatric Oncology Research Group at Haukeland University Hospital

Department of Internal Medicine - Hematology

- PRECOS
- The Signaling-Targeted Research Group

Department of Radiology

- Bergen Cancer Imaging Research Group
- Bergen Tracer Development Center, part of 180 °N
- Neurostimulation and Brain Imaging Research Group (NBIG) and MMIV

Department of Thoracic Medicine

- Bergen Respiratory Reseach Group

Head and Neck Clinic

- Bergen Head and Neck Cancer Research Group

Laboratory Medicine and Pathology

- Brain Tumor & Microenvironment Research Group
- Breast Cancer of the Young – Bergen (BCY-B)
- Cancer cell plasticity and therapy resistance group
- Computational Pathology Bergen (COMPAT Bergen)
- Early Breast Cancer
- Experimental Pathology Research Group
- Hormone laboratory breast cancer research group
- InPreD Cancer Genomics
- Molecular Pathology of Pancreatic Disease
- Tumor Biology Research Group
- Western Norway Familial Cancer center (Regionalt kompetansesenter for arvelig kreft)

Neuro Clinic – Dept of Neurosurgery

- Neurosurgical research
- Paraneoplastic neurological syndromes

Surgical clinic

- Bergen Urological Research Group
- Colorectal cancer
- Gastrointestinal surgery research group

Women's Clinic

- Bergen Research Group for Gynecological Cancer
- GenderHealth at VID Specialized University
- Innovative Novel Ovarian Cancer Treatment Approaches (INOVA)

Overview of central/regional research support, core facilities and infrastructures

*) For additional research infrastructures affiliated at UiB, see page 69

Key Indicators in Cancer Research

2025

Completed Ph.D degrees:

14

Approx. cancer research costs:

€16.3 M

Number of new patients included in clinical trials:

201

Approx. Total number of FTEs in cancer research:

105

Number of active clinical trials:

80

Total number og peer-reviewed publications (with HUS first, second or last author)

203 (105)

Number of publications with impact factor >10 (with HUS first, second or last author)

23 (2)

Presentation of the research groups at Haukeland CCC

Anaesthesia and Surgical Services:

Research Group for Palliative Care

Website: Research Group for Palliative Care | UiB
Research Group Leader: Margrethe Aase Schaufel

Number of Group Members: 15

Research Focus:

- Incurable cancer, currently a special focus on lung cancer
- Clinical research and health services research

Research Focus: Research group for Palliative Care conducts a wide variety of studies regarding communication and decision-making in life-threatening disease, clinical ethics, symptom management, palliative surgery, organization of palliative care services, and end-of-life care.

Current Projects:

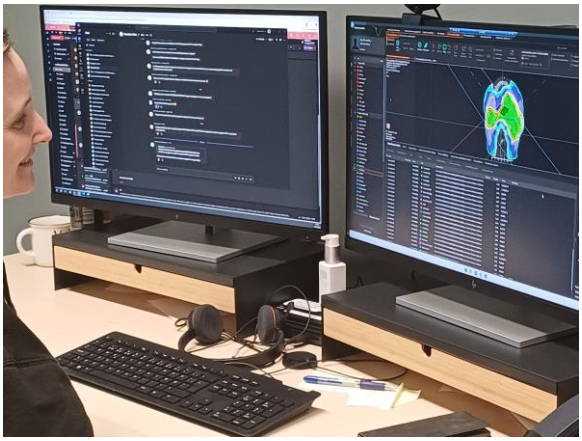
- SCAN-ONC (Scalable Natural Language Processing (NLP) for Tracking Clinical Data and Improving Healthcare in Oncology). A study applying NLP technology already implemented in healthcare systems in the United States which we will modify to the Norwegian language and documentation styles, validate, and operationalize to identify four domains of text-based data: 1) Pathology reports; 2) Symptoms and treatment toxicities; 3) Goals of care conversations; and 4) Palliative care quality indicators.
- iLIVE: Live well, die well. A research program to support living until the end. International multicenter study with participants from 13 countries. In Norway, two hospitals and a nursing home participate. The overall objective is to contribute to better care for the dying, by exploring the worries, expectations and choices of seriously ill and dying patients and their relatives.
- SAMKOM (SAMhandling om forhåndssamtaler i KOMmune- og spesialisthelsetjenesten/Collaboration on Advance Care Planning in Municipal and Specialist Health Services – an Implementation Study). A study investigating key factors and strategies for successful and sustainable Advance Care Planning collaboration between specialist palliative care, oncological care and the municipal health service. We will report findings regarding both implementation outcomes, health services outcomes and health outcomes.
- INCLUDE: Decision-making, communication and user experiences in precision cancer medicine for patients with advanced lung cancer. This study investigates a) treatment discussion and decision-making in Molecular Tumor Board (preMOL-MDT); b) clinicians' experience with referral to large gene panels; and c) patient experiences and communication about PCM.

Highlights for 2025:

- SCAN-ONC: software-training, ROS and data set access completed
- iLIVE: 5 papers published
- SAMKOM: intervention started (ACP-training)
- INCLUDE: 3 million NOK PhD grant from Stiftelsen Dam

Cancer Clinic

ART-FORSEE - Network in adaptive radiotherapy for novel treatment strategies



Research Group Leader: Grete May Engeseth

Number of Group Members: 5 senior researchers, 4 PhD students (1 to be hired in 2026). A total of 22 people is part of the network including researchers, user representative, clinicians and study personnel

Research Focus:

- Adaptive proton therapy
- Proton Relative Biological Effectiveness
- Head and neck cancer, Lung cancer, palliative radiotherapy
- Translational and clinical research

Research Focus: Adaptive radiotherapy (ART) enhances precision by accounting for anatomical and biological changes during radiotherapy. ART-FORSEE advances adaptive proton therapy across multiple disease sites, aiming to reduce toxicity, enable dose escalation, and address uncertainties in range and Relative Biological Effectiveness. The project also investigates ART integration in clinical trial design and the feasibility of same-day adaptive ART. Through clinical studies, in-silico simulations, and workflow innovation using automation, imaging, and biological modelling, ART-FORSEE will generate evidence to support broader clinical adoption of ART.

Current Projects:

- Adaptive proton therapy in head and neck cancer
- Adaptive proton therapy in lung cancer
- Impact of online adaptations on clinical trial design
- Same day palliative radiotherapy

Highlights for 2025:

- 3 PhD students hired
- 1 poster at ESTRO congress 2025
- Kick-off *Adaptive proton therapy lung cancer* and *Impact on online adaptions on clinical trial design*
- First patient included in the project Same-day palliative radiotherapy
- Submissions: 2 abstracts to ESTRO congress 2026, 1 manuscript to Physics and Imaging in Radiation Oncology

Radiotherapy research group

Research Group Leader: Liv Bolstad Hysing

Number of Group Members:
4 Researchers: Grete May Engeseth (HUS/OsloMet), Sara Pilskog (HUS/UiB), Camilla Stokkevåg (HUS/UiB) and Liv Bolstad Hysing (HUS/UiB), 1 postdoc, 5 PhD students and 14 Master students

Research Focus:

- Proton therapy and radiotherapy of Head and Neck, Childhood, Lung, Brain, Prostate and Rectal cancer as well as palliative care
- Pre-clinical and translational (both biological and technological)
- Clinical studies

Research Focus: Proton therapy is a major research focus in 2025, aligned with the clinical startup of our proton therapy program. It is a key radiotherapy modality in cancer treatment, used alone or in combination with other therapies. Our research spans both proton therapy and conventional photon-based radiotherapy. We conduct translational research integrating modeling, medical imaging, and in silico simulations to optimize treatment strategies, with a particular focus on biological responses to radiotherapy, including therapeutic effects and normal-tissue side effects. We also perform interventional radiotherapy studies and develop predictive dose–response models. In 2025, we initiated preclinical research that will be a future priority for understanding radiobiological mechanisms in proton versus conventional radiotherapy. Our group actively contributes to national and international research consortia, including NERR, RAPTOR+, and NOVO, with the overall aim of improving cancer outcomes by curing disease, prolonging survival, and alleviating symptoms.

Current Projects:

- TNT-RECORD: a clinical and translational study for rectal cancer
- NOVO: innovation research for dose verification in proton therapy
- PulmDIBH: simulation studies for improving radiotherapy for lung cancer
- NTCP: Late effects and patient selection to proton therapy for head and neck cancer patients
- LET's GO: LET Optimisation in paediatric proton therapy – Guideline development and clinical implementation
- PRORADNOR: PROton RADiotherapy in NORwegian head and neck cancer patients
- RAPTOR+: :Right-time Adaptive Particle Therapy Of CanceR

Highlights for 2025:

- Start-up of pre-clinical cell irradiation experiments in the dedicated proton research gantry
- PhD Andreas Havsgård Handeland, 26.06.2025 "Advancing Proton Therapy for Paediatric Cancer: The Role of Linear Energy Transfer in Predicting and Mitigating Brainstem Toxicity"
- PhD Johannes Tjelta, 11.06.2025 "Monte Carlo Simulations of Neutrons in Pediatric Proton Therapy: Exposure and Late Effects"
- Several research projects have received funding: protonSUMMIT, LET's GO, ENLUCA, Little Beams, Bio-precise protons

Brain Tumour Research Group

Research Group Leader: Dorota Goplen

Number of Group Members: 5

Research Focus:
The BORTEM-17 clinical trial has recruited 62 of the planned 63 patients. The preliminary data are planned to be published in 2026-2027.
Glio-Plate is an observational, prospective study of the platelet proteome and its potential role in diagnostics of high-grade glioma. The study revealed an altered platelet and exosome protein expression in tumour bearing patients compared to health individuals. The drafts of manuscripts are being edited and planned for submission soon.
PRO-GLIO is a multicentre international study with the primary objective is to show that proton therapy is non-inferior to photon therapy for patients with IDH-mutated diffuse grade 2 and 3 gliomas. The manuscript “Norwegian Consensus Guidelines for Selection of Neuro-Oncology Patients to Proton Therapy has been accepted for publication.
The Phase I Dose-Escalation Trial combining Sulfasalazine and Stereotactic radiosurgery in patients with recurrent Glioblastoma is completed and submitted for publication. A phase II trial is planned.

Current Projects:

- All projects are currently ongoing. BORTEM-17 was not completed in 2025. Including the last patient is planned.
- The recruitment to Glio-Plate is closed and the analysis in ongoing.
- The Pro-Glio is open and recruiting.

Cancer Caregiver Research Group

Pårørendeforskning i Kreftomsorg (PaFKO)

Research Group Leaders: Kari Britt Hagen and Karen Rosnes Gissum

Research Group Members: RN, PhD Kari Britt Hagen, RN PhD Karen Rosnes Gissum, RN MSc Marianne Ødegaard, RN MSc Åse Grøthe, RN PhD Sigrunn Drageset & RN Professor Sidsel Ellingsen

Research Focus: Family caregivers, cancer caregiving, caregiver needs, caregiver experiences, psychosocial challenges, emotional burden, support services, cancer survivorship, informal care, caregiver well-being, health service development, caregiver support interventions, caregiver role expectations.

Research Focus: The research group focuses on family caregivers of individuals who are undergoing, or have previously undergone, cancer treatment. As caregivers are increasingly expected to assume a more prominent role in the follow-up and care of cancer patients, our work aims to investigate their experiences and needs. By generating knowledge about the challenges and expectations associated with the caregiver role, we seek to support the development of services and interventions that ensure caregivers are better equipped and adequately supported to meet the demands placed upon them.

In addition, emerging findings from our own research indicate that caregivers of cancer patients often experience many of the same emotional responses and challenges as the patients themselves. This suggests a need for further investigation to better understand these parallels and to develop evidence-based measures that can more effectively address caregivers' psychological and practical burdens.

Current Projects:

- Qualitative research on relatives of breast cancer patients
- We plan to expand the project into a prospective study collecting both qualitative and quantitative data

Highlights for 2025:

- First paper was submitted in December 2025

The Norwegian Cancer Origin Research Group (NorCORG)

Research Group Leader: MD PhD Eli Sihn Samdal Steinskog

Research Group Members: MD PhD Eli Sihn Samdal Steinskog, MD PhD Kristine Aasebø, MD PhD Kjersti Elvestad Hestetun, MD PhD Kjersti Tefre Davidsen, MD PhD Hilde Ytre-Hauge Smeland, MD PhD Gry Sandvik Haaland.

Research Focus: Improved diagnostics and treatment approach for patients with advanced cancer of unknown origin (CUP)

Research Focus:
CUP is a rare cancer disease with poor prognosis with few treatment options. However, improved diagnostics with comprehensive molecular profiling has shown promising results regarding improved survival with a more personalised treatment approach. The group focuses on translational research to improve diagnostics, treatment, and outcomes for CUP patients by integrating clinical oncology, molecular profiling, pathology, and artificial intelligence. NorCORG collaborates closely with InPreD, IMPRESS-Norway, Mohn lab, Cancer Genomics, and Patologi i Vest.

Current Projects:

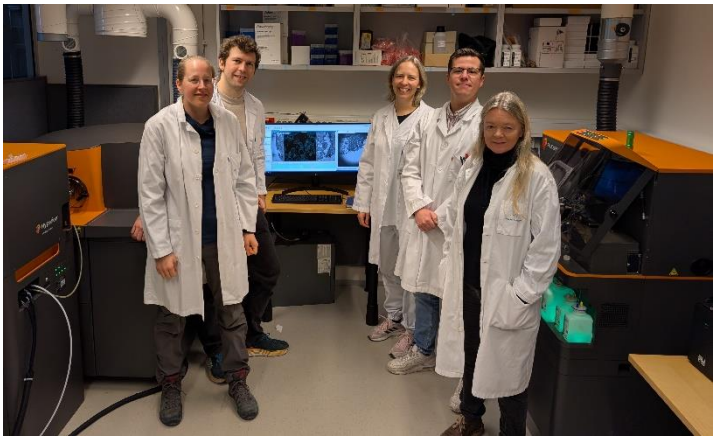
- RETRO-CUP: Retrospective study of diagnostics, treatment and outcome of CUP patients in Norway between 2010-2020
- The NorCUP trial: A national trial analysing the impact of comprehensive tumour molecular profiling and implementation of CUP molecular multidisciplinary team meeting (MDT) for CUP patients
- CUP-AID: Cancer of Unknown Primary – Artificial Intelligence, Integrated Diagnostics & Decision Support.

Highlights for 2025:

- Received grants from the Trond Mohn Foundation
- Recieved grants from MATRIX
- Ethical approval for general biobank.
- Ethical approval for the NorCUP trial and RETRO-CUP

Ongoing grants:
The Norwegian Cancer Society open project grant (2024)
The Trond Mohn Foundation (2025)
MATRIX Norwegian Centre for Clinical Cancer Research (2025)

Melanoma research group



Research Group Leader: Oddbjørn Straume

Research Group Members:
Oddbjørn Straume (Professor, Director of the Cancer Clinic)
Cornelia Schuster (MD PhD, Senior Consultant Oncology)
Kjersti Tefre Davidsen (MD PhD, Senior Consultant Oncology)
Austin J Rayford (MsSc PhD)
Franziska Görtler (Bioinformatician, PhD)

Research Focus:

- Melanoma
- Biomarkers for response and side effects to checkpoint inhibitors
- Deep multiparametric profiling

Research Focus:
Immunotherapy with check point inhibitors have revolutionized the management of difficult- to treat cancers like melanoma. However, this treatment comes with a high risk of severe autoimmune side effects that are detrimental to the patients' health and quality of life, and about half the patients do not respond to the therapy. In our research we leverage advanced deep multiparametric profiling (CyTOF and Imaging Mass Cytometry, RNAseq, WES) of melanoma patient biopsies from clinical trials and a retrospective real-world study. The aim is to identify predictive biomarkers for response and serious immune related side effects to immunotherapy with checkpoint inhibitors.

Current Projects:

- Deep multiparametric profiling of pretreatment biopsies from melanoma patients (from The Haukeland University Hospital based, randomized Phase Ib/II study BGBIL006 (NCT02872259, PI: O. Straume)
- Imaging Mass Cytometry of melanoma biopsies from a retrospective real-world study and a national phase IV study (IPI4, NCT02068196), PI: T. Guren
- Assessment of immune and stress-response markers in pretreatment tissue samples from IPI4 study (NCT02068196).
- Biobank for immune-related side effects, designed to prospectively collect blood samples at multiple predefined time points and systematically record relevant clinical data. Multiomics, single cell and serum concentration analysis will be performed. Analysis of PD1-serum concentration in melanoma patients (NCT02872259)

Highlights for 2025:

- Helse Vest researcher grant 2025 C. Schuster
- Patient inclusion to Biobank for Immune- related side effects started
- Nordic Melanoma Meeting (NMM) 2025, Tromsø:
  - Preliminary results of WES and RNAseq analyisis of the BGBIL006 study presented by K. Davidsen.
  - Acta Oncologica award for best case report to C. Schuster

Mohn Cancer Research Laboratory

Research Group Leader: Stian Knappskog

Number of Group Members: 18
2 Professors
2 Senior scientists
2 Senior oncologists
7 PhD students
3 Technicians
1 Study nurse
3 MSc students

Research Focus:

- Breast cancer, neuroendocrine carcinoma, colon cancer, melanoma, ovarian cancer, endometrial cancer
- Translational: Genetics/Genomics, epigenetics and clinical trials

Research Focus:

The research group applies large scale molecular analyses (genetic, genomic and epigenetic etc.) within clinical trials, to identify and implement new predictive biomarkers. A particular focus has been on neoadjuvant treatment of breast cancer.

Further translational programs include assessment of intratumor heterogeneity and subclonal dynamics in tumor evolution and during cancer treatment.

An additional main topic is epimutations. This program is based on the finding that embryonic epimutations of BRCA1 cause an increased risk of breast and ovarian cancer and seem to be the underlying cause of around 20% of all triple-negative breast cancer. We are currently expanding this concept into other tumor suppressor genes and cancer types.

Current Projects:

- Genomic analyses to identify predictive biomarkers for neoadjuvant breast cancer therapy
- Determine the role of embryonic epimutations as underlying causes of multiple cancer types (e.g. breast, ovarian, colon, endometrium, melanoma)
- Map the molecular landscape of rare neuroendocrine carcinoma
- Subclonal dynamics in tumor evolution and response to therapy

Highlights for 2025:

- Publication of response data from patients with luminal A like breast cancer, from the PETREMAC-trial.
- Received major competitive grants from the Norwegian Cancer Society, the Regional Health Authorities and the K.G.Jebsen Foundation.

Mohn Cancer Research Laboratory - Digestive High-Grade Neuroendocrine Neoplasms

Research Group Leader: Halfdan Sørbye

Group Members:

Helse Bergen
Professor Halfdan Sørbye, Cancer Clinic, Haukeland University Hospital
Professor Stian Knappskog, Mohn Cancer Research Laboratory
MD, PhD candidate Siren Morken, Cancer Clinic, Haukeland University Hospital
MD Margrethe Thune Rudlang, Cancer Clinic, Haukeland University Hospital

International participants
Professor Aurel Perren, Institute of Tissue medicine and Pathology, University of Bern, Bern, Switzerland.
Professor Anne Couvelard, Department of Pathology, Bichat Hospital, Paris, France.
PhD MD Seppo Langer, Department of Oncology, Rigshospitalet, Copenhagen, Denmark.
Professor Eva Tiensu Jansson, Section of Endocrine Oncology, Uppsala University, Uppsala, Sweden

Research Focus: Digestive high-grade neuroendocrine neoplasms consist of well-differentiated neuroendocrine tumours (NET G3) and poorly differentiated neuroendocrine carcinomas (NEC).

Research Focus: Digestive high-grade neuroendocrine neoplasms consist of well-differentiated neuroendocrine tumours (NET G3) and poorly differentiated neuroendocrine carcinomas (NEC). They are rare but represent a huge clinical unmet need. They usually present with advanced disease, behave aggressively clinically and have a very poor prognosis and short survival with limited treatment options. Molecular markers for classification, treatment selection and prognosis are generally lacking. We have collected a prospective Nordic Cohort on 800 patients with clinical characteristics, treatment benefit and survival. Most cases have been re-classified according to the new WHO classification. We have collected tumour samples from 250 cases and performed gene sequencing (NGS) on these cases. We have also analysed circulating tumour DNA in in 170 plasma samples with the TSO500. Colorectal NEC has the worst prognosis among digestive NEC. Recurrence after surgery for localized CRC NEC is frequent, with a 30% survival rate compared to 70% for adenocarcinoma. Benefit of palliative chemotherapy is very limited for CRC NEC. The reason why CRC NEC are so more aggressive compared to its adenocarcinoma counterpart is not understood. To investigate this, we have started whole genome analyses on >100 CRC NEC tumour samples and methylation studies are planned. Our results could give important information for classification, for prognosis and for selection of treatment in digestive high-grade NEN patients. It could give a better molecular understanding why some cancers are so aggressive and make the fundament for more personalized patient treatment in the future.

Current Projects:

- Molecular alterations in colorectal neuroendocrine carcinomas (NEC) - identifying potential for new treatments
- Multicentric morphological and molecular appraisal of GEP-NEN G3 with clinical correlations.
- Neuroendocrine carcinomas (NEC) – a new molecular era for an understudied malignancy.
- PI for European multicentre study on stage I-III Digestive NEC.

Highlights for 2025:

- Sorbye H et al: Characteristics and treatment outcome in a prospective cohort of 639 advanced high-grade digestive neuroendocrine neoplasms (NET G3 and NEC). The NORDIC NEC 2 study. Br J Cancer 2025 Aug;133(3):316-324
- Morken: oral NEC study presentation at ENETS 2025 conference at Krakow as first author.
- Sørbye: oral NEC study presentation at ENETS 2025 conference at Krakow as first author.
- Helse Vest 2025 grant (2026-2029): *Molecular basis for new treatment of colorectal neuroendocrine carcinomas (NEC)*

Sarcoma group Haukeland University Hospital

Research Group Leader: Nina L. Jebsen, consultant oncologist Haukeland University Hospital, PhD, associate professor University of Bergen

Number of group members: Representatives from Deps. of Orthopaedic surgery, General surgery, Paediatric medicine, Gynaecology, Radiology, Pathology

Research focus in short:

- Bone- and soft tissue tumours
- Clinical studies

Research areas:

Local recurrence in extremity and trunk wall soft tissue sarcoma, prognostic factors and impact of adjuvant radiotherapy, observational studies. Late effects following surgery and radiotherapy in extremity and trunk wall soft tissue sarcoma, evaluation during clinical follow-up

Clinical trials and treatment protocol collaboration:

- Scandinavian Sarcoma Group treatment protocols in soft tissue sarcoma with neoadjuvant or adjuvant chemotherapy and radiotherapy (SSG XX, Neo-STS)
- International collaboration in clinical trials in bone sarcoma with pre- and postoperative chemotherapy (Euramos 1, EUROBOSS, rEECur)

Current Projects:

- Adjuvant chemotherapy in high-risk soft tissue sarcoma in extremities and trunk wall
  - Neo-STS: Preoperative chemotherapy in high-risk soft tissue sarcoma in extremities and trunk wall
- Myxoid liposarcoma
  - Long-term follow-up ofthe DOse REduction of preoperative radiotherapy in MYxoid liposarcomas
  - International prospective registry on local treatment approaches in myxoid liposarcomas
- Precision medicine in paediatric oncology with focus on osteosarcoma and neuroblastoma (PICCA2, PERCAP)
- Late morbidity and health related quality of life after surgery and radiotherapy for extremity localized soft tissue sarcoma. A Scandinavian Sarcoma Group (SSG) project

Highlights for 2025:

- Renewed funding for the project Precision medicine in paediatric oncology with focus on osteosarcoma and neuroblastoma (PICCA2, PERCAP), including effective production of CAR-T for pediatric cancers
- 29. Mach 2025: (biannual) Sarcoma Day, organized by The Sarcoma Centre in collaboration with the Western Norway patient union for Sarcoma. Patients, relatives, and health personnel involved in sarcoma care were invited to a conference focusing on development in sarcoma treatment, physical and psychological late effects of therapy, and current research aspects
- 2025 and ongoing: Representation in the national proton project, establishing a national registry (NORPREG) om proton- and radiotherapy, piloting development of structured Electronic Patient Records in sarcoma treatment for secondary use of data for quality assessment and research
- Revision and update of national guidelines for the investigation and treatment of sarcoma, 1. Oct. 2025

Other research projects within the Cancer Clinic

PhysCan Study

Investigates the effects of supervised physical training on muscle cellular outcomes, muscle function and physical fitness in breast cancer patients undergoing adjuvant chemotherapy and whether exercise intensity moderates this effect. Data will inform exercise guidelines to reduce late effects of treatment. Collaborations include the Norwegian School of Sport Sciences, University of Agder and Uppsala University.

- **Ongoing doctoral theses (UiB) within the PhysCan study:**
  Effects of moderate or high intensity exercise on muscle metabolism and exercise capacity during adjuvant treatment in breast cancer patients.
  PhD candidate: Tor-Helge Wiestad, The unit for Cancer Rehabilitation, Cancer Clinic.
  Main supervisor: Truls Raastad, Department of Physical Performance, Norwegian School of Sport Sciences, Oslo, Norway.

Children and Youth Clinic

Oral Late Effects after Childhood Cancer Treatment Research Group

Research Group Leader: Dorota M. Wojcik MD, PhD, senior consultant, Paediatric Oncology/ Haematology, Haukeland University Hospital

Number of group members:
5 - Representatives from Departments:
- Clinical Dentistry, University of Bergen, Department
- Oral and Maxillofacial Surgery, Haukeland University Hospital
- Paediatrics, haematology/oncology, Haukeland University Hospital

Research focus in short:
The long-term oral and craniofacial complications following treatment of various types of cancer in children and clinical research.

Research Focus:
The research group investigates the long-term oral and craniofacial complications following treatment for childhood cancer, including chemotherapy, radiation, and surgery. The focus is on identifying the prevalence and severity of dental developmental disturbances, caries, malocclusion, salivary dysfunction, and craniofacial growth anomalies. The group utilises clinical and radiographic examinations, statistical analyses, and longitudinal follow-up to improve diagnostics, early interventions, and follow-up guidelines, aiming to enhance oral health and quality of life for survivors.

Current Projects:
Development and growth of the face, jaws and teeth, and assessment of oral health in children aged 0–18 years after treatment for childhood cancer.

Paediatric Oncology Research Group at Haukeland University Hospital

Research Group Leader: Maria W. Gunnes, M.D, PhD

Number of Group Members: (15) Paediatric oncologists and study nurses at the Department of Paediatric Haematology and Oncology, collaboration with researchers from the University of Bergen and Oslo University Hospital, as well as international collaborators (Sweden, France, Canada)

Research Focus:

- Personalized medical treatment with chemotherapy, immunotherapy, and other targeted medicines
- Monitoring minimal residual disease (MRD) to detect early relapse in solid tumours ("liquid biopsy") through ddPCR method
- Pharmacokinetics and pharmacogenomics in paediatric patients
- Supportive care, special focus on infections and neutropenic fever during treatment

Research Focus: The whole spectrum of childhood cancer, with focus on supportive treatment as well as rare/refractory cancer, in particular neuroblastoma. Clinical research as well as translational research with spheroids and PDX's and drug testing, proteomics, and immunotherapy (including the development of CAR-T for osteosarcoma and neuroblastoma in close collaboration with researchers at Oslo University Hospital). We work to make cancer treatment for children better, safer, and more precise. Through clinical studies, we investigate new medicines and treatment methods, and how these can be tailored to each individual child.
We use modern technologies such as genetic sequencing and flow cytometry, and collaborate with other researchers in Norway and internationally. Our goal is to help more children survive cancer, experience fewer side effects, and enjoy a better quality of life after treatment.

Current Projects:

- "Better antibiotic treatment for children with cancer"- Christian Thaulow
- "Improved Diagnosis and treatment of childhood cancer "-Maria W. Gunnes/ Lars Herfindal/ Reidun Æsøy
- "Personalized Immunotherapy"- Maria W. Gunnes/Sebastien Walchli (OUS)
- Development and growth of the face, jaws, and teeth, and assessment of dental health in children aged 0–18 years after treatment for childhood cancer. Dorota Wojcik

Highlights for 2025:

- Submitted paper on mRNA-based CART cells for Osteosarcoma
- Abstract SIOP (International Society of Paediatric Oncology) October 2025 Amsterdam. R Aesoy et al. "Early detection of neuroblastoma progression using CTDNA-based liquid biopsy"
- Evening seminar in collaboration with Barnekreftforeningen, for their members and others from the public, with update on paediatric cancer research in Bergen, February 2025
- Presentation at CCBIO Junior scientist symposium February 2025; R. Æsøy; "ct-DNA based liquid biopsy for monitoring paediatric cancer progression"

Department of Internal Medicine – Haematology

PRECOS

Research Group Leader: Emmet Mc Cormack

Number of Group Members: 17

Research Focus in short:
Cancer, drug development, immunotherapy, preclinical development, molecular imaging

Research Focus:
Research focus and subprojects: The groups core activities focusses on development, characterization and application of clinically relevant models (Patient derived xenografts (PDX), Hu-PDX, in vitro decellularized scaffold platforms) and multimodal molecular imaging strategies (optical imaging, including fluorescence image guided surgery, PET/CT/MR, MRI and US), and how we believe judicious application of these technologies can expedite clinical development of novel therapeutics. More recently the group has had a focus on the development of novel immunotherapies (CAR-T and BiTes). The group is an associated member of the NFR SFF CanCELL, the Norwegian centre for Molecular Medicine (NCMM) and working group 2 leaders in the Immunomodel COST action CA21135.

Current Projects:

- **AMIDE:** In the **NFR FRIPRO** project we explore the development of an immune avatar patient derived xenograft mouse model to predict the efficacy and toxicities related to CAR T cell therapy in addition to development of innovative CAR T cell designs to offset CAR T cell exhaustion in solid cancers, while the **MyCAR project funded by Helse Vest** aims to develop a new immunotherapy for Myelodysplastic syndrome patients based on CAR T cell technology
- **IIDEA:** This project **funded by the Norwegian cancer society** aims to develop an immune avatar PDX (iaPDX) - using CD34+ cells and thymus epithelium cells (TEC) derived from patient induced pluripotent stem cell (iPSC) line, in addition to developing armored CAR-T cell constructs
- **PedHemaCAR and PERCAP:** Both projects are **funded by Barnekreftforeningen** (the children's cancer society) to develop novel preclinical models and immunotherapies of paediatric cancers with the aim of accelerating clinical translation.
- **CodaFLIGHT:** This **EIC pathfinder grant** is a European collaboration on the development of a time-domain fluorescence guide surgery platform.

Highlights for 2025:

1. **NFR FRIPRO AMIDE:** In collaboration with Sébastien Wälchlis' group in Oslo, the group published 3 articles demonstrating the efficacy of novel CAR T cells (Caulier 2024, PMID: 38754420; Casey 2024, PMID: 38604812; Abrantes, PMID: 40925376), 2 papers on the development of novel preclinical models, for CAR T efficacy studies (Safont, PMID: 39673705) and an innovative 3D ovarian cancer metastasis model (Gjerde, PMID: 41633102) in collaboration with the INOVA group.
2. **Kreftforeningen IIDEA:** The group published several exciting therapeutic studies, including an innovative combination targeting resistant AML cells (Eriksson, PMID: 41270153), and a comprehensive review of AXL tyrosine kinases (Eriksen Gjertsad, PMID4024513), a novel therapeutic modality in AML, in collaboration with the Gjertsen group (HA, PMID: 39582120).

2 further papers in collaboration with INOVA have been accepted for publication examining therapeutic modalities in ovarian cancer (Tandaric, PMID: 39887612 and *accepted*).

3. Katrin Kleinmanns won the Onkologisk Forums Young Researcher award. Kleinmanns has been a PhD, postdoctoral researcher and now senior researcher in the group.
4. Senior researcher Pascal Gelebart, who was enrolled in “The Forge” Norway's first national biotechnology accelerator, has been awarded 4.5 MNOK from Barnekreftforeningen to develop novel Bispecific T cell engagers (BiTEs) for Pediatric cancers – BIPED. The group was awarded the medical faculty's Innovation award for “DogBiTE” in 2025.

The Signalling-Targeted Research Group

Research Group Leader: Professor Bjørn Tore Gjertsen

Number of Group Members: 24 including master students.

Research Focus in short:
Single cell functional profiling, early identification of non-responders, tumour clonality, cell fates, single cell immune profiling, single cell signal profiling, companion diagnostic, Acute Myeloid leukaemia (AML), Chronic Myeloid Leukaemia (CML), p53, CD37CAR-T Repurposing of drugs in cancer, Clinical trials, mass cytometry, RNA single cell sequencing.

Research Focus:
The Signalling-Targeted Research Group focuses on single cell immune and signalling profiling, aiming to early distinguish therapy responders from non-responders, as well as to identify new potential drug targets for therapy development in AML and CML.

The research group is a part of the KG Jebsen Centre for Myeloid Blood Cancer (C-MYC) since September 2024. The centre is focused on establishment and validation of new single-cell technologies, including mass cytometry and single cell sequencing, to delineate the molecular dynamics of cancer cells at diagnosis and longitudinally during therapy. The Centre is also engaged in outreach to secure a larger biobank with biomaterials from clinical trials and aimed to recruit and offer more leukaemia patients to participate in clinical trials. The C-MYC centre plays a key role in moving forward in myeloid blood cancer research through strengthening our collaboration with leukaemia focused research groups in other Nordic and European countries. Treatment of leukaemia has previously shown the way in the development of targeted treatment with chemotherapy tablets, and advanced immunotherapy and cell therapy. The centre will build on these experiences and the researchers hope that the final delivery will be new diagnostics and groundbreaking treatments that can make a clear difference for people with cancer.

We believe that development of companion diagnostics through single-cell profiling will improve personalized precision therapy for AML patients. The group's results indicate that the pERK1/2 pathway and p53 protein and signalling modulation, could be candidates for companion diagnostics (Tislevoll *et al.*, 2023). The research group recently received funding from the Norwegian Cancer Society for collecting longitudinal blood samples from all AML patients in the Nordic countries, to verify these findings.

The research group has several self-initiated clinical trials, as well as being involved in trials initiated at other sites, both in Norway and abroad. From all clinical trials, we are collecting samples for our general biobank.

The project "Single-cell immune profiling in cancer" aims to show the potential of single-cell profiling in cancer prognostication and response evaluation, based on biobanked peripheral blood in small clinical trials. Immune profiling with intracellular signalling demonstrates that AML patients in complete remission are very different from healthy individuals. Also, imaging mass cytometry are being used to analyse skin biopsies from AML patients treated with a dendritic cell vaccine in a Phase1/2 clinical trial performed in collaboration with MENDUS, to examine the mechanisms involved in vaccine-triggered T cell responses.

One subproject is drug repurposing in AML. Our preliminary data indicate clinical benefit of the combination Valproic acid and Quinacrine especially in patients carrying TP53 mutations, a subgroup

with high unmet need. The concept will be developed in advanced cancer with genetic profiles predicting low survival. Another subproject focuses on the tumour suppressor p53 protein profiling in cancer. Profiling of p53 isoforms and posttranslational modification in single cells are being developed and connected to the signalling state and phenotype of the cell.

Cellular immunotherapy through allogeneic hematopoietic stem cell transplantation is highly effective to avoid relapse in AML, but is limited by adverse effects. We are therefore developing the first Norwegian designed and produced Chimeric Antigen Receptor (CAR) T cell therapy, employing the immune cell restricted target CD37. CD37 is a unique target with reduced anticipated adverse effects. Preclinical evidence of the anti-leukemic efficacy of the CD37CAR in *in vitro* and *in vivo* models of AML have laid the foundation for a phase I first-in-man dose finding study of the CD37CAR. In this trial, which includes all the four University Hospitals in Norway, we will enrol 8 AML patients meeting the criteria of being in first complete remission but with positive measurable residual disease and CD37 positive at diagnosis.

Current Projects:

- Early therapy response evaluation for prediction of clinical outcome. Collection of longitudinal peripheral blood samples from AML and CML patients in the Nordic countries for verifying the findings published in Tislevoll *et al*. Nature Communication 2023.
- Initiation of a Phase 1 CD37CAR-T clinical trial in patients with AML
- Development of antibody panels for CyTOF and imaging mass cytometry for analysing Peripheral blood and bone marrow biopsies from AML patients
- Use already establish mass cytometry and antibody panels to analyse collected blood and bone marrow sample from several clinical studies in AML, CML, Melanoma, and colon cancer

Department of Radiology

Bergen Cancer Imaging Research Group

Research Group Leaders: Ingfrid S. Haldorsen (PI) and Kristine E. Fasmer (co-PI)

Number of Group Members: 8

Researchers: Erlend Hodneland (HUS), Ingfrid Haldorsen (HUS/UiB), Kristine Fasmer (HUS)

PhDs: Jostein Sæterstøl, Julie Dybvik, Njål Lura, Ankush Gulati, Agnes Jebsen

Research Focus: Gynaecologic cancer, MRI, PET/CT, radiomics, AI, precision oncology

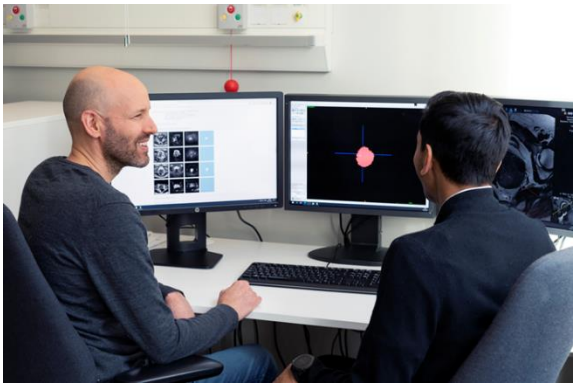
Research Focus: Gynaecologic cancers exhibit distinct structural and functional imaging characteristics that are associated with clinical phenotypes. Our multidisciplinary team integrates MRI, CT and PET/CT with molecular and genetic data aiming to advance precision oncology. Through multimodal and multiparametric imaging research, we identify and validate imaging biomarkers that predict aggressive disease and poor outcome. By developing machine learning tools for automated tumour segmentation and radiomic tumour profiling, we aim to personalize therapy and improve outcomes through predictive, data-driven imaging diagnostics.

Current Projects:

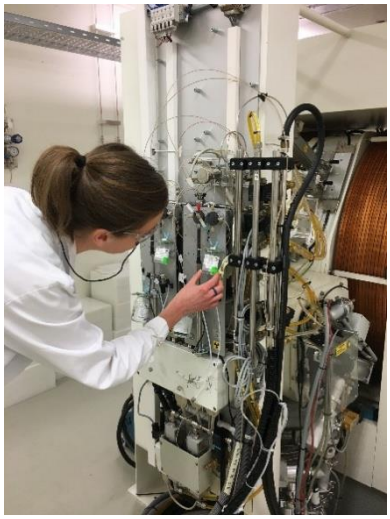
- AI-driven tumour segmentations to enhance gynaecological cancer diagnostics
- MRI- and FDG PET/CT radiomic tumour profiling for predicting aggressive disease, treatment response and poor outcome
- Multiparametric MRI and FDG PET/CT detecting more precise imaging markers
- Cross-centre validation of AI and radiomic models for prediction of aggressive disease, treatment response and survival

Highlights for 2025:

- AI algorithm for automatic gynaecological tumour segmentation on MRI implemented for testing in clinical image system (PACS)
- 12 peer-reviewed scientific papers
- PhD dissertation Njål Lura 24.10.2025 "MRI Precision imaging for individualized treatment in uterine cervical cancer"
- Oral presentations at ECR2025, NFMF2025, NCR2025, EANM2025, ESUR2025



Bergen Tracer Development Centre, part of 180 °N



Research Group Leaders: Tom Christian Holm Adamsen (PI), Bengt Erik Haug (co-PI), Erwan Le Roux (co-PI).

Number of Group Members: 8

Research Focus: Development of novel radiopharmaceuticals for diagnostic and therapeutic use. Production, separation and chelation chemistry of ^{45}Ti. Novel labeling methods for ^{18}F using silicon-oxygen mediated solid support.

Research Focus: The key and often limiting factor in nuclear medicine, and PET in particular, is the availability of radiopharmaceuticals, often referred to as “tracers”. Only a few of a large number of synthesized PET tracers reach the clinic or become clinically relevant despite their potential.
The primary objective of 180 °N is to increase the number of clinically relevant radiotracers and make these available through strengthening radiochemistry within the 180 °N network. This objective will be met by establishing a consortium-wide tracer implementation framework based on the experience already gained in Bergen. Tracers primarily needed for clinical multi-center studies will be made locally available throughout the consortium. Novel tracers will be multi-center validated, drawing on the combined expertise, competence and resources.
Novel radionuclides not already clinically employed will actively be characterized to assess their suitability. This includes e.g. ^{45}Ti whose difficult aqueous chemistry will be challenged.

Current Projects:

- ^{45}Ti chelation and stabilization in-vivo
- Silicon supported labeling with ^{18}F
- Precursor development
- Metal specific ligands/chelators

Highlights for 2025:

- Proved ^{45}Ti-DOTA complexation
- Increased stability of aqueous titanium species
- Successful Si-F-O supported fluorinations

Neurostimulation and Brain Imaging Research Group (NBiG) and MMIV

Research Group Leaders:

NBiG: Leif Oltedal (PI), Olga Therese Ousdal (co-PI) and Ute Kessler (co-PI).
MMIV leader: Leif Oltedal

Number of Group Members: NBig 14, MMIV 38

Research Focus:

- Neurostimlation; Electroconvulsive therapy and Transcranial Magnetic Stimulation
- Neuroradiological imaging, including brain tumours such as glioma and vestibular schwannoma

Research Focus:

For this report focus is on the cancer and tumour related research from the groups, where we have several projects. We use advanced MRI including cutting-edge MR Spectroscopy to non-invasively measure the metabolite 2HG which can predict IDH – mutation status in gliomas. We also collaborate in experimental studies of new drugs used for glioblastoma treatment and develop algorithms for tumour detection and segmentation of vestibular schwannomas. Finally, we take part in the working group of the national research registry for brain and spinal cord tumours. By developing machine learning tools for automated tumour segmentation, we aim to provide improved diagnostic workflows for and more precise tumour measurements.
MMIV also has a large research portfolio in gynaecological cancer as described under the Bergen Cancer Imaging Research Group.

Current Projects:

- Manual segmentation and algorithm development for vestibular schwannoma
- 2HG-MRS to evaluate IDH status in glioma patients
- Registry studies on brain and spinal cord tumours in Norway
- AI supported services for image diagnostics in Western Norway (ASIS)

Highlights for 2025:

- 1 peer-reviewed paper from the registry for brain and spinal cord tumours
- First results of schwannoma PhD project (AI algorithm) presented at the MMIV conference
- MMIV conference in December 2025 with several talks on cancer-related research
- ASIS project hired 1 post doctor, 1 PhD student and 1 programmer

Department of Thoracic Medicine

Bergen Lung Cancer Research Group (BLCRG)

Part of Bergen Respiratory Research Group (BRRG)

Research Group Leaders:

Associate professor Marianne Aanerud (BLCRG) and Professor Tomas ML. Eagan (BRRG)

Number of Group Members:

30, of which 15 researchers and technicians work directly with studies on lung cancer. Margrethe Aase Schaufel, the Group Leader for the Research Group for Palliative Care, is also affiliated and works closely with BLCRG.

Research Focus:

- Resistance mechanisms to immunotherapy (including lung microbiome and bronchoscopic sampling)
- Participation in clinical lung cancer studies
- Collection of blood and tissue from lung cancer patients for research conducted by collaborating groups.
- Prognostic models in small cell lung cancer based on pretreatment imaging

As the department is in contact with approximately 10% of the lung cancer patients in Norway, either through diagnostic work up, treatment, or follow up, our department has great potential for data collection, both pre-treatment, during treatment, and through taking part in clinical studies.
We collect data and collaborate with researchers at the institute of biomedicine (Agnete Engelsen and prof Thomas Arnesen), paraclinical researchers (pharmacology, prof Silje Skrede), and clinical researchers in multi-center studies.

Current Projects:

1. Ongoing **multi-center trials** on SCLC include ACHILES, TRIPLEX, IMPRESS, and DHARTS (coming). Ongoing multi-center trials on NSCLC include DART, SOLUCOM and SUNRAY-01.
2. Ongoing **data sampling**: Respiratory- and gut microbiome in patients with suspected lung cancer and examining differences in treatment effects. Sampling of blood from patients treated with immune checkpoint inhibitors for concentration measurements.
3. **Prognostic factors** for survival in limited stage SCLC. As 60% of patients with limited stage SCLC relapse and die from their disease despite treatment with curative intent, a project combining clinical and radiological data from the ACHILES and THORA studies on limited stage SCLC to find prognostic factors that can be used for treatment decisions.
4. Biobanking SCLC and implantation of lung cancer tissue in immune deficient MICE started in December 2025.

Highlights for 2025

- 8 papers in lung cancer published with authors from the group
- Started tissue sampling from SCLC with implantation in mice
- Funding for PhD candidate working in lung cancer with Bergen Palliative Research Group

Head and Neck Clinic

Bergen Head and Neck Cancer Research Group

Research Group Leader: Professor Hans Jørgen Aarstad

Number of Group Members: About 10 associated investigators

Research Focus in short:

- Head and neck squamous cell carcinoma (HNSCC)
- Molecular biology, tumour immunology, surgical treatments, fear of recurrence, quality of life, patient satisfaction

Research Focus:

We have analysed somatic TP53 mutations and the TP53 single-nucleotide polymorphism (SNP) codon 72 (P72R; rs1042522) (proline → arginine) from patients with HNSCC. In HPV (-) patients we determined 80% prevalence of somatic TP53 mutations with TP53 R72 SNP cohort versus 40% in the TP53 P72 cohort (p=.001). 39/44 HPV (+) tumour patients harboured the TP53 R72, in contrast to 42/60 patients in the HPV (-) group (p=.024) Thus, being genetic Northern may raise risk of HNSCC. Patient satisfaction, fear of recurrence and quality of life scores are quality and prognostic indexes of health care. Personality can modulate such scores. Therefore, is important to identify the patients with “true” low scores. Appropriate interventions may then be planned.

Current Projects:

- We study the presence of somatic tumour mutations, single nuclear polymorphism (SNP) and HPV DNA incorporation in head and neck cancer and their influence on risk and prognosis.
- We study blood concentrations of inflammatory interleukins and growth factors, tumour infiltration levels of T lymphocyte/macrophage dependent on prognosis.
- We study the impact of HPV infection on prognosis and relation to standard clinical parameters. Of interest is also long-term prognosis dependency on inflammatory and HPV status.
- We study patient-reported QoL and treatment satisfaction regarding HNC patients following treatment. Of particular interest is how patient personality modulate these parameters.

Laboratory Medicine and Pathology

Brain Tumour & Microenvironment Research Group

Research Group Leader: Hrvoje Miletic

Number of Group Members: 1 associate professor (20%), 1 researcher, 2 PhD students, 1 technician (50%), 2 masters students, 1 research assistant

Research Focus in short:

- Glioblastoma (primary brain cancer)
- Basic and Translational

Research Focus:

Glioblastoma are highly malignant and invasive primary brain tumours that maintain close communication with their microenvironment. In our research group, we investigate the mechanisms through which tumour cells interact with each other and their surrounding microenvironment. Our findings have demonstrated that mitochondria can be transferred from normal astrocytes to tumour cells, promoting tumour growth and enhancing oxidative metabolism. Mitochondria transfer occurs through cytoplasmic extensions known as microtubes (MTs), which form connections between tumour cells and also link normal astrocytes to tumour cells, creating an extensive communication network. Our current research focuses on unravelling the molecular mechanisms underlying this network and its role in driving treatment resistance.

Current Projects:

- Molecular mechanisms of Microtube formation in glioblastoma
- Molecular mechanisms of Mitochondria transfer in glioblastoma
- Impact of cell death on the immune microenvironment in glioblastoma
- Identifying gene networks that contribute to glioblastoma long-term survival

Highlights for 2025:

- Invited speaker for Cajal Cancer Neuroscience School, Bordeaux, France (first of its kind)
- Published a paper on pyroptosis resistance in glioblastoma (Cell Death Discovery; PMID: 40544161)
- Contributed to establishing a novel brain organoid model (PMID:41284925)

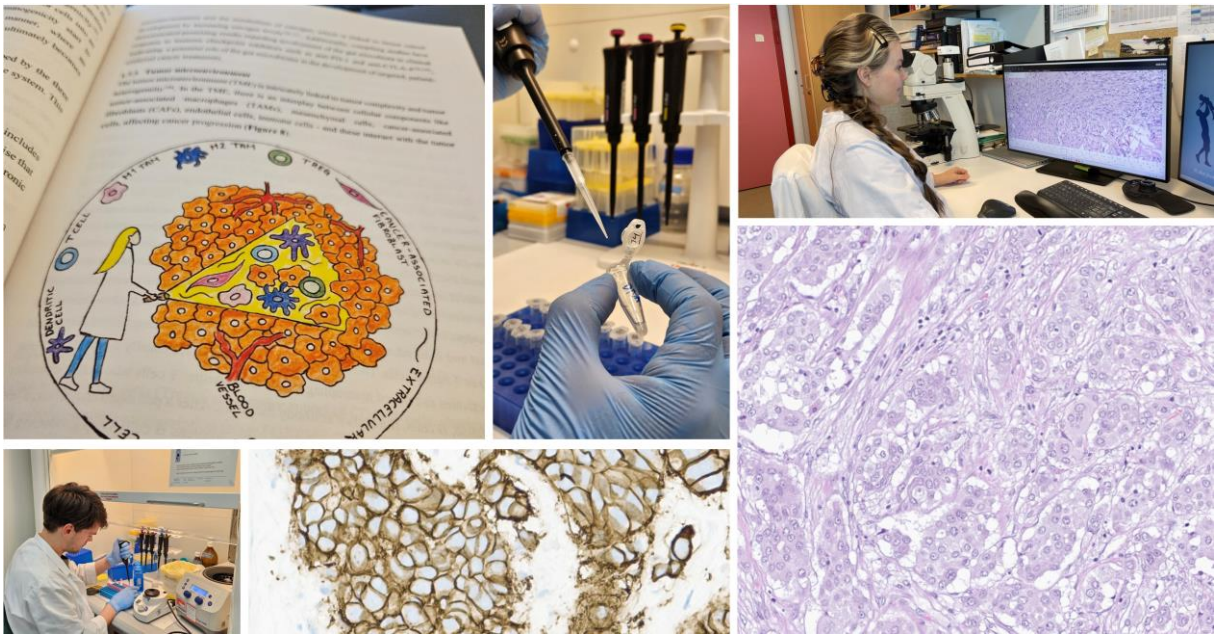
Breast Cancer of the Young – Bergen (BCY-B)

Research Group Leader: Elisabeth Wik og Erling A. Høivik

Number of Group Members: 9

Research Focus:
Young breast cancer, early-onset cancer, biomarkers, metastasis, molecular subtypes, tumour microenvironment, transcriptomics, immunohistochemistry, prognostic markers, therapy resistance.

Research Focus: BCY-B was established in 2020. We investigate the biological and clinical features of breast cancer in young women, using tissue-based molecular profiling, transcriptomics, and advanced immunohistochemistry. The group focuses on biomarkers, tumour evolution, metastasis, and the tumour microenvironment to identify age-specific signatures and prognostic markers. The group's work enhances biological insights, refines risk stratification, informs development of personalized therapies, and contributes to the adaptation of clinical trial designs and treatment guidelines for younger patients.



Current Projects:

- **Molecular profiling of young breast cancer:** Identifying age-specific gene expression signatures and prognostic markers.
- **Discordant biomarker expression in metastases:** Studying matched primary tumours and metastases by biomarkers and multiomics data to uncover mechanisms of tumour progression and evolution.
- **Immune landscape analysis:** Investigating immune evasion patterns in tumours from young patients using multiplex immunohistochemistry.
- **Resistance mechanisms in therapy:** Exploring molecular drivers of treatment resistance in young breast cancer.

Highlights for 2025:

- **Publications:** Multiple publications related to molecular data, biomarkers and prognostication, and application of the successfully established BCY-B Biobank.
    - **Distinct clinicopathological features and treatment differences in breast cancer patients of young age.** Humlevik ROC, Svanøe AA, Aas T, Heie A, Sæle AKM, Akslen LA, Wik E, Hoivik EA. 2025. Sci Rep.
    - **Reduced GATA3 expression associates with immuno-metabolic alterations and aggressive features in breast cancer.** Sæle AK, Svanøe AA, Askeland C, Knutsvik G, Ingebriktsen LM, Humlevik RO, Heie A, Aas T, Winge I, Collett K, Stefansson IM, Hoivik EA, Akslen LA, Wik E. 2025. J Pathol Clin Res.
    - **Tumor necrosis associates with aggressive breast cancer features, increased hypoxia signaling and reduced patient survival.** Syrtveit AA, Ingebriktsen LM, Tegnander AF, Akslen LA, Wik E, Hoivik EA. 2025. Sci Rep.
- **Positions:** Secured funding for one new PhD candidate. One of the BCY-B group leaders has been assigned associate professor at the Department of Clinical Medicine (K1), section of Pathology, at the University of Bergen, and is leading the CCBIO Research School for Cancer Studies, with course responsibility for two courses.

Cancer cell plasticity and therapy resistance group

Research Group Leader: Agnete S. T. Engelsen

Number of Group Members: 2

Research Focus in short:

- NSCLC
- Basic/ translational

Research Focus:

Extracellular stressors, including exposure to anti-cancer therapies, low oxygen availability, immune editing, contribute to promoting phenotypic epithelial-to-mesenchymal plasticity, a recently recognized cancer hallmark and a mechanism that drives cancer therapy failure. The research group is dedicated to exploring how phenotypic plasticity interferes with therapeutic efficacy and immune cell-mediated killing. We apply preclinical in vivo and patient-derived in vitro models and cancer-cell immune cell co-culture models. We also use the imaging mass cytometry technology to explore how tumour-immune cell dynamics impact outcome in cohorts of non-small cell lung cancer patients treated with immune checkpoint inhibitor monotherapy at HUS.

Current Projects:

- The group has been dedicated to establishing improved preclinical models of non-small cell lung cancer (NSCLC) to explore how phenotypic plasticity interferes with therapeutic efficacy and immune cell-mediated killing. In collaboration with thoracic oncologists Marianne Aanerud and Fabian Gärtner, cardiothoracic surgeon Pirjo-Riitta Salminen, and pathologists Maria Ramnefjell and Professor Lars A. Akslen, the research group has established and characterized advanced patient-derived 3D models of NSCLC.
- The current projects aim to unravel the best molecular targets to prevent phenotypic plasticity-driven therapy resistance and immune escape in solid tumours. In collaboration with Professor James B. Lorens, the group aim to elucidate the effect of phenotypic plasticity on the spatial organization of tumour immune microenvironment to uncover predictive mechanisms of resistance in ICI-treated NSCLC patients. In particular, PhD students Maria Lie Lotsberg and Austin Rayford has implemented the Imaging Mass Cytometry (IMC) platform to explore tumour immune dynamics in solid tumours affected by phenotypic plasticity
- In one subproject, we explore a therapeutic intervention with hyperbaric oxygen therapy (HBOT) to improve the efficacy of immune checkpoint inhibition by modulating the metabolism of and crosstalk between malignant cells and cells of the tumour immune microenvironment. The goal of this project is to address the remaining clinical challenge, that most NSCLC patients do not experience long-term benefit from ICI therapy.

Computational Pathology Bergen (COMPAT Bergen)

Research Group Leader Team: Sabine Leh (Pathology) and Hrafn Weishaupt (Computer Science)
Number of Group Members: 7

Research Focus:

- Digital pathology, computer aided diagnostics, methods in AI (unsupervised learning, weakly supervised learning, multiple instance learning, multimodal AI strategies, explainable AI)
- Implementation research, user-centred adoption, benefit analysis
- Workflow optimization

Research Focus: We are an interdisciplinary research group based in Bergen, advancing methodological AI research for applied digital pathology. Emerging from a regional strategic initiative, our goal is to enhance diagnostic precision in both cancer and non-neoplastic diseases. Our activities span the entire research and development continuum—from hypothesis generation and study design, through experimental investigation and analysis, to product development, regulatory alignment, and clinical integration with a focus on user experience and benefit analysis. We cover original research, industry collaboration, and AI support for other research teams, drawing on expertise in pathology, computer science, mathematics, medical technology, and biomedicine.

Current Projects:

- Development of an AI tool for classification of colorectal polyps (industry collaboration)
- Development of holistic AI models for diagnosis and prognosis in kidney cancer
- Implementation of artificial intelligence as support tools for pathology in Helse Vest
- From Pixels to Practice: Validation and Impact Assessment of AI tools in Pathology

Highlights for 2025:

- Implementation research with 2 AI models for prostate and breast cancer
- Scientific input and organizational support for the European Congress on Digital Pathology 2025 in Barcelona
- Publication of the NorPreM report “Implementering av KI-løsninger i patologidiagnostikk”
- PMID: 40730596, PMID: 39615882

Early Breast Cancer

Research Group Leader: Carina Strell

Number of Group Members: 4

Research Focus:

- Breast cancer, Non-small cell lung cancer, Cancer progression, Therapy resistance, Immunotherapy
- Basic/Translational, Predictive biomarker, Diagnostic assay development

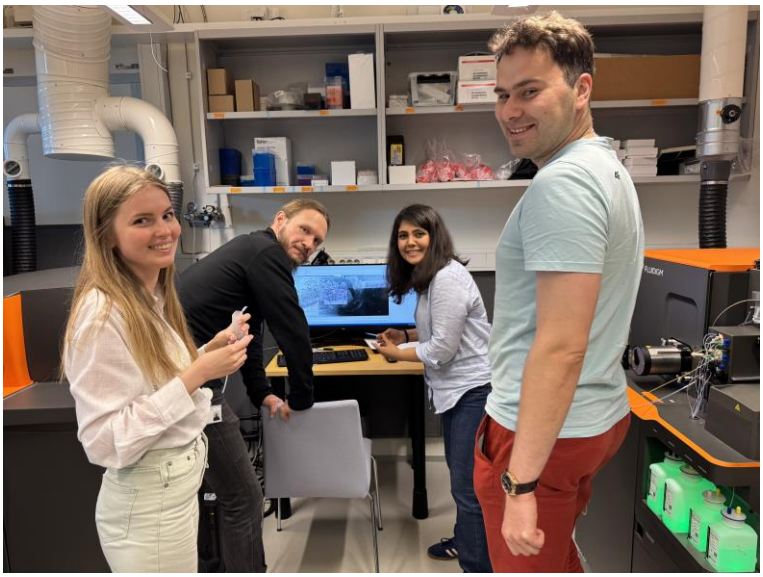
Research Focus: Our group focuses on functional diagnostics, shifting from static biomarker assessment to spatial mapping of active signalling pathways in diagnostic tissues to provide direct treatment rationales. By integrating pathway-specific proximity ligation assays (PLA) with spatial multi-omics (RNA, protein, and metabolites), we develop actionable biomarkers of cancer progression, therapeutic resistance, and treatment-related toxicity.
We recently demonstrated that active PD-1/PD-L1 signaling outperforms the current clinical standard of PD-L1 immunohistochemistry in predicting immunotherapy benefit in NSCLC (Lindberg et al., Journal of Thoracic Oncology, 2025). In addition, mapping PDGFRβ–Grb2 interactions in situ revealed distinct prognostic subgroups in lung squamous cell carcinoma (Lindberg et al., Cell Communication and Signaling, 2026). We also quantify HER2 activation in breast cancer to optimize neoadjuvant trastuzumab/pertuzumab therapy. Finally, we investigate cell fate pathways distinguishing indolent from aggressive ductal carcinoma in situ, with a focus on metabolic reprogramming and immune regulation.

Current Projects:

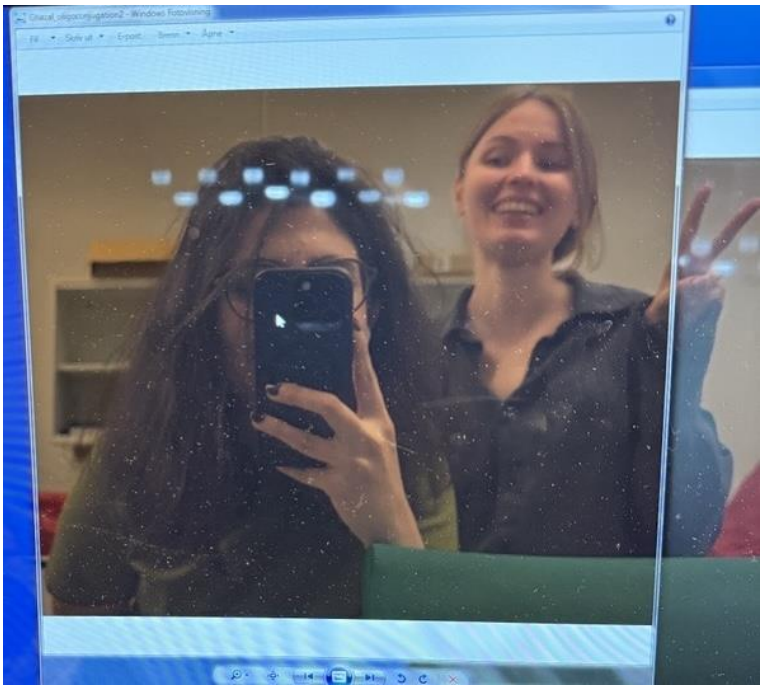
- Functional diagnostics: PD1-PDL1 interaction as predictive biomarker for immunotherapy in NSCLC and triple negative breast cancer
- Functional diagnostics: Assessing HER2 activation status to better guide neoadjuvant trastuzumab/pertuzumab therapy of HER2+ breast cancer
- Cell fate determinants in ductal carcinoma in situ: indolence versus invasive progression
- Cancer treatment associated cardiotoxicity

Highlights for 2025:

- Accepted publication in Journal of Thoracic Oncology (Lindberg et al, 2025, impact factor 20.1) showing that in situ detection of PD1/PDL1 interactions functions as a functional predictor for response to immune checkpoint inhibition in NSCLC.
- Accepted publication in Cell Communication and Signaling (Lindberg et al, 2026, impact factor 8.9) showing that active PDGFRb signaling in the stroma of in lung squamous cell carcinomas carries prognostic information.



From left to right: Anna Gorbunova (postdoc), Lars Muhl (senior researcher), Ghazal Toussi (PhD student), and Bartosz Sobocki (visiting MD student from Gdansk Medical University in Poland) at the Hyperion Mass Imager for tissue samples



Ghazal Toussi (PhD student) and Anna Gorbunova (postdoc) at the agarose gel imager, very happy about a successful oligo conjugation

Experimental Pathology Research Group

Research Group Leader: Daniela Elena Costea

Number of Group Members: 12

Research Focus:

- tumour microenvironment, cancer-associated fibroblast heterogeneity, biomarkers
- advanced *ex vivo* tumour models
- translational precision oncology

Research Focus:

We investigate the contribution of non-inflammatory tumour stroma, particularly cancer-associated fibroblasts (CAFs), to tumour progression mainly focusing on head and neck and vulvar cancer. Our work emphasizes CAF heterogeneity, aiming to identify tumour-constraining subsets with potential for therapeutic exploitation. By characterizing CAF-driven mechanisms, we seek novel biomarkers for patient stratification and more effective targeted treatments. In parallel, we develop advanced *ex vivo* models that better recapitulate the tumour microenvironment, enabling prediction of therapy response and preclinical testing of new strategies. A key goal is to translate these insights into affordable diagnostic and prognostic tools applicable in both high- and low-resource healthcare settings, through national and international collaborations.

Current Projects:

- Predictive biomarkers for immunotherapy in head and neck squamous cell carcinoma.
- Development of *ex vivo* multicellular models as functional precision medicine tools for head and neck squamous cell carcinoma.
- Exploring CAF heterogeneity in normal and neoplastic mucosa using imaging mass cytometry (Hyperion) and spectral flow cytometry.
- Establishing a human-derived extracellular matrix from autopsy material as a replacement for Matrigel/collagen in experimental cancer models.

Highlights for 2025:

- **Providing new insights into cancer stem cell heterogeneity in oral squamous cell carcinoma.** *Identification of phenotypically distinct cancer stem cell subpopulations in oral squamous cell carcinoma*. Osman TA, Rikardsen O, Teh MT, Sapkota D, Liang KX, Neppelberg E, Biddle A, Mackenzie I, Uhlin-Hansen L, Johannessen AC, Costea DE. Cancers (Basel). 2025 Nov 1;17(21):3547. doi: 10.3390/cancers17213547. PMID: 41228340. This study demonstrated that multiple, phenotypically distinct cancer stem cell subpopulations coexist within oral cancer, each associated with different clinical parameters, supporting a model of acquired and evolving stem cell heterogeneity during carcinoma progression.
- **Advancing biomarker-driven patient stratification in vulvar cancer.** *Prognostic Value of an Integrated Human Papillomavirus and Immunoscore Model to Predict Survival in Vulva Squamous Cell Carcinoma.* Elnour R, Hindenes IH, Færevaag M, Kolseth IBM, Thomsen LCV, Johannessen AC, Costea DE, Bjørge L, Dongre HN. Mod Pathol. 2025 Jun 10;38(10):100809. doi: 10.1016/j.modpat.2025.100809. PMID: 40505815. The study advanced development of a prognostic model integrating HPV status and immunoscore, providing a powerful tool for predicting survival and stratifying patients with vulvar cancer.
- **Identifying gaps in oral cancer prevention knowledge among dental students in Eastern Europe.** *Exploring dental students' knowledge on oral cancer prevention: a cross-sectional study in Moldova, Armenia, and Belarus.* Golburean O, Uncuta D, Manrikyan G, Shakavets N, Vardanyan I, Markaryan M, Özkaya F, Costea DE, Osman TA.

BMC Oral Health. 2025;25:81. doi: 10.1186/s12903-025-05459-8. This study revealed substantial knowledge gaps and risk-related behaviors among dental students, highlighting the need for strengthened education to improve early detection and prevention of oral cancer in high-risk regions.

- **Achieving interdisciplinary innovation with functional nanomaterials.** *Zwitterionic Dipeptide Surface Functionalization of Detonation Nanodiamond for Enhanced Control in Biological Environments.* Mayerhoefer E, Parajuli H, Cimpan MR, Costea DE, Dongre HN, Krueger A. Angew Chem Int Ed Engl. 2025 Jun 17;64(25):e202501202. doi: 10.1002/anie.202501202. Epub 2025 May 19. PMID: 40159347; PMCID: PMC12171329. Through international collaboration, we achieved novel surface functionalization strategies for nanodiamonds, with broad potential in biomedical applications and oncology, highlighting interdisciplinary research impact.

Left panel: Hassan Elsaid (postdoc) checking the zebra fish embryos before injection of cancer cells, at Fish Facilities at High Technology Center, UiB. Right upper panel: zebra fish embryos (2 days old) before injections, under 10x microscope; Right lower panel: a zebra fish embryo under 10x microscope, being injected with 2µl cell suspension containing 1000 head and neck cancer cells and cancer associated fibroblasts.

Hormone Laboratory Research Group

Research Group Leader: Gunnar Mellgren

Number of Group Members: 5 (breast cancer unit)

Research Focus: Breast cancer; endocrine therapy; biomarkers; liquid biopsy; steroidomics; LC–MS/MS; translational research

Research Focus: We investigate endocrine drivers and treatment response in breast cancer, integrating hormone-receptor biology with biomarker discovery and therapy optimization. Using the Prospective Breast Cancer Biobank (PBCB) and our LC–MS/MS steroidomics platform, we evaluate liquid-biopsy markers (ctDNA, microRNA, metabolites) and drug/metabolite levels (e.g., tamoxifen/endoxifen, aromatase inhibitors) to predict recurrence, detect minimal residual disease, and personalize dosing. Patient cohorts are combined with cell models, multi-omics and imaging for true bench-to-bedside translation.

Current Projects:

- **PBCB translational pipeline:** liquid-biopsy (ctDNA, microRNA), metabolomics and tumor profiling for early relapse detection and risk stratification.
- **Endocrine therapy pharmacology:** LC–MS/MS quantification of steroid hormones and therapy metabolites to optimize tamoxifen/endoxifen and aromatase inhibitor dosing; presurgical and PK/PD studies with international partners.
- **Systemic progression biology:** longitudinal serum proteomics to track metastatic disease dynamics and identify circulating biomarkers.

Highlights for 2025:

- Publications: **P.P. Strømland et al. (2025).** *Effects of metformin on transcriptomic and metabolomic profiles in breast cancer survivors enrolled in the randomized placebo-controlled MetBreCS trial.* **Scientific Reports.** May 15;15(1):16897. **Aanestad KL et al**. (2025) *Monitoring of circulating tumor DNA allows early detection of disease relapse in patients with operable breast cancer.* **Mol Oncol.** 2025 Nov 27.
- Publication/consortium output informing dose personalization: **A.M. McLaughlin et al. (2024).** *Nonlinear Mixed-Effects Model of Z-Endoxifen Concentrations in Tamoxifen-Treated Patients (CEPAM cohort).* **Clinical Pharmacology & Therapeutics 116(3):690–702.**
- Publication (endocrine prevention): **D. Serrano et al. (2024).** *Drug and biomarker tissue levels in a randomized presurgical trial on exemestane alternative schedules.* **J Natl Cancer Inst 116(12):1979–1982.**
- Cohort capacity: **PBCB** now includes **>1,200** Bergen patients with annual long term (11 years) follow-up and serial blood/urine sampling, enabling early-recurrence biomarker discovery.

InPreD Cancer Genomics

Research Group Leader: Randi Hovland

Number of Group Members: 8

Research Focus: Diagnosis, prognosis and predictive, molecular, biomarkers

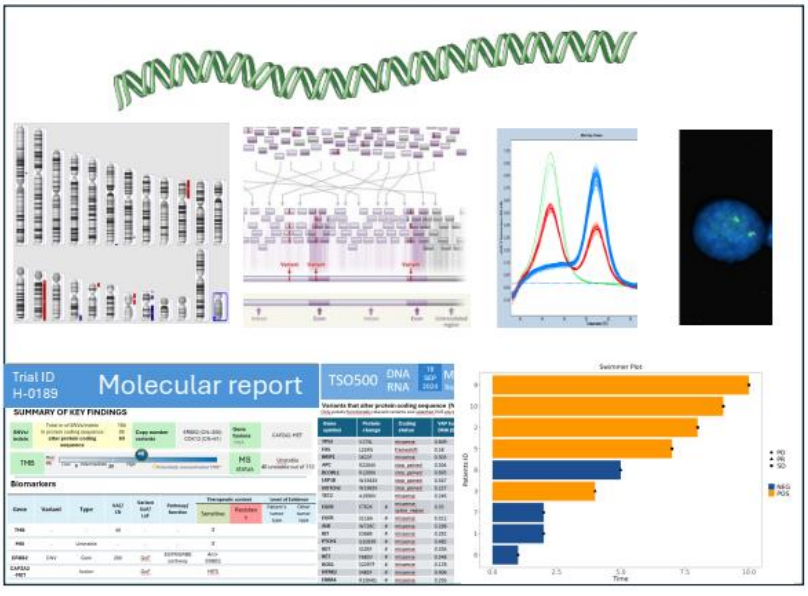
Research Focus: Research Focus: Cancer Genomics research focus is molecular biomarkers in diagnosis and treatment of cancer. Assessment of the clinical utility for biomarkers and validation to ensure effective integration and appropriate use of molecular markers in diagnostic and clinical practice is one of our main objectives. Our research projects collaborate closely with the clinical departments and aim to pave the way for the implementation of cutting-edge molecular diagnostic modalities in order to facilitate precision medicine in public cancer care.
Our research employs a range of molecular methods to detect genetic markers from FISH to next generation sequencing and methylation profiling in solid tumours, haematological malignancies and circulating molecular markers.

Current Projects:

- IMPRESS Norway: Improving Public cancer care by Implementing Precision medicine in Norway
- NorCUP: Better diagnosis of Cancer of Unknown Origin (CUP)
- Process improvement of acute leukaemia diagnosis using whole genome sequencing (WGS)
- Methylation profiling in classification of CNS using the Oxford Nanopore technology
- Nanopore technology in diagnostic use
- Assessment of the clinical utility of ctDNA in right-sided colon cancer
- Implementation of Circulating Nucleic Acid Analysis in Clinical Routine and Clinical Trials
- Improvement of in-house national post-processing of comprehensive gene-panels
- eCAN plus, WP6
- JA-PCM, WP 6, 7 and 8.

Highlights for 2025:

The NorCUP project received funding from Trond Mohn Research
Funding from the Norwegian Cancer Society for the nanopore, ctDNA and postprocessing projects



Ilustration: From molecular methods to clinical decisions

Molecular Pathology of Pancreatic Disease

Research Group Leader: Professor Anders Molven

Number of Group Members: 7

Research Focus: Pancreatic cancer, basic and translational

Research Focus: We are studying the implications of mutations, occurring either somatically or in the germline, for pancreatic cancer risk and development. This involves investigations of the gene encoding the digestive enzyme carboxyl ester lipase (CEL) and oncogenic variants of the signalling protein KRAS. Our research takes advantage of: (1) A biobank of tumour, blood and pancreatic juice samples from patients with pancreatic neoplastic disease treated at Haukeland University Hospital; (2) Genetic mouse models for chronic pancreatitis recently developed by our group. (3) Spatial characterization of pancreatic neoplastic lesions by imaging mass cytometry. In addition, we contribute clinical data, radiological images and biological material to pancreatic cancer research projects run by other groups.

Current Projects:

- Development of a mouse model of chronic pancreatitis into a model for pancreatic cancer
- Analysis of mutational signatures in blood and pancreatic juice from patients with pancreatic cancer
- Studies of CEL germline variants as genetic risk factors for pancreatic cancer

Highlights for 2025:

- Successful establishment and publication of a new mouse model for chronic pancreatitis based on a mutation in the human *CEL* gene. Publication: A. Gravdal et al. (2025). The MODY-causing mutation of the human carboxyl ester lipase gene (CEL) triggers chronic pancreatitis but not diabetes in mice. *Gastroenterology* 169: 161-164
- Contribution of CT images and clinical data from Haukeland University Hospital to the so far largest international study of radiology and AI used in pancreatic cancer detection. Publication: N. Alves et al. (2026). Artificial intelligence and radiologists in pancreatic cancer detection using standard of care CT scans (PANORAMA): an international, paired, non-inferiority, confirmatory, observational study. *Lancet Oncology* 27: 116-124
- Contribution of expertise from Haukeland University Hospital to new guidelines for diagnosing and treating pancreatic exocrine insufficiency in pancreatic cancer and other diseases. Publication: J.E. Dominguez-Muñoz et al. (2025). European guidelines for the diagnosis and treatment of pancreatic exocrine insufficiency. *United European Gastroenterology Journal* 13: 125-172.

Tumor Biology Research Group (CCBIO Cancer Biomarkers Group)

Research Group Leader: Lars A. Akslen, MD PhD (professor of tumor pathology)

Number of group members: 10 (researchers, faculty, technicians, students)

Research Focus in short: Tumor microenvironment, cancer neuroscience, proteomics, breast cancer, biomarker discovery, imaging mass cytometry, predictive markers, patient prognosis, translational studies.

Research Focus: The group investigates the cellular and molecular mechanisms driving tumor progression, with particular emphasis on the tumor microenvironment. Using advanced proteomic technologies and single-cell spatial profiling, the team identifies and validates novel tissue-based biomarkers for improved molecular classification and patient stratification. Ongoing work explores hypoxia-driven responses, neurogenesis, and angiogenesis as determinants of tumor aggressiveness, aiming to enhance biological understanding and support the development of precision cancer diagnostics and therapies.

Current Projects:

- Stromal proteomic patterns and improved stratification of breast cancer
- Hypoxia-induced reprogramming in breast cancer
- Cancer–neural interactions in primary and metastatic breast cancer

Highlights for 2025: The Akslen group and collaborators reported new insights into tumor biology, biomarker discovery, and digital pathology, highlighting how microenvironmental factors, immune and metabolic markers, hormone receptor status, and - including hypoxia, adrenergic signaling, and stem cell-associated proteins - are linked to cancer aggressiveness and prognosis. Using advanced imaging, proteomics, and AI-based methods, the work established improved tools for tumor stratification, risk prediction, and molecular understanding across several tumor types.

1. Hugdahl E, Aziz S, Klingen TA, Akslen LA. Prognostic value of immune biomarkers in melanoma loco-regional metastases. PLoS One 2025 Jan 30;20(1):e0315284.

2. Lien HE, Hjelmeland ME, Berg HF, Gold RM, Woie K, Akslen LA, Haldorsen IS, Krakstad C. Multiplex single-cell profiling of putative cancer stem cell markers ALDH1, SOX9, SOX2, CD44, CD133 and CD15 in endometrial cancer. Molecular Oncology 2025 Jun;19(6):1651-1667.

3. Humlevik ROC, Svanøe AA, Aas T, Heie A, Sæle AKM, Akslen LA, Wik E, Hoivik EA. Distinct clinicopathological features and treatment differences in breast cancer patients of young age. Sci Rep. 2025 Feb 15;15(1):5655.

4. Oskouei S, Valla M, Pedersen A, Smistad E, Dale VG, Høibø M, Wahl SGF, Haugum MD, Langø, Ramnefjell MP, Akslen LA, Kiss G, Sorger H. Segmentation of Non-Small Cell Lung Carcinomas: Introducing DRU-Net and Multi-Lens Distortion. J Imaging 2025;11(5):166.

5. Høibø M, Spiske U, Pedersen A, Ytterhus B, Akslen LA, Wik E, Askeland C, Reinertsen I, Smistad E, Valla M. Predicting estrogen receptor status from HE-stained breast cancer slides using artificial intelligence. Front. Med. 2025 Jun 9;12:1593143.

6. Oskouei S, Pedersen A, Valla M, Dale VG, Wahl SGF, Haugum MD, Langø T, Ramnefjell MP, Akslen LA, Kiss G, Sorger H. OKEN: A Supervised Evolutionary Optimizable Dimensionality Reduction Framework for Whole Slide Image Classification. Bioengineering 2025 Jul 4;12(7):733.

7. Høibø M, Pedersen A, Dale VG, Berget SM, Ytterhus B, Lindskog C, Wik E, Akslen LA, Reinertsen I, Smistad E, Valla M. Immunohistochemistry guided segmentation of benign epithelial cells, in situ lesions, and invasive epithelial cells in breast cancer slides. PLoS One. 2025 Jul 17;20(7):e0328033.

8. Gabrielsen E, Wilsgaard T, Frydenberg H, Lofterød T, Dalen SM, Mortensen E, Solbu MD, Nalwoga H, Akslen LA, Blix ES, Haugnes HS. Higher pre-diagnostic serum syndecan-4 levels are associated with increased breast cancer risk: a case-cohort study. Breast Cancer Res Treat. 2025 Jul 22.

9. Sæle AK, Svanøe AA, Askeland C, Knutsvik G, Ingebriktsen LM, Humlevik RO, Heie A, Aas T, Winge I, Collett K, Stefansson IM, Hoivik EA, Akslen LA, Wik E. Reduced GATA3 expression associates with immuno-metabolic alterations and aggressive features in breast cancer. J Pathol Clin Res. 2025 Nov;11(6):e70050.

10. Carrasco M, Bjørnstad OV, Vethe H, Akslen LA. Adrenergic signals influence proteomic responses in breast cancer cells. Front Neurosci. 2025;19:1608017.

11. Stefansson IM, Knutsvik G, Arnes J, Collett K, Askeland C, Akslen LA. Loss of androgen receptor expression is associated with aggressive tumor features and reduced survival in breast cancer patients. Hum Pathol. 2025 Nov;165:105956.

12. Syrtveit AA, Ingebriktsen LM, Tegnander AF, Akslen LA, Wik E, Hoivik EA. Tumor necrosis associates with aggressive breast cancer features, increased hypoxia signaling and reduced patient survival. Sci Rep. 2025 Nov 27.

Westeren Norway Familial Cancer center

Regionalt kompetansesenter for arvelig kreft
Center leader: Cathrine Bjorvatn
Number of Group Members: 8

Research Focus: Hereditary cancer, Rare tumour risk syndromes (RTRS), development of personalized guidance tools incorporating digital aids and artificial intelligence. Cost-effectiveness analysis, clinical practice improvement, patient-centered information tools, functional diagnostic testing.

Research Focus: Our research is deeply integrated with clinical practice, ensuring that beneficial findings are rapidly translated into everyday patient care. This encompasses both functional laboratory testing and the evaluation of patient experiences when receiving information across diverse platforms. Our aim is to deliver safe, efficient, and personalized care tailored to each patient's informational needs. In addition, we perform cost-benefit analyses to guide evidence-based decision-making and optimize resource allocation. The PREVENTABLE project was established to assess the clinical, social, and economic impact of implementing multidisciplinary, specialized care to prevent advanced disease in families affected by RTRS.

Current Projects:

- Developed, evaluated, and implemented a chatbot based on AI to support patients during genetic testing for hereditary breast and ovarian cancer.
- We are leading the Norwegian arm of EU Horizon project: PREVENTABLE.
- We are evaluating novel strategies for cancer risk stratification in patients without identified germline variants. This includes piloting the CanRisk (a risk prediction model) to guide surveillance eligibility and assessing "Smart Flow" to improve efficiency amid a sustained >10% annual increase in referrals.
- Breast cancer susceptibility gene 1 (*BRCA1*) – Functional analysis of variants of uncertain significance (VUS)

Highlights for 2025:

- Elen Siglen, defended her Ph.D. degree, June 2025, "The Rosa Chatbot Study – The development, evaluation, and implementation of a Chatbot to support patients during genetic testing for hereditary breast and ovarian cancer". Main supervisor: Cathrine Bjorvatn
- We have served as main supervisors for four individuals who have written their master thesis with data from our center: one molecular biologist, one genetic counsellor, and two medical students
- Patients' and healthcare professionals' experiences with implementing the Rosa chatbot in mainstream genetic testing for hereditary breast and ovarian cancer. Siglen E, Vetti HH, Lyssand A, Dahl-Michelsen T, Bjorvatn C.J Genet Couns. 2025 Oct;34(5):e70119. doi: 10.1002/jgc4.70119.PMID: 41128404
- The risk of a second primary cancer in PTEN Hamartoma Tumor Syndrome (PHTS). Genet Med. 2025 Oct;27(10):101467. doi: 10.1016/j.gim.2025.101467. Epub 2025 May 24.PMID: 40433764

Neuro Clinic – Dept of Neurosurgery

Neurosurgical research

Academic Qualifications in the research group

2 professors, 2 associate professors and 14 PhDs (4 PhD candidates, 9 consultants / specialists with MD/PhD and 1 specialist candidate with MD/PhD)

Research Focus in short:

- Benign and malignant brain tumours, Gamma Knife radiosurgery, paediatric neurosurgery, degenerative spinal disorders, neurotrauma and neurovascular disease and quality improvement in neurosurgery
- Basic/Translational/Clinical/ Epidemiological/Health Services Research

Research Focus:

The department has the National Treatment Centre for Vestibular Schwannomas and the National Treatment Centre for Gamma Knife Radiosurgery, of which research is key activity. We have over 40 years collaborated with the Translational Brain Tumour Research Group at the University of Bergen, particularly on high grade primary tumours and brain metastases. We have built a large biobank of brain tumours over the last 20 years, which is a key asset in multiple research projects. Several colleagues have been instrumental in the foundation of the Norwegian Brain Tumour Consortium, which has developed a Norwegian Brain Tumour Registry and is facilitating clinical trials across Norway. We currently lead or participate in five clinical intervention trials on brain tumours. We have strong national, Nordic and international collaborations in brain tumour research and co-lead the NorTrials Brain Centre for industrial partnerships in clinical trials.

Current Projects:

- Vestibular schwannomas: T-REX – Ten-year outcomes after radiosurgery or expectation of vestibular schwannoma (randomized controlled trial)
- Gamma Knife Radiosurgery: Salazopyrin (Sulfasalazine) in combination with stereotactic radiosurgery against recurrent glioblastoma (phase 1 trial)
- Brain Metastases Research Group: Genetics of brain metastases and associated primary tumours (basic/translational study)
- Norwegian Brain Tumour Consortium: Personalized functional profiling of glioblastoma (phase 1 drug screening study)

Highlights 2025:

1. PMID: 41395619
2. PMID: 41079754
3. PMID: 40980438
4. PMID: 40844361
5. PMID: 41536516
6. PMID: 40932639
7. PMID: 40272132
8. PMID: 41052856
9. PMID: 39927827

Paraneoplastic neurological syndromes

Research Group Leader: Christian Vedeler

Number of Group Members: 8

Research Focus:

- Gynaecological cancer, Cerebellum
- Translational medicine

Research Focus:

The group focuses on understanding the mechanisms behind development of paraneoplastic neurological syndromes (PNS) and improving diagnostic tests. PNS are autoimmune, neurodegenerative side effects of cancer affecting the nervous system. It is triggered when tumours express proteins normally only expressed in nervous tissue. This mounts an immune attack against both the tumour and nervous tissue expressing such proteins. Specific autoantibodies are found in serum and cerebrospinal fluid. Each autoantibody is associated with specific neurological syndromes and cancer types.

The research group mainly works on the most common PNS, paraneoplastic cerebellar degeneration, that affect 0.5–1% of women with ovarian or breast cancer. The associated autoantibody (anti-Yo) targets cerebellar degeneration-related proteins (CDR2 and CDR2L), expressed by cancer cells and Purkinje neurons. This autoimmune response results in cerebellar degeneration with loss of Purkinje cells and rapid and debilitating loss of motor control and coordination.

Current Projects:

- The impact of nerve innervation on development of PCD
- Exosome characterization in PNS
- Role of microglia in PCD

Highlights for 2025:

- Nevrologiske komplikasjoner ved bruk av immunsjekkpunkthemmere.
  Nes MS, Flobak Å, **Vedeler C.**Tidsskr Nor Laegeforen. 2025 Aug 21;145(10). doi: 10.4045/tidsskr.24.0600. Print 2025 Sep 9.PMID: 40923170
- En mann i 70-årene med svekket kraft og følelse i beina.
  Nes MS, Søyland J, Haugen M, **Vedeler C.**Tidsskr Nor Laegeforen. 2025 Jan 27;145(2). doi: 10.4045/tidsskr.24.0288. Print 2025 Feb 11.PMID: 39932092
- 2 PhD students presented posters at International Society of Neuroimmunology (ISNI) 2026, Chiba, Japan

Surgical clinic

Bergen Urological Research Group

Research Group Leader: Christian Beisland

Number of Group Members: 20

Research Focus in short:

- Kidney, Urothelial (Bladder, Upper tract), Prostate, Testicular, Penile
- Basic/Translational/Clinical/ Epidemiological/Health Services Research

Research Focus:

The group conducts clinical, translational, and epidemiological research on urological cancers—renal, urothelial, prostate, testicular, and penile. Focus areas include diagnostics, treatment strategies, surgery, complications, follow-up, late-effects of treatment, quality of life, and psychosocial factors. The group also includes subgroups working on benign urology (e.g., endourology and urolithiasis), where significant overlap with cancer diagnostics and treatment provides strong translational value. The team co-leads and participates in RCTs and observational studies nationally and internationally, with strong Nordic collaboration and industrial partnerships ensuring access to innovative methods and technologies.

Current Projects:

- The penile cancer research focuses on HPV-related prognosis, surgical outcomes, and molecular/genetic mechanisms. Studies include long-term cohorts and registry data, complication analyses, and development of organoid models for translational research.
- The prostate cancer project focuses on introducing a safer transperineal biopsy method under local anaesthesia, significantly reducing complications while maintaining high cancer detection rates to improve patient safety and outcomes.
- The bladder cancer projects focus on investigator-initiated RCTs, including chemoablation for non-muscle invasive tumours (the Nordic COBRA trial) and a setting up a national multicentre trial on a novel lymph node dissection technique during cystectomy (the NOR-BLOC - trial).
- In kidney cancer, the focus is currently launching two new Nordic multicentre trials. The Nordic-SUN trial, which evaluates the effect of cytoreductive nephrectomy after immunotherapy in patients with metastatic disease, and the RESTART trial, comparing surgery and ablation for small renal tumours

Colorectal Cancer

Research Group Leader: Kristin Bentung Lygre

Number of Group Members: 14 (including 4 Ph.D candidates (not formally registered), 3 postdoctorial stipends (Helse Vest grants))

Research Focus: Colorectal cancer

Research Focus: Endoscopic treatment of early stage cancer, risk factors, endoscopic techniques and success-rates, complications and the need of formal resection after endoscopic treatment. Surgical quality, open vs minimally invasive, standardization, complications, personalized treatment. Prehabilitation (general and targeted for frail patient). Risk stratification based on immunoprofiling, mutational profile, liquid biopsies, histopathology and radiologic features. MSI-H colorectal cancer. Right-sided colon cancer, standardization and extent of lymphadenectomy. Rectal cancer and robotic surgery. Systemic oncologic treatment, risks and benefits. Neo-adjuvant treatment of rectal cancer. Metastatic colorectal cancer.

Current Projects:

- REK application for regional biomarker project on colorectal cancer (jan)
- Establish work packages for biomarker project
- Applications for foundation of biomarker project

Highlights for 2025

- Established in 2025
- First research group meeting november 2025

Gastrointestinal surgery research group

Research Group Leader: Frank Pfeffer

Research Focus: The group conducts epidemiological, register based, clinical and translational research on gastrointestinal cancers—upper GI-cancer (oesophagus), hepato-pancreato-biliary cancer (primary liver cancer (HCC), cholangiocarcinoma, pancreatic cancer and colorectal liver metastasis) and colorectal cancer (colon cancer, rectal cancer and early colorectal cancer. Focus areas include diagnostics, risk stratification, treatment strategies, endoscopic treatment of early cancer, surgery, complications, follow-up and quality of life. The group also works on individual preoperative testing and prehabilitation in elderly patients (> 70 years) with oesophageal or colorectal cancer. For oesophageal and pancreatic cancers, the group participates in biomarker trials. The colorectal group leads a prospective biomarker trial with broad genetic mapping and analysis of circulating tumor DNA in patients with right-sided colon cancer. The team is currently working on an extension of this project to include all patients with colorectal cancer in Helse Bergen, Helse Førde and Helse Fonna. The team participates in RCTs and observational studies nationally and internationally.

Current Projects

Upper GI:

- NORECA (Norwegian Esophageal Cancer Consortium) - National multicentre prospective study with biobanking and registry of clinical parametres in patients with oesophagial cancer.

Hepato-pancreato-biliary:

- ASAC trial (closing) – Nordic multicentre RCT with aspirin adjuvant in patients undergoing resection for colorectal liver metastases.
- NORPACT-III trial (recruiting) – Norwegian multicentre prospective trial in patients with borderline and locally advanced pancreatic cancer. Registry of clinical parametres, sampling of circulating tumor DNA. Study of resection rates following neoadjuvant chemotherapy.
- “No Drain Trial” (recruiting) – Norwegian multicentre observational trial in patients undergoing distal pancreatic resection leaving no drain after resection.

Colorectal:

- Radical right colectomi (RRC) (Recruiting) - Prospective observational study
- SCAR (Surgery versus Endoscopic Resection for Incompletely Removed Early Colon Cancer) Trial (Recruiting) - European multicenter randomized controlled trial (RCT). Local primary investigator.
- Open D3 hemicolectomy compared to laparoscopic CME right hemicolectomy for right-sided colon cancer (Closed) - Multicenter RCT including a prospective biomarker study (ct DNA and single-cell immunprofiling).
- Prospective observational study on robotic colorectal surgery (Recruiting) - Ongoing observational study focusing on robotic techniques in colorectal procedures.
- No Stoma Trial (Closed) - Norwegian multicenter observational study. Local primary investigator and part of the steering group.
- SELSA Trial (Recruiting) - SELective defunctioning Stoma Approach in low anterior resecton for rectal cancer (SELSA): a prospective study with a nested randomised clinical trial. Nordic multicenter RCT. Local primary investigator and part of the steering group.
    - Assessment of difficulty level in robotic low anterior rectal resections (Recruiting)

Women's Clinic

Bergen Research Group for Gynecological Cancer

Research Group Leader: Professor Camilla Krakstad

Number of Group Members: 17
2 Professors
3 Senior scientists
1 Senior oncologists
4 PhD students
3 Technicians
1 Study nurse
3 MSc students

Research Focus:

- Gynecological cancer; main focus endometrial and cervical cancers
- Translational research

Research Focus:

Our highly international research group focuses on better understanding of endometrial and cervical cancer development, molecular subtypes and cancer cell mechanisms aiming to improve patient treatment. A population based biobank with associated clinical data allows biomarker studies and real-world data analysis, molecular profiling of cervical and endometrial cancers, including identification of single-cell phenotypes and clonal evolution. Endometrial and cervical cancer patient-derived organoid models have been established from all histological grades and subtypes. These models are used to investigate cancer dependencies and treatment resistance through genome-wide library CRISPR-Cas based screens, treatment response in orthotopic mouse models, and profiling of metastatic clones from *in vivo* implantation through genetic barcoding technology.

Current Projects:

- Understanding resistance to chemotherapy in uterine cancers
- Identification and implementation of biomarkers for endometrial cancer
- Genetic and phenotypic profiling of uterine cancers
- Understanding the metastatic process in endometrial cancer and phenotyping of metastatic cell-clones

Highlights for 2025:

1. Vrede SW, Weinberger V, Colas E, Krakstad C, Pijnenborg JMA, van Weelden WJ. It takes two to tango: importance of oestrogen receptor and progesterone receptor in endometrial cancer. Lancet Oncol. 2025;26(11):e572.
2. Ulvang ML, Kvile OF, Berg HF, Woie K, Haldorsen IS, Santin AD, et al. Co-expression of tissue factor, TROP2, and NECTIN4 in primary and matched metastatic cervical cancer lesions. Transl Oncol. 2025;59:102453.
3. Lien HE, Hjelmeland ME, Berg HF, Gold RM, Woie K, Akslen LA, et al. Multiplex single-cell profiling of putative cancer stem cell markers ALDH1, SOX9, SOX2, CD44, CD133 and CD15 in endometrial cancer. Mol Oncol. 2025.
4. Berg HF, Trovik J, Hjelmeland ME, Lien HE, Halle MK, Haldorsen IS, et al. Pragmatic preoperative molecular classification of endometrial cancers; Replacing POLE sequencing with hormone receptor staining. Gynecol Oncol. 2025;198:9-16.

GenderHealth at VID Spesialized University.

Research Group Leader: Tone Dahl-Michelsen and Ragnhild Tveit Sekse

The research group *Gender Health* has no active Phd project at the moment that deals with cancer topics. However, Ragnhild Tveit Sekse has an ongoing project related to Gynea - a digital psycho-educative program /rehabilitation program - where resources have been received from Helse Vest (2025-2027) to implement this in the clinic, at the gynecological outpatient clinic, Helse-Bergen. The digital program is research-based and has been tested in a feasible study and will now be implemented. This is an offer for all women who have finished treatment for gynaecological cancer.

Highlights for 2025:

Tveit Sekse, R. J., Breistig, S., & Synnes, O. (2025). Processing the trauma of gynaecological cancer through reading and writing: Women's experiences from digital storytelling after treatment. Health Care for Women International, 1-19.

Sekse, R. J. T., & Augestad, M. (2025). A digital psycho-educative program addressing women's fear of cancer recurrence: A qualitative thematic analysis of informants' own written texts. Nordic Journal of Nursing Research, 45, 20571585251343259.

Breistig, S., Thorkildsen, K. M., Werner, H. M. J., Nordgreen, T., & Tveit Sekse, R. J. (2025). Women's lived experiences with nurse-supported digital rehabilitation after gynaecological cancer: A phenomenological hermeneutic study. Nordic Journal of Nursing Research, 45, 20571585251332162.

Breistig, S., & Sekse, R. J. T. Kvinners erfaringer med digital rehabilitering etter underlivskreft–fra marginalisering til seksuell integritet.

Innovative Novel Ovarian Cancer Treatment Approaches (INOVA)

Research Group Leader: Line Bjørge and Katrin Kleinmanns

Number of Group Members: 10

Research Focus:

- Ovarian cancer, vulva cancer
- Translational: profiling (single cell analysis, proteomics), preclinical models, clinical trials

Research Focus:

The INOvA research team focuses on high-grade serous ovarian carcinoma through the RETHINK initiative, aiming to transform tumour profiling into personalized care. Four programs drive this work: tumour microenvironment profiling, preclinical modelling, antibody-based diagnostics, and clinical translation. Key methods include multi-omics immunoprofiling, advanced 3D tumour modelling using decellularized tissue, and functional preclinical testing. This approach has led to biomarker discovery, improved immunotherapy strategies, and novel diagnostic tools. A similar strategy is now applied to vulvar cancer as well.

Current Projects:

- Generate personalized immunophenotyping tools through multi-omics profiling.
- Engineer 3D hybrid systems to model tumor–stroma interactions and enable functional therapeutic testing.
- Develop localized CAR-T cell therapy using custom peritoneum-derived hydrogels for surgery-assisted immunotherapy.
- Identify precision drugs targeting resistant subpopulations to overcome chemoresistance.

Highlights for 2025:

- *Recipient of the National Young Investigator Award: Katrin Kleinmanns, recognized for her work on developing translational ovarian cancer model systems relevant to pharmacological and surgical treatment.*
- Establishment of advanced preclinical models for vulvar cancer.
- Identification of immunosignatures for personalized therapy selection in ovarian cancer.
- **Identification of single-cell resistance programs enabling rational carboplatin-anchored combination therapies in ovarian cancer.**

CCBIO – Centre for Cancer Biomarkers

In 2025, the Centre for Cancer Biomarkers (CCBIO) continued to strengthen its role as a leading environment for translational cancer research. As the centre entered the CCBIO 2.0 phase, its activities reflected strong scientific productivity, deeper integration with clinical practice, and a growing emphasis on innovation and international collaboration.

Scientific Highlights
Research groups across CCBIO delivered important advances in tumour biology, biomarker development, and immuno-oncology. A recurring theme in 2025 was the application of high-dimensional and single-cell technologies to uncover tumour heterogeneity and treatment resistance.

Key scientific contributions included new insights into aggressive breast cancer especially in young women, immune signatures in ovarian cancer patients treated with combination immunotherapy, more precise functional assays for predicting response to immune checkpoint inhibitors, and detailed single-cell mapping of proposed cancer stem-cell markers in endometrial cancer. Together, these studies strengthened CCBIO's position at the forefront of biomarker-driven cancer research. Emerging research also explored the role of the nervous system in tumour development, suggesting that neural involvement may represent an under-recognised hallmark of cancer progression.

Innovation and Translation
2025 marked a clear reinforcement of CCBIO's innovation agenda. The 13th CCBIO Annual Symposium highlighted extensive participation from industry, with sessions dedicated to entrepreneurship, translational partnerships, and early-phase innovation. This shift reflects CCBIO's long-term ambition to bridge fundamental discoveries with diagnostic and therapeutic applications.

Major translational projects progressed in 2025, including initiatives testing repurposed drug combinations to improve treatment options for AML patients and the launch of an international collaboration aimed at creating advanced ex vivo platforms for studying drug resistance in head and neck cancer. These efforts underline CCBIO's growing ability to attract competitive funding and support innovation in clinically relevant areas.

Strategic Development and Capacity Building
As CCBIO advanced into the CCBIO 2.0 phase, the centre further consolidated its organisational structure, research culture, and clinical partnerships. A major milestone was the release of CCBIO in Brief, a comprehensive retrospective summarising over a decade of scientific activity, strategic development, and lessons learned.

Capacity building remained a central priority. The CCBIO Research School for Cancer Studies continued to offer an extensive course portfolio, and junior researchers took part in international research stays, including year-long exchanges at Harvard Medical School. CCBIO also contributed to institutional competence-building activities at UiB, sharing insights from its experience as a Centre of Excellence.

Events and Scientific Community Engagement
CCBIO maintained an active scientific events calendar throughout 2025. Key activities included seminars with international speakers, hands-on workshops on 3D cancer models, junior-researcher symposia, and the new single-cell satellite seminar preceding the annual symposium. These events strengthened CCBIO's research community and supported cross-disciplinary collaboration.

In summary, CCBIO's activities in 2025 reflect a robust and forward-looking research environment that successfully integrates scientific excellence, clinical relevance, innovation, and international collaboration. As the centre continues to evolve within the CCBIO 2.0 framework, it remains a key contributor to national and global efforts to improve cancer diagnostics, treatment strategies, and patient outcomes.

Read more about CCBIO:
CCBIO – Centre for Cancer Biomarkers | UiB
CCBIO in Brief 2013–2024 | UiB

Research grants 2025

Selected research grants awarded to researchers affiliated with Haukeland University Hospital.

Research grants from the Norwegian Cancer Society

Project title: LET's GO: LET Optimisation in paediatric proton therapy – Guideline development and clinical implementation
Project lead: Grete May Engeseth

Project title: ENLUCA: Enhancing lung cancer treatment response with proton therapy (Liv Bolstad Hysing)
Research grant: 8 MNOK
Project lead: Liv Bolstad Hysing (HUS/UiB)
Ny studie skal undersøkje om protonterapi kan gi betre behandling for lungekreftpasientar - Helse Bergen HF

Research grants from the Research Council of Norway

Project title: BioPrecise Protons: Advancing physical and biological precision to enhance efficacy and reduce toxicity in proton therapy
Research grant: 40 MNOK
Project lead: Kristian Ytre-Hauge (UiB), Collaborator Camilla Stokkevåg (HUS/UiB)
Utvikler ny verdsleiande forsking på protonterapi mot kreft | Fakultet for naturvitenskap og teknologi | UiB

Trond Mohn Research Foundation

Project title: ProtonSUMMIT: Translational research to advance clinical proton therapy and improve long-term outcomes
Research grant: 27 MNOK
Project lead: Camilla Stokkevåg (HUS/UiB)

The research group: Liv Hysing, Sara Pilskog, Camilla Stokkevåg (PI), Oddbjørn Straume, Grete May Engeseth og Stian Knappskog

Synopsis of research project: The ProtonSUMMIT project received NOK 27 million from the Trond Mohn Research Foundation to strengthen Bergen's position in international proton therapy research. The nearly NOK 80 million project is based in the new proton facility at Haukeland University Hospital, where researchers combine expertise in medicine, physics, biology, imaging and artificial intelligence to study how proton radiation affects cells and tissues. The project aims to identify biomarkers and biological mechanisms that can improve treatment precision and to develop methods that allow proton therapy to be used in a more targeted and gentle way for cancer patients.
Website: 27 Million NOK from Trond Mohn Research Foundation: Bergen Researchers Take a New Step in the Fight Against Cancer

Projects related to Driv – Center for Women's Health Research

Total research grant: 24 MNOK

Cancer related projects
Project title: Early embryonic epimutations and female cancer.
Project lead: Stian Knappskog (UiB/HUS)

Project title: Rethinking Ovarian Cancer: Developing Diagnostic and Functional Tools and Designing Innovative Multimodal Treatment Strategies.
Project lead: Line Bjørge (UiB/HUS)

Research grants Helse Vest

Website: Desse får forskingsmidlar frå Helse Vest i 2026 - Helse Vest RHF

Immune checkpoint inhibitors in cancer treatment: improved risk-benefit balance and resource use through pharmacokinetic modelling.
Anna-Kristina Fredheim Oma. Helse Bergen HF.
Grant: PhD fellowship, 3 years (100%).

Novel imaging markers guiding prognostication and targeted treatment in uterine cervical cancer.
Kari Strøno Wagner-Larsen. Helse Bergen HF.
Grant: Postdoctoral fellowship, 6 years (50%).

Personalising cancer treatment with predictive markers of response to immunotherapy in melanoma.
Kjersti Davidsen. Helse Bergen HF.
Grant: Postdoctoral fellowship, 6 years (50%).

Holistic and personalised diagnostics, treatment and follow-up for colorectal cancer.
Kristin Bentung Lygre. Haraldsplass Diakonale Sykehus.
Grant: Postdoctoral fellowship, 6 years (50%).

The role of regulatory dendritic cells in resistance to AXL-inhibition.
Sturla Magnus Grøndal. Helse Bergen HF.
Grant: Postdoctoral fellowship (100%) + international mobility grant.

STARS-Trial: Stereotactic Radiation Therapy and Adjuvant Radiosensitisation with Sulfasalazine for recurrent GBM – a phase 2 international multicentre trial.
Bente Sandvei Skeie. Helse Bergen HF.
Grant: Project support, NOK 1,666,000 (2025).

Development of a new immunotherapy for myelodysplastic syndrome patients based on CAR-T cell technology (MyCAR).
Emmet Mc Cormack. Helse Bergen HF.
Grant: Project support, NOK 2,330,000 (2025).

Holistic Ovarian Cancer Prediction (HOPE).
Line Bjørge. Helse Bergen HF.
Grant: Project support, NOK 1,264,000 (2025).

Embryonic BRCA1 epimutations – a hidden cause of breast cancer.
Stian Knappskog. Helse Bergen HF.
Grant: Project support, NOK 1,109,000 (2025).

Disease extent and recurrence patterns in small-cell lung cancer.
Marianne Aanerud. Helse Bergen HF.
Grant: Clinical research fellowship, 6 years (50%).

PET-MR for response evaluation in breast cancer patients receiving neoadjuvant therapy.
Hanna Dillekås. Helse Bergen HF.
Grant: Clinical studies grant (20%), 3 years.

PhD defences

Cancer related PhD defences affiliated with Haukeland University Hospital

Bjørn-Erik Bertelsen
Date of PhD defence: 23.1.2025
Thesis title: Ultrasensitive Assays for Targeted Breast Cancer Treatment
Main supervisor: Bjørg Almås
Co-supervisors: Kristin Viste og Gunnar Mellgren
More information (in Norwegian): Verdensledende metode gir håp for bedre brystkreftbehandling | Nye doktorgrader | UiB

Hanne Øye
Date of PhD defence: 25.4.2025
Thesis title: Small cell lung cancer – The role of a putative tumor suppressor
Main supervisor: Henriette Aksnes
Co-supervisors: Professor Thomas Arnesen og Dr. Marianne Aanerud
More information (in Norwegian): Ny innsikt i metastasering av småcellet lungekreft | Nye doktorgrader | UiB

Luka Tandarić
Date of PhD defence: 23.5.2025
Thesis title: Rethinking High-Grade Serous Ovarian Carcinoma: Towards Personalized Immunotherapy through Preclinical, Translational and Clinical Evaluation of Combined CD73 and PD-L1 Blockade
Main supervisor: professor Line Bjørge
Co-supervisors: professor Emmet Mc Cormack, researchers Liv Cecilie Vestrheim Thomsen and Katrin Kleinmanns
More information (in Norwegian): Ny innsikt i immunterapiens effekt på eggstokkreft | Nye doktorgrader | UiB

Emma Kayleigh Rigg
Date of PhD defence: 6.6.2025
Thesis title: Targeting Extracellular Vesicles and Tumour-Mediated Signalling in Brain Metastasis
Main supervisor: professor Frits Thorsen
Co-supervisors: professor Rolf Bjerkvig og Dr. Jian Wang
More information (in Norwegian): Omprogrammering av hjernens miljø ved hjernemetastaser | Nye doktorgrader | UiB

Mette Skorstad
Date of PhD defence: 6.6.2025
Thesis title: Follow-up care of gynecological cancer survivors
Main supervisor: professor Ingvild Vistad (UiO)
Co-supervisors: professor Sveinung Berntsen (UiA) og professor Line Bjørge (UiB/HUS)
More information (in Norwegian): Individuell oppfølging bedrer livet etter gynekologisk kreft | Nye doktorgrader | UiB

Johannes Tjelta
Date of PhD defence: 11.6.2025
Thesis title: Monte Carlo Simulations of Neutrons in Pediatric Proton Therapy: Exposure and Late Effects
Main supervisor: Camilla Hanquist Stokkevåg (HUS/UiB)

Co-supervisors: Kristian Smeland Ytre-Hauge (UiB)
More information (in Norwegian): Sekundær nøytronstråling ved protonbehandling av barnekreft | Nye doktorgrader | UiB

Andreas Havsgård Handeland
Date of PhD defence: 26.6.2025
Thesis title: Advancing Proton Therapy for Paediatric Cancer: The Role of Linear Energy Transfer in Predicting and Mitigating Brainstem Toxicity
Main supervisor: Camilla Hanquist Stokkevåg
Co-supervisors: professor Kristian Smeland Ytre-Hauge
More information (in Norwegian): Betre sparing av hjernen ved protonbehandling av barnekreft | Nye doktorgrader | UiB

Elen Siglen
Date of PhD defence: 30.06.2025
Thesis title: *The Rosa chatbot project - The development, evaluation and implementation of a chatbot to support patients during genetic testing for hereditary breast and ovarian cancer*
Supervisor: Cathrine Bjorvatn, Hildegunn Vetti
More information (in Norwegian): Disputas: Kan en chatbot være en god samtalepartner om arvelig kreft? - vid.no

Eleni Christakou
Date of PhD defence: 16.10.2025
Thesis title: Studies on soluble AXL and the function-blocking antibody tilvestamab
Main supervisor: professor Petri Kursula
Co-supervisors: David Micklem
More information (in Norwegian): Løselig AXL: nye muligheter for biomarkører og behandling | Nye doktorgrader | UiB

Ingeborg Nerbø Reiten
Date of PhD defence: 24.10.2025
Thesis title: New Molecules and Repurposed Drugs for Improved Cancer Therapy
Main supervisor: Professor Lars Herfindal
Co-supervisors: Professor Håkon Reikvam
More information (in Norwegian): Nye molekyler og kombinasjonsbehandlinger mot kreft | Nye doktorgrader | UiB

Njål Lura
Date of PhD defence: 24.10.2025
Thesis title: MRI Precision imaging for individualized treatment in uterine cervical cancer
Main supervisor: professor Ingfrid S. Haldorsen
Co-supervisors: professor Camilla Krakstad og dr. Kathrine Woie
More information (in Norwegian): MR ved livmorhalskreft gir nyttig informasjon om risiko for tilbakefall | Nye doktorgrader | UiB

Marte Karen Brattås
Date of PhD defence: 31.10.2025
Thesis title: Exploring the spleen tyrosine kinase (SYK) as a possible pharmacological target in human acute myeloid leukemia
Main supervisor: professor Håkon Reikvam
Co-supervisors: Kimberley Hatfield

More information (in Norwegian): SYK – et mulig behandlingsmål i akutt myelogen leukemi? | Nye doktorgrader | UiB

Tara Helén Steinsland Dowling
Date of PhD defence: 18.11.2025
Thesis title: Acute myeloid leukemia at single-cell resolution
Main supervisor: Bjørn Tore Gjertsen
Co-supervisors: Cara E. Wogsland og Pascal Gelebart
More information (in Norwegian): Krigen mellom klonane: det klonale landskapet i AML | Nye doktorgrader | UiB

Rammah Elnour
Date of PhD defence: 5.12.2025
Thesis title: Advancing Translational Approaches in Vulvar Squamous Cell Carcinoma
Main supervisor: Harsh Nitin Dongre
Co-supervisors: professor Daniela Elena Costea, professor Line Bjørge, researcher Ahmad Rashad
More information (in Norwegian): Biomarkører og 3D-modeller gir ny innsikt i vulvakreft | Nye doktorgrader | UiB

News

Artificial Intelligence Matches Radiologists in Early Detection of Pancreatic Cancer

A major international study with contributions from Haukeland University Hospital demonstrated that artificial intelligence (AI) can detect pancreatic cancer on CT imaging with accuracy comparable to, or exceeding, that of experienced radiologists. Pancreatic cancer is one of the most lethal cancer types and notoriously difficult to detect early, even with expert interpretation. In the study, more than 250 AI algorithms were submitted globally, and the top-performing models were evaluated on CT scans from over 1,100 individuals. The AI systems matched or outperformed 68 radiologists in distinguishing cancer from other diseases and normal findings.

Researchers from Radiology and the Department of Pathology at Haukeland contributed essential imaging and biological material to the project. The study, published in *The Lancet Oncology*, highlights the potential of AI to improve diagnostic accuracy, support earlier detection, and reduce workload for radiologists. The findings also underscore the importance of long-term interdisciplinary collaboration at Haukeland in advancing AI-based cancer diagnostics.

Artificial intelligence and radiologists in pancreatic cancer detection using standard of care CT scans (PANORAMA): an international, paired, non-inferiority, confirmatory, observational study - The Lancet Oncology

Ny studie: Kunstig intelligens oppdagar bukspyttkjertelkreft like godt som radiologar – NRK Vestland

From left: Professor Ingfrid S. Haldorsen, Director of the Department of Radiology, Professor Anders Molven, Laboratory Clinic, Marjolein Liedenbaum, Consultant Radiologist, Department of Radiology

Christian Beisland Receives the Helse Vest Research Prize 2025

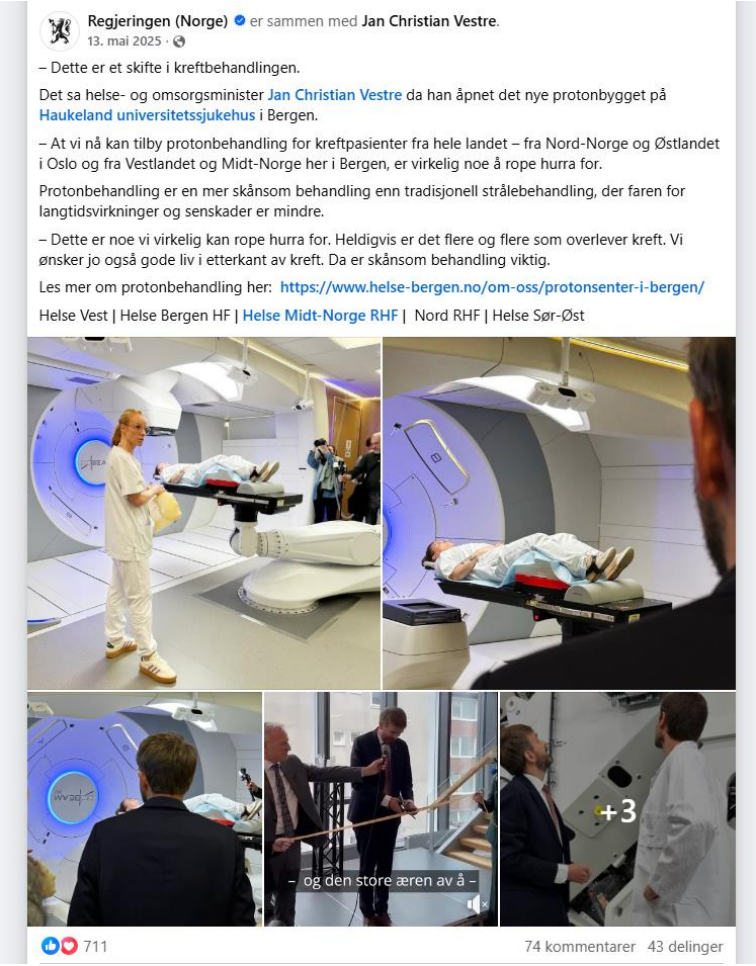
Christian Beisland, Head of Department and Consultant Urologist at Haukeland University Hospital and Professor at the University of Bergen, received the Helse Vest Research Prize 2025 for his pioneering clinical research in urology. His work has significantly improved the diagnosis, treatment, and follow-up of patients with kidney and urinary tract cancers, influencing European clinical guidelines. The award was presented at the regional Helse Vest Research Conference, which annually highlights outstanding contributions to research and innovation.

Christian Beisland (center) receiving the award for Researcher of the Year, and Øystein Eikrem (left) with the award for Young Researcher of the Year. Pictured together with the Chief Executive Officer of Haukeland University Hospital, Eivind Hansen.

Proton Therapy Opens at Haukeland University Hospital

The opening of the new proton therapy facility at Haukeland University Hospital in May 2025 marked a major shift in cancer treatment in Norway, according to Minister of Health and Care Services Jan Christian Vestre.

Proton therapy is a gentler form of radiation treatment compared to traditional radiotherapy, with a lower risk of long-term side effects and late complications. As more people survive cancer, the focus is increasingly on ensuring a good quality of life after treatment, making less harmful treatment methods especially important. The launch of this facility is therefore seen as an important milestone worth celebrating.



From the opening of the Proton facility

First patient receiving proton therapy

First patient receiving proton therapy

Advancing Clinical Evidence in Proton Therapy

Norway has set a clear ambition to include 75% of all proton therapy patients in clinical studies, reflecting a strong commitment to evidence-based implementation and continuous improvement of cancer care. In support of this goal, the national call for clinical treatment research (KLINBEFORSK) awarded NOK 50 million to two major clinical proton therapy projects commencing in 2025: PRORADNOR and PROSARC.

PRORADNOR evaluates the benefits of proton therapy in patients with head and neck cancer and includes a large randomized clinical trial in patients treated with curative intent. The study aims to

generate robust evidence on treatment outcomes and toxicity reduction compared with conventional radiotherapy.

PROSARC is a national project comprising two clinical studies in soft tissue sarcoma: one comparing preoperative proton versus photon therapy in patients with localized disease, and another assessing definitive proton therapy in patients with inoperable tumors.

In addition to these newly funded initiatives, the PRO-GLIO study has been ongoing since 2022. This randomized trial compares proton and photon therapy in patients with IDH-mutant grade 2 and 3 glioma. The study includes patients from all health regions in Norway as well as Sweden, and to date has enrolled 55% of the planned patient population. PRO-GLIO is funded by the Norwegian Cancer Society and the South-Eastern Norway Regional Health Authority.

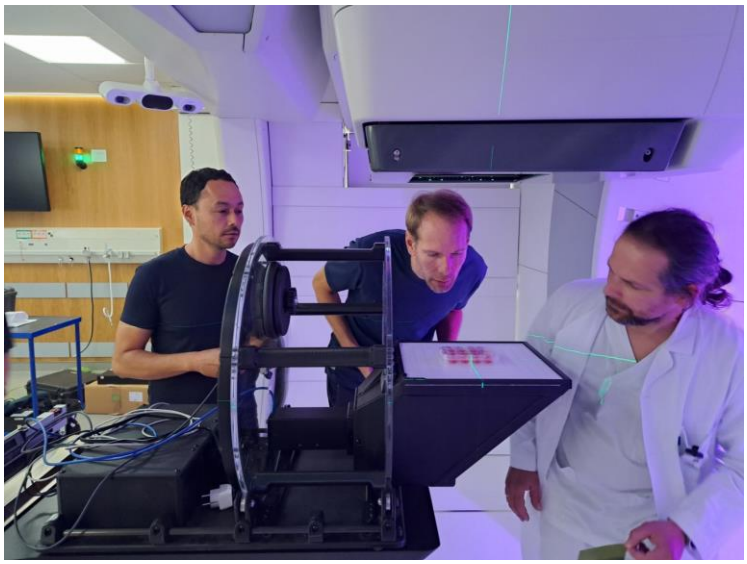
Together, these studies represent a comprehensive national effort to generate high-quality clinical evidence across multiple cancer diagnoses, supporting safe, effective, and equitable use of proton therapy in Norway.

Expanding Research Capacity in Proton Therapy

Research—beyond clinical studies—is essential to identify new applications of proton therapy and to enable access for broader patient groups. To support this development, our proton facility includes a dedicated research gantry and is now established as a national core facility for pre-clinical proton research.

In 2025, a formal collaboration agreement was signed with Western Norway University of Applied Sciences (HVL) and the University of Bergen (UiB) for the use of this core facility. During the same year, a research coordinator was appointed, and the first cell irradiation experiments were successfully initiated.

Going forward, expanded use of this core facility will be a key priority, supporting both biological research and technology development. These efforts will contribute to advancing knowledge on biological effects, improving precision in dose delivery, and fostering innovation across disciplines, thereby strengthening the foundation for future clinical implementation of proton therapy.



First experiment at the proton research core facility

Research infrastructures

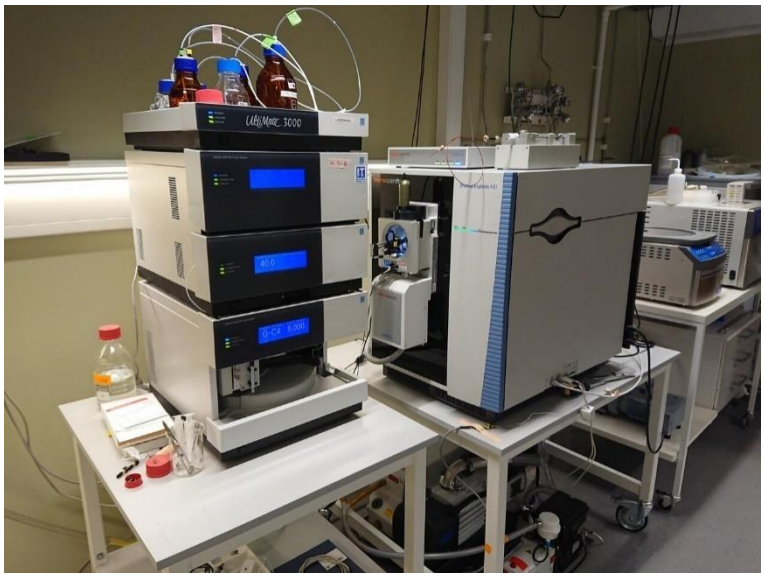
A selection of core facilities available at University of Bergen / Haukeland University Hospital.

Core facilities for biomedical research in Bergen

The Faculty of Medicine, University of Bergen (UiB), is host to 9 advanced equipment and infrastructure platforms, or core facilities, providing analytical frameworks for cutting-edge biomedical research across disciplines. Researchers from both the University of Bergen and Haukeland University Hospital have equal access to all facilities, including equal pricing, and a large proportion of projects involve researchers, material or data from both institutions. Access and usage are managed transparently through the booking platform BookitLab. By centralizing equipment and accompanying expertise, the core facilities enable researchers to work efficiently and achieve high-quality results. Several facilities are involved in, or helming, large national infrastructures funded through dedicated calls from the Norwegian Research Council. Among the 9 core facilities, 5 considered particularly relevant to cancer-related research are described below.

The Proteomics Unit (PROBE)

The Proteomics Unit (PROBE) is a research infrastructure dedicated to advanced mass spectrometry–based proteomics. As one of the faculty's central molecular platforms, PROBE provides high-resolution protein identification, quantification, and post-translational modification analysis, enabling researchers to investigate complex biological systems at unprecedented depth. The facility offers state-of-the-art instrumentation, including high-sensitivity LC-MS/MS systems, complemented by expert scientific support in experimental design, sample preparation, and data interpretation. PROBE plays a significant role in translational research by supporting biomarker discovery, precision oncology, infection biology, and systems medicine. Through its integration with national and international proteomics networks, the facility ensures that researchers at UiB and Haukeland University Hospital have access to cutting-edge methodologies and analytical pipelines.



Thermo Fisher Orbitrap Exloris. Photo: Olav Mjaavatten

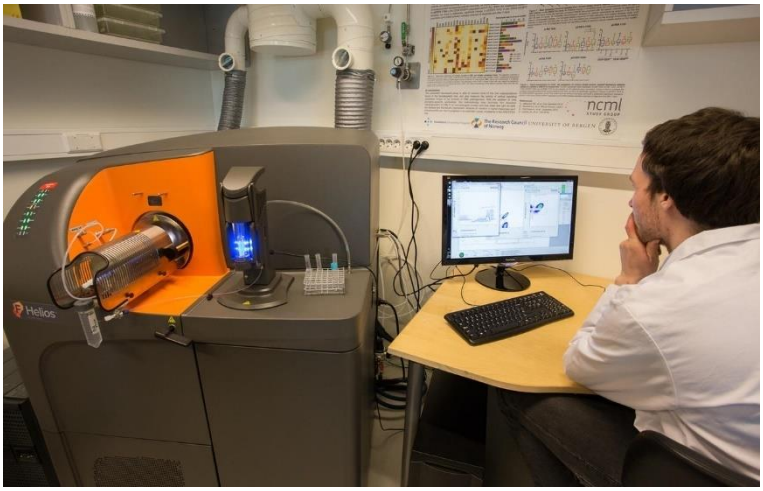
Genomics Core Facility

The Genomics Core Facility provides advanced sequencing and molecular analysis services to researchers across the university and its clinical partners. As a key member of the national NorSeq consortium, the facility offers high-quality whole-genome, whole-exome, targeted sequencing,

RNA-seq, epigenetic profiling, and metagenomic analyses. Equipped with state-of-the-art sequencing instruments and automated library preparation systems, the facility ensures robust, reproducible, and high-throughput data generation. Expert staff provide comprehensive support, from project planning and experimental design to bioinformatics analysis and data interpretation.

Flow Cytometry Core Facility

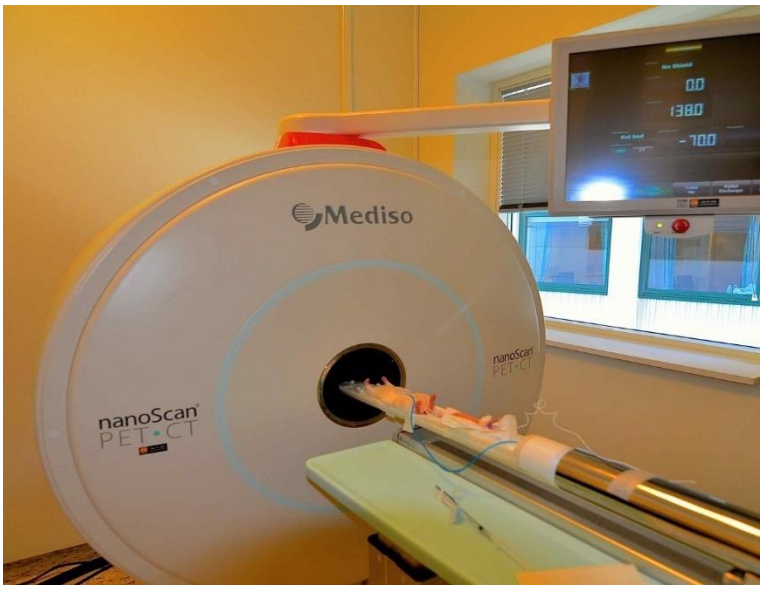
The Flow Cytometry Core Facility provides essential analytical and cell-sorting capabilities for biomedical research. The facility offers a broad portfolio of advanced flow cytometers, high-speed cell sorters, and mass cytometry platforms (CytofXT and Helios/Hyperion), enabling detailed characterization of immune cells, stem cells, tumor populations, and engineered cell systems. In recent years, the facility has expanded its services to include 3D tissue imaging and high-parameter analysis, supporting projects in immunology, hematology, oncology, and regenerative medicine. Skilled staff provide training, experimental guidance, and assistance with panel design, data acquisition, and computational analysis.



Helios Cytof XT instrument in use. Photo: FLOW core facility.

The Molecular Imaging Center

The Molecular Imaging Center (MIC) provides a comprehensive suite of advanced imaging technologies, including high-resolution light microscopy, confocal and super-resolution imaging, multiphoton microscopy, and in vivo imaging of small animals. The facility supports the entire imaging workflow, from sample preparation and live-cell imaging to quantitative image analysis and visualization. This ensures that researchers can generate high-quality, reproducible data. MIC's scientific staff offer extensive expertise in imaging methodology, experimental design, and advanced analysis pipelines, making the facility a key resource for cell biology, neuroscience, oncology, infection biology, and tissue engineering.



Mediso nanoScan Animal PET-CT. Photo: Aurora Brønstad

The Laboratory Animal Facility

The Laboratory Animal Facility is a core facility that provides essential *in vivo* research capabilities for biomedical and translational science. The facility is designed to meet high international standards for animal welfare, biosafety, and ethical research, and it supports a broad range of experimental models, including rodents, zebrafish, and specialized disease models. With modern housing systems, controlled environments, and advanced imaging and surgical suites, the core facility enables researchers to investigate disease mechanisms, test therapeutic strategies, and validate molecular findings in physiologically relevant systems. Highly trained staff provide expertise in animal breeding, experimental procedures, regulatory compliance, and refinement of animal models. The facility's close collaboration with Haukeland University Hospital ensures seamless integration between preclinical and clinical research.

The remaining core facilities, which can also play significant roles in biomolecular research, are the Core Facility for Metabolomics, the Core Facility for Biostatistics and Data Analysis (BIOS), the Research Unit for Health Surveys (FHU), and the Biophysics, Structural Biology, and Screening (BiSS) facility.

Eitri – incubator and innovation centre

Haukeland University Hospital (HUS) and the Faculty of Medicine at the University of Bergen (UiB), established Eitri at the end of 2021 at the top of the building of basal biology, located nearby the laboratories and the clinical and research expertise. Eitri is both a healthcare incubator and an innovation center with aim to develop new solutions in close dialog with those who know the challenges best, and to support a stronger innovation culture among the institutions.

To reach the ambitious goals of the Cancer Mission, researchers, policy makers, health care institutions, industry and patient organizations are asked to work together to find good solutions. In 2025 Eitri was engaged in some tasks to help this happen.

The Health community in Bergen gave a first consultant (researcher PhD) in the Center of excellence in Palliative Care Haukeland University, a recruitment and collaboration grant to implementation of preliminary interviews – for safe patient pathways. Eitri got the role of facilitating kick-off for the collaboration with the participants from Haukeland University Hospital, Øygarden Municipality and the Cancer Society.

The head of Eitri was also engaged as a consultant for the Cancer Society to help them into the shift of data driven innovation. With a focus on insight and service innovation, the goal was to support cancer survivors even better. As a result, pre-rehabilitation for cancer patients became a political priority in 2026.

The Cancer Society also chose Eitri as the venue for awarding grants to Norwegian cancer research in 2025. CCBIO/UiB received a prestigious research grant from the Norwegian Cancer Society, with the project: “Cancer – Neuron Synapses and Behavior of Breast Cancer”.

VIS – The innovation Company of Vestland

Eitri is operated in collaboration with VIS – Vestlandets Innovasjonsselskap AS, who is one of the largest innovation companies in Norway. VIS is owned by Haukeland University Hospital (HUS), the University of Bergen (UiB), the Institute of Marine Research, SIVA, Western Norway University of Applied Sciences (HVL), and the Norwegian School of Economics (NHH). VIS’s overall mission is to help ensure that knowledge and new ideas are transformed into solutions that benefit society — through value creation, sustainability, and innovation.

VIS combines ecosystem and incubator activities with a professional Technology Transfer Office (TTO) function. The TTO team operates in close collaboration with researchers and clinicians at UiB and HUS and is responsible for advancing research ideas from an early stage to decision-making documentation, intellectual property strategy, and further commercial realization. The VIS TTO team brings together interdisciplinary expertise and assembles the right competencies for each project across institutions, managing a portfolio spanning medtech, diagnostics, drug development, platform technologies, and digital health.

Examples of ongoing innovation projects within cancer research in 2025:

A first-in-class radiosensitizer, based on research conducted at UiB, the project aims to develop treatment targeting metastatic cancer. The purpose of the treatment is to increase the effectiveness of radiotherapy as an add-on to today’s standard treatment. The project has received funding through the Research Council of Norway (NFR) Verification program. The funding has contributed to validation of leading drug candidates and the establishment of a solid basis for commercialization.

Breast cancer diagnostics (PROCAST-35) is based on research at UiB and aims to develop a tool to identify and classify high-risk patients. This will allow patients to receive more targeted treatment early in the treatment process. The project has received funding through the NFR Qualification program. The funding has contributed to validation of biomarker panels, an early commercial assessment, and initial dialogue with relevant commercial actors. The project will apply for NFR Verification funding for further development and realization.

CanProX, based on research conducted at UiB, is developing a precise tool for stratification of breast cancer patients, improving decision-making in radiotherapy planning and helping to avoid overtreatment. The project has received funding through the NFR Qualification program. The funding has contributed to validation of biomarker panels, as well as early commercial evaluation and early dialogue with relevant commercial stakeholders. The project will apply for NFR Verification funding for further development and realization.

Meeting and dialogue between researchers, startups and the government in Norway. From left: Kari Øritsland (Head of Eitri), Ådne Iden Høiland (Incubator Manager of Eitri), Jan Christian Vestre (Minister of Health and Care Services), Gerd Kvale (Founder and CEO of Safe Choice Clinic and Research), Eivind Hansen (Chief Executive Officer Haukeland University Hospital), Per Bakke (Dean of the Faculty of Medicine at the University of Bergen) Sarankan Sivakanesan (Founder of Noteless), Hilde Hordnes (CEO and founder of Dynamon) Øystein Theodor Ødegaard-Olsen (CEO and founder of Eupnea).

List of publications 2025

Cancer-related publications affiliated with Haukeland University Hospital (HUS). Publications are listed alphabetically by title. Authors affiliated with HUS are indicated in bold.

"It was 15 minutes without pain" - a mixed methods pilot study on the implementation of music therapy for hospitalised patients with incurable lung disease. Bruland Andresen V (UIB), **Schmid W**, **Låstad T**, **Sigurdardottir KR**, **Assmus J**, **Schaufel MA**. European clinical respiratory journal. 2025. 12 (1). PMID: 41058745

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