

Tyks Cancer Centre Annual Report 2025



LÄNTINEN SYÖPÄKESKUS
FICAN WEST
FICAN VÄST



**European
Reference
Network**

for rare or low prevalence
complex diseases

Network
Adult Cancers
(ERN EURACAN)

Member
Turku University
Hospital – Finland

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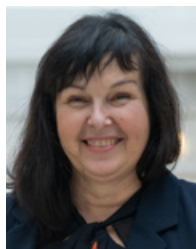
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PART 1 Tyks Cancer Centre / Turku University Hospital Tyks

In November 2019 the Tyks Cancer Centre was approved as a Cancer Centre member in the Organization of European Cancer Institutes (OECI). The Cancer Centre status confirms that Tyks meets all high-quality standards of cancer care and research when benchmarked and peer-reviewed with other cancer institutes in Europe. In October 2025, Tyks CC was re-audited and we look forward to results after peer-review and improvement plans.

In 2023, a comprehensive, national reform of all health and social services was initiated in Finland. The hospital districts in Finland were replaced by 21 wellbeing services counties. Tyks belongs to the Wellbeing Services County of Southwest Finland (VARHA) as a hospital service unit. The TYKS Cancer Centre has been a part of this unit as well as a part of the FICAN (Finnish Cancer Centre network) and resides administratively in FICAN West together with the hospitals in Pori (Wellbeing services county of Satakunta) and Vaasa (Wellbeing services county of Ostrobothnia).

The oncological functions of these organizational units collaborate within a comprehensive cancer research cluster, which includes the University of Turku. In the wellbeing counties, the voice of cancer patients and cancer research must be emphasized continuously, since the wellbeing services counties are responsible for the public administration of all branches of healthcare, social services, and rescue services in Southwest Finland – an enormous workload and responsibility which requires a great deal of human and funding resources.

In addition, year 2025, the 13 hospital service units within TYKS were united to form five service areas. Service area 2 includes FICAN West and Tyks Cancer Centre and most of the operational functions of the hospital service. In the midst of these changes, our mission is to establish TYKS

and FICAN West as one of the leading centers of cancer care and research in Finland.

The members of the Tyks Cancer Board represent all service areas that carry operational and therapeutic responsibility for cancer care in this region. We are committed to continuous development of personalized, high-precision medicine-based cancer care. In doing this, we have, for example, developed a proprietary molecular tumor board working model within FICAN used in all of Finland, and we have supported the special education of a pathologist in the international field of molecular pathology, since this specific education is not available in Finland yet.

An executive committee of the Tyks Cancer Board convenes four times annually. In the future, we are planning to organize these meetings every second month. The main goal of these meetings is to reinforce the collaboration related to decision-making, implementation of cancer care, and cancer research across Tyks and the University of Turku.

The members of this executive committee have been nominated by the CEO of Tyks, and they represent the main heads of the service areas involved in cancer treatment and research. The executive board operates in close collaboration with the Cancer Board (Clinical) and the Scientific Cancer Board, which together cover all heads of department and research directors involved in cancer treatment and research.

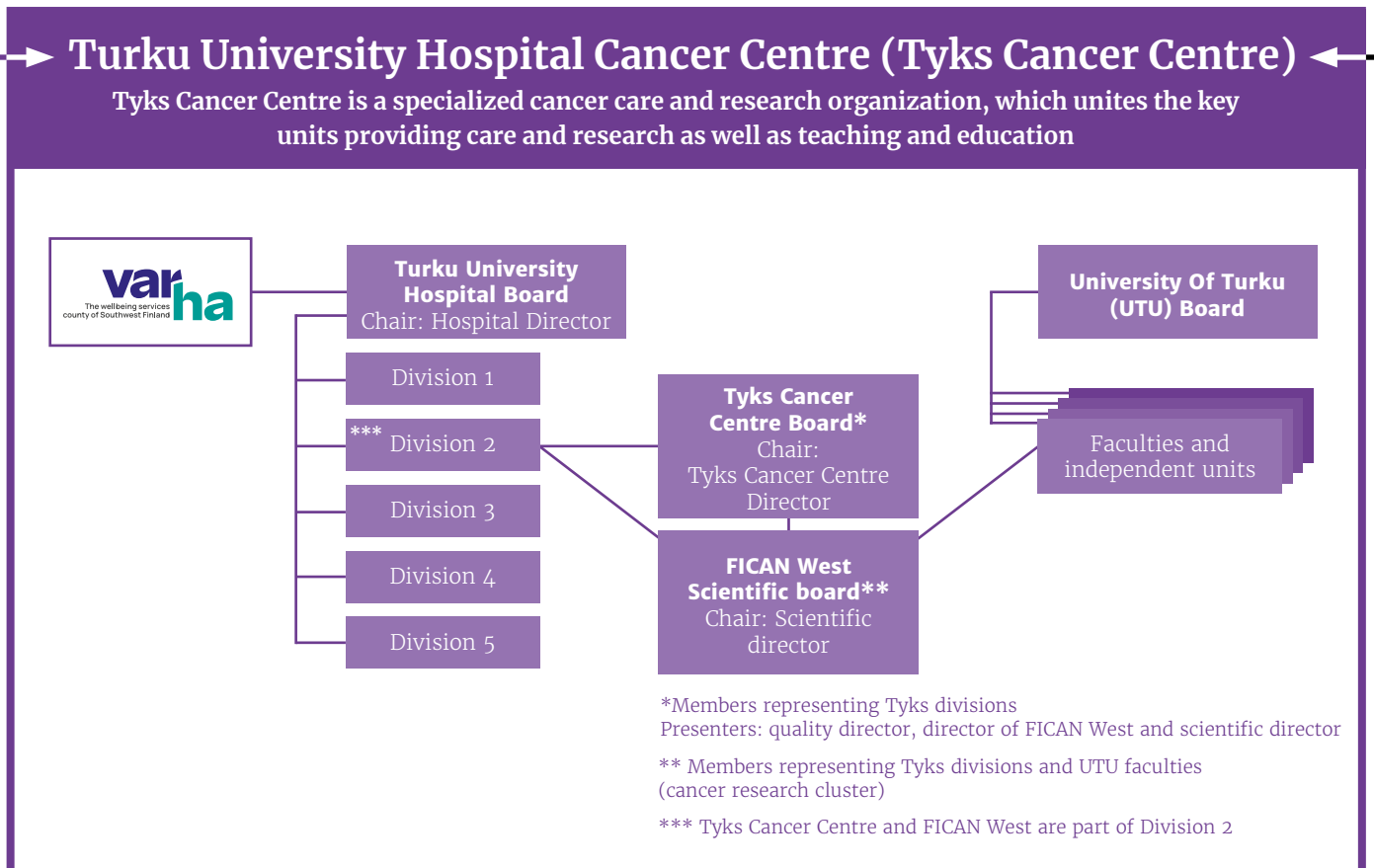
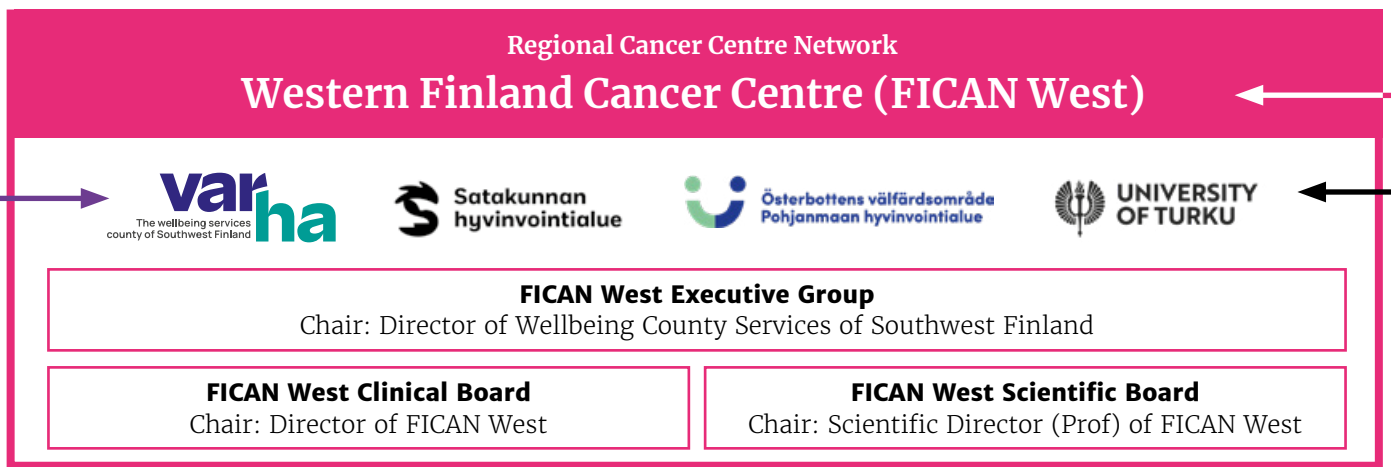
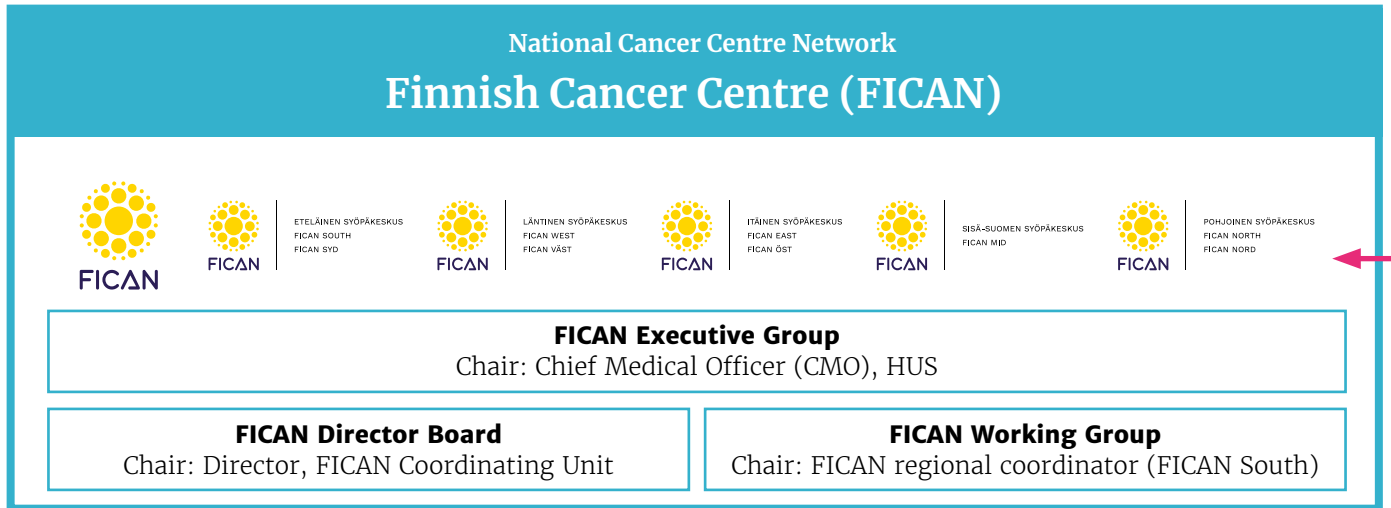
Cancer care and clinical research have faced many challenges in 2025. Finland is still undergoing significant budget cuts in healthcare and surprisingly, many wellbeing service counties will achieve a budget surplus in 2025. The first Finnish National Cancer Strategy has been published 10th November 2025 and the future years will show how these ambitious plans are implemented in practice.

FICAN – Finnish National Cancer Center

FICAN is a collaborative network in Finland aiming at improving the care of patients as well as research and education in the field of oncology through co-operation among regional cancer centers. The coordination centre of FICAN started operating in the spring of 2022, with Professor Tomi Mäkelä as director. Regional cancer centers (FICAN East, FICAN Mid, FICAN North, FICAN South, FICAN West) have been established already since 2018. The goal of the network is to enhance cancer prevention,

diagnostics, treatment, rehabilitation, and translational and clinical research across the country. During the year 2025, the main effort has been to create a national cancer strategy for Finland, and more than 200 multidisciplinary cancer professionals, the Ministry of Social Affairs and Health, cancer research organizations, patient organizations and medical companies have participated in this endeavor.

Organizational structure



Tyks Cancer Centre Board

Sirkku Jyrkkiö, MD, PhD, Director, Tyks Cancer Centre, Cancer Clinic and Main Centre

Maria Gardberg, MD, PhD, Chief physician, Pathology *

Sakari Hietanen, MD, Prof, Chief physician, Gynecologic Oncology *

Maija Itälä-Remes, MD, Prof, Chief physician, Hematology *

Sari Johansson, Head nurse, Neurocentre *

Juhani Juhola, MD, Chief physician, Rehabilitation services

Annukka Katila, Head nurse, Ortho

Nana Kautto, Chief confidential man

Marita Kilpeläinen, MD, PhD, Chief physician, Pulmonary Diseases *

Gaber Komar, MD, PhD, Medical Imaging *

Minna Koskenvuo, MD, PhD, Chief physician, Pediatrics & Adolescent

Hanna-Kaisa Kuitunen, Head nurse, Abdominal surgery *

Heidi Laine, Head nurse, Hearth centre *

Ruut Laitio, MD, PhD, Chief physician, Intensive care

Maija Lavonius, MD, PhD, Chief physician, Abdominal surgery

Tuija Lehtikunnas, PhD, Hospital Head nurse

Sanna Maula, MD, PhD, Chief physician, Palliative Care

Pirjo Mustonen, MD, PhD, CEO, VARHA

Marja-Kaisu Norvasuo-Heilä, Head nurse, Rehabilitation services

Heikki Nuutinen, MD, PhD, Gastroenterology surgery

Kristiina Pälve, MD, PhD, Cardiothoracic Surgery *

Jaakko Rinne, MD, Prof, Chief physician, Neurocentre *

Minna Santikko, Head Nurse, Cancer Clinic and Main Centre *

Mervi Siekkinen, PhD, Development Manager, FICAN West *

Tero Soukka, MD, PhD, Chief physician, Cancer Clinic and Main Centre *

Sari Tanninen, Head nurse, Cancer Clinic and Main Centre *

Hanna Vinberg, Head nurse, Intensive care

Heikki Ukkonen, MD, PhD, Chief physician, Heart center

Annika Ålgars, MD, PhD, Chief physician, Cancer clinic *

Ville Äärimaa, MD, PhD, Chief physician, Ortho

Clinical Cancer Board Members

Pia Vihinen, MD, PhD, Adjunct professor, Director, FICAN West (Chair of Clinical Board)

Nina Bruck, MD, PhD, Plastic Surgery

Maria Haanpää, MD, PhD,

Eeva Haapio, MD, PhD, Head and Neck Surgery

Pauliina Hartiala, MD, PhD, Chief physician, Plastic Surgery

Eetu Heervä, MD, PhD, Cancer clinic

Tuula Huumonen, Head nurse, Oncology, Satahospital

Johanna Hynninen, MD, PhD, Gynecologic Oncology

Antti Jekunen, MD, Prof, Chief physician, Oncology, Vaasa Central Hospital

Nina Jumisko, Head nurse, Hematology

Veli Kairisto, MD, PhD, Genomic

Sonja Karinkanta, Head nurse, Oncology, Vaasa Central Hospital

Saila Kauhanen, MD, PhD, Digestive Surgery and Urology

Sini Keskinen, MD, PhD, Medical Genetic

Ilpo Kinnunen, MD, prof, Head and Neck

Marikka Kuoppamäki, MD, PhD, Palliative Care

Anne Laapotti-Salo, Head nurse, Pulmonary, Skin Diseases

Jussi Liippo, MD, PhD, Chief physician, Skin Diseases

Päivi Lähteenmäki, MD, Prof, Researcher, Pediatrics

Kalevi Pulkkanen, MD, PhD, Chief physician, Oncology, Satahospital

Leila Varakas, Head nurse, Obstetrics and Gynecology

Pirita Varpe, MD, PhD, Digestive Surgery and Urology

Vesa Vilkki, MD, PhD, Cardiothoracic Surgery

Maria Silvoniemä, MD, PhD, Pulmonary Diseases

Maria Sundvall, MD, PhD, Cancer clinic

Outi Tuominen, PhD, Head nurse, Pediatrics and Adolescent

Aaro Turunen, MD, PhD, Oral and Maxillofacial Diseases

Scientific Cancer Board Members

Panu Jaakkola, MD, PhD, Prof, UTU, Tyks, FICAN West, Scientific director, (Chair of the board)

Tero Aittokallio, PhD, Statistics and Applied Mathematics, UTU

Peter Boström, MD, PhD, Urology, Tyks

Klaus Elenius, MD, PhD, Prof, Director, Turku Bioscience, BioCity Turku, UTU

Laura Elo, PhD, Prof, Turku Bioscience, UTU

Pauliina Hartiala, MD, PhD, Plastic Surgery, Tyks

Eetu Heervä, MD, PhD, Oncology and Radiotherapy, Tyks

Sakari Hietanen, MD, PhD, Prof, Gynecological Surgery, Tyks

Maija Hollmén, PhD, MediCity Research Laboratories, UTU

Riikka Huovinen, MD, PhD, Oncology and Radiotherapy, Tyks

Pekka Hänninen, PhD, Dean, Faculty of Medicine, UTU

Heikki Irjala, MD, PhD, Prof, Head and Neck Surgery, Tyks

Maija Itälä-Remes, MD, PhD, Prof, Hematology, Tyks

Johanna Ivaska, PhD, Prof, Turku Bioscience, UTU

Antti Jekunen, MD, PhD, Prof, Oncology and Radiotherapy UTU, Vaasa Central Hospital

Saila Kauhanen, MD, PhD, Gastroenterological Surgery, Tyks, UTU

Jani Keyriläinen, PhD, Medical Physics, Tyks

Minna Koskenvuo, MD, PhD, Pediatrics and Adolescent Cancer, Tyks

Ville Kytö, MD, PhD, Director of Research and Development, Tyks

Veli-Matti Kähäri, MD, PhD, Prof, Dermatology, UTU, Tyks

Riitta Lahesmaa, MD, PhD, Prof, Director, Turku Bioscience, UTU

Janne Leivo, PhD, Department of Life Technologies, UTU

Emilia Peuhu, PhD, Institute of Biomedicine, UTU

Matti Poutanen, PhD, Prof, Institute of Biomedicine, Center for Disease Modeling, UTU

Kalevi Pulkkanen, MD, PhD, Oncology, Sataairaala

Eeva Rainio, PhD, Head of faculty development, Faculty of Medicine, UTU

Johanna Schleutker, PhD, Prof, Genomics, TYKS, Institute of Biomedicine, UTU

Mervi Siekkinen, PhD, Development manager, Oncology and Radiotherapy, Tyks, FICAN West

Maria Sundvall, MD, PhD, Oncology and Radiotherapy, Tyks, UTU

Pekka Taimen, MD, PhD, Prof, Pathology, Tyks, UTU

Mervi Toriseva, PhD, Tyks, FICAN West, secretary of the board

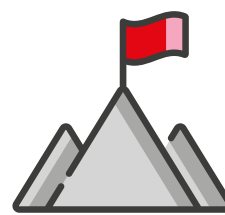
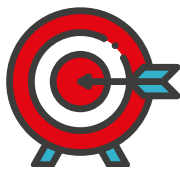
Pia Vihinen, MD, PhD, Director, Oncology and Radiotherapy, Tyks, FICAN West

Jukka Westermarck, MD, PhD, Prof, Turku Bioscience, UTU

*members both the Tyks Cancer Centre Board and Clinical Cancer Board

Tyks Cancer Centre strategy 2023–2025

The Tyks Cancer Centre strategy 2023–2025 constitutes a strategic plan of the future, which will guarantee the population of the region high-quality and efficacious treatment of cancer, research and education in the context of a center of excellence to be.



VISION: The Tyks Cancer Center is an internationally acknowledged high-quality cancer center which produces evidence-based cancer treatment and high-level scientific research in a timely manner in an environment where the personnel experience a high level of wellbeing. It will be one of the leading centers of Finnish cancer care and research.

MISSION: The Tyks Cancer Center is the heart of the cancer care and research produced by the FICAN West Cancer Center and it also includes the central hospitals in Pori and Vaasa and the Turku University Cancer Research cluster. FICAN West is an active part of FICAN (Finnish Cancer Center) together with FICAN South (Helsinki), FICAN Mid (Tampere), FICAN East (Kuopio), FICAN North (Oulu) and Co-ordination unit (at HUS)

Assets and specialties of the Tyks Cancer Centre

- The Tyks Cancer Centre has all diagnostics and treatments available in Finland to be used to the benefit of cancer patients.
- Highly specialized development in personalized medicine and genomic diagnostics. The Auria Biobank and the clinical information unit provide a unique setting that makes it possible to combine information on tumor molecular biology with patient records, a combination that will provide real-world evidence data for daily practice and research. The hospital campus area harbors one of the leading PET centers in Europe and the Auria Biobank for collection, storage and advanced research on biological specimens.
- Multilingual, highly competent professionals. Cancer care is routinely provided in Finnish or Swedish.
- The leading stem cell transplantation unit in Finland.
- Basic cancer research and clinical research are combined and form the FICAN West Research network located in the same campus area. More than 100 cancer-oriented biotechnology companies at the same campus generate and develop research innovations from bench to bedside.
- Nursing science research is integrated into a program of the Tyks Cancer Centre called Psychosocial care and survivorship care of cancer patients.
- All facets of cancer care and research are easily reached within the campus area.

Tyks Cancer Centre: Key strategic measures 2023-2025

1. Strengthen the involvement of FICAN West in the Finnish Cancer Center network (FICAN).
2. Be involved in the planning of the Finnish Cancer Strategy and commit to its work.
3. Continue work in the OECI accreditation program and in the European network of Rare Cancers (EURACAN).
4. Support precision medicine-based treatment, the collection of fresh tumour biopsies (Finprove, Pro-exmet and iCAN studies), and continue to develop the work of molecular tumour boards (MTB)
5. Increase the number of clinical trials (also radiotherapy trials) in the most common cancer groups (breast cancer, prostate cancer, lung cancer) and improve patient accrual to trials.
6. Strengthen the research network among the partners of FICAN West and promote investigator-initiated studies and thesis projects.
7. Continue to develop biological imaging of cancer with new tracers (PET).
8. Be active in various research networks and organisations and in obtaining EU funding, when possible.
9. Support career development and education of cancer care professionals, e.g., by education events, mentoring and exchange programs.
10. Be active in establishing nationwide quality registers on cancer treatment and develop solutions for electronic follow-up of patients and how patient contacts are managed and supported.
11. Develop further patient-centered supportive care and cancer rehabilitation.

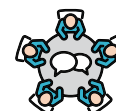
Core activity data 2025



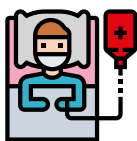
Diagnosed (new) patients
3391 in 2024



Radiotherapy patients
1601



Molecular Tumour Board
patient cases 80



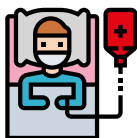
Chemotherapy patients 3019



Stereotactic radiotherapy patients
231



Total number of medical imaging
studies 16922
(MRI, PET, PET-MRI, PET-CT, CT)



Chemotherapies 5038



Ward care periods 7981



Molecular pathological studies
8163



Outpatient appointments
187 835



Ward care days 49596

Relative survival

The Finnish Cancer Registry maintains the national registry of all the diagnosed cancer cases since 1953. It is also a statistical and epidemiological research institute that collaborates both nationally and internationally.

Year 2023 there were 39238 new cancer cases and 13 646 cancer-related deaths in Finland. 334263 patients diagnosed with cancer were alive. About 70% of all patients diagnosed with cancer live at least 5 years. There were 4538 new cases of bowel cancer, 5216 new cases of breast cancer, and 5631 new cases of prostate cancer in Finland.

This table shows the data on relative 5-year survival of patients treated at the Southwest Finland area. Survival data originates from the Finnish Cancer Registry (www.cancerregistry.fi). Table shows five-year relative survival (%) in patients diagnosed 2021–2023 for the five most common cancer diagnoses in Finland and for cutaneous melanoma by gender. Urinary tract cancers include diagnoses C65–C68 and D09.0–D41.1–9. The number of patients treated at the Southwest Finland (FICAN West Cancer Centre) area (excluding patients treated at the Ostrobothnia) are also shown.

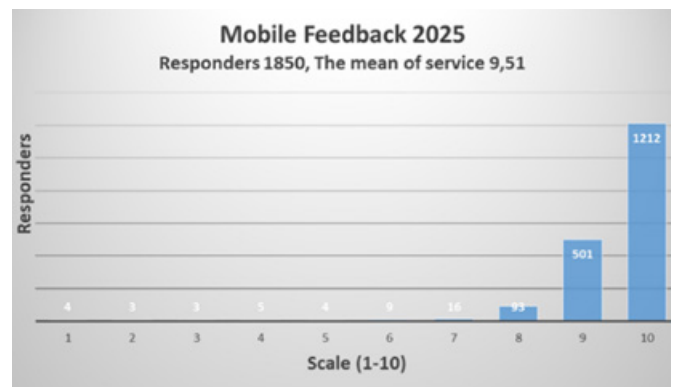
ICD-10	Tumor location	Gender	5-year survival Finland 2021–2023	5-year survival FICAN West 2021–2023	Patients (n) FICAN West 2023
C50	Breast	Female	92.38	93.55	786
C18-20	Colon		69.71	68.65	345
C54	Uterus		81.33	80.08	145
C33-34	Lung		24.12	26.17	204
C43	Melanoma		94.54	86.58	119
C65-68	Urinary tract		65.18	Unknown	65
C61	Prostate	Male	93.83	93.80	890
C18-20	Colon		67.28	66.50	425
C33-34	Lung		14.96	16.31	306
C65-68	Urinary tract		74.56	67.94	203
C43	Melanoma		92.58	93.46	169

Patient satisfaction and feedback in 2025

Patient feedback and recognition of patient needs are extremely important for improving the services of FI-CAN West. Patients can continuously provide us with feedback in several ways. An electronic feedback form is available on the TYKS website, smiley terminals are at the disposition of clients, and traditional feedback forms on paper may be used. The paper forms can be returned into a feedback box in the care unit. All feedback is collected in the Roidu system. The Roidu system generates relatively little feedback, which is why patient satisfaction and feedback are analyzed here only by using another feedback system that has been used for a longer period, i.e., feedback by text message (SMS): The patient receives a text message on his/her mobile phone and a hyperlink for providing immediate feedback after a treatment visit. <https://roidu.com/>

A total of 1,850 patients treated in the oncology unit provided feedback in 2025. The feedback was provided on a score from 1 to 10 and it turned out to be very positive indeed: no less than 66 % of the respondents gave the overall service a score of 10 with an average score of 9.51.

In addition to the overall rating, respondents could evaluate the service by scoring five preprepared statements. The scale ran from 1 to 5. The statement that scored the lowest was Decisions concerning my care were made in cooperation with me, with a mean of 4.77 score points, and the one that scored the highest was “The personnel was friendly”, with a mean of 4.89 points.



Respondents provided also free comments, which were, in general, positive. Some examples:

“I received an appointment with a doctor on the same day, after calling my nurse in the morning while in pain. The doctor was very aware of my situation, and I received the treatment I needed. Thank you.”

“Gentle therapeutic interaction was excellent! Everyone smiled, greeted me, and created a feeling of belonging. The care was holistic. I felt safe.”

“The nurse explained the instructions in plain language. She did not use Latin terms or otherwise difficult vocabulary. It was wonderful to understand everything that was discussed. The nurse also answered all questions directly.”

Some comments suggested improvement:

“Even after six and a half years, I still hope to meet a familiar doctor—my ‘own doctor’—during my visits, instead of a new resident every time. I do not feel safe.”

“This feedback concerns a phone call from my oncologist. The doctor was rude, rushed, and dismissive. It left me feeling bad. I didn’t even have time to ask everything, as she ended the call so quickly. Usually, I have only received good care and high-quality patient interaction at the oncology clinic. This phone conversation was neither.”

Quality system



Quality management means operative leadership, assessment and improvement aimed at reaching preset quality goals. The goal of the quality management plan of Tyks is to support systematic and continuous development of quality and patient safety. The quality management plan is based on national legislation, organizational strategy, operative quality goals and on systematic assessment and continuous improvement of what is done.

In general, the SHQS quality program is used by all departments in the Tyks hospital that manage cancer patients. In addition, the work done within the Tyks laboratory functions (clinical chemistry, pathology, genomics, microbiology, Auria Biobank) are accredited clinical laboratory activities (SFS-EN ISO 15189: 2013, FINAS). Medical imaging (clinical neurophysiology, clinical physiology, nuclear medicine, and – within PET – also production of radiopharmaceuticals) are accredited diagnostic functions. An external clinical audit of the use of medical radiation in the department of nuclear medicine, in the PET center and in radiotherapy has been carried out, as required by the Radiation Act.

Tyks has been a member of European Reference Network (ERN) since 2016 and re-audited to European Cancer Network (Euracan) 2023.

Tyks Cancer Centre has been a member of Organization of European Cancer Institutes (OECI) Cancer Centre since 2016. Cancer Centre status received at 2019

confirmed that Tyks meets all high quality standards of cancer care and research when compared and peer-reviewed with other cancer institutes in Europe. During 2025 Tyks Cancer Centre went through the re-accreditation process and peer review.

Tyks Cancer Center Participated in the OECI peer review

The vision of the OECI (Organization of European Cancer Institutes) quality assessment program is to provide cancer patients with equal access to high-quality cancer care delivered by multidisciplinary teams; to ensure that cancer research and innovation are fully integrated into patient pathways; and to place patients at the center of their care. To support these goals, the Tyks Cancer Center went through the OECI auditors' peer review on 1.-2.10.2025. The audit required a significant collective effort of all Tyks personnel and everyone who prepared for and participated in the audit from both Tyks and Varha.

During the two-day visit, the auditors toured eight units and conducted fifteen interviews. They assessed cancer diagnosis, treatment, education, research, and management using OECI standards and indicators as well as peer review. Based on the preliminary findings, our care is patient-centered, the staff is motivated and skilled, the treatment and infrastructure are excellent and well-equipped, and the connection to the university is strong. The next step is to await the audit final report to support continuous quality improvement.

Quality registry

A central part of the quality register for cancer treatment and research is the national Finnish

Cancer Registry. The Finnish Cancer Registry automatically receives information about new cases of cancer, histologically confirmed. The challenge is to create comprehensive clinical reports. The aim of the Cancer Registry is to expand the registry to allow for extensive clinical and epidemiological research.

FICAN West works on a national level closely with other regional cancer centers of FICAN, including the Finnish Cancer Registry, with the aim of improving coverage of the information of the entries of the Finnish Cancer Registry. Quality registers, implemented in surgery, are expected to unify the structured operative reports. Currently, systems are in place for collection of information on adverse events experienced by patients receiving oncological drugs and on disease follow-up (this is the case, e.g., in gynecology, hematology, lung diseases, pediatrics, oncology and urology). This has been made possible through modern technology, which allows commercial companies or the Health village system to analyze data. During 2025, the unification of datapool of Tyks hospital at Wellbeing services county of Southwest Finland (Varha) is still on-going.

Measures of quality of care and follow-up

Together with Wellbeing services county of Southwest Finland IT service and the Finnish Cancer Registry, to support Tyks Cancer Centre clinical work and the monitoring of the treatment effectiveness more effectively and facilitate scientific research, FICAN West coordinates the development of cancer quality registries and a Cancer data dashboard. The unified

operative model and indicators of quality and follow-up will be determined.

Strengthening Data-Informed Management in Cancer Care: The Cancer Data Dashboard Pilot

Development of a management dashboard for specialised health-care leadership at the TYKS Cancer Centre began in 2019. This long-term development work created the foundation for the Cancer Data Dashboard pilot at 2025, which represents the next phase in strengthening data-informed, impact-based, and cost-aware decision-making in cancer care. It focuses on developing a management dashboard that enables the systematic monitoring of patient access to care, quality of care, treatment effectiveness, and selected cost-related dimensions alongside the previously developed MILA indicators. By providing timely and comparable data, the dashboard supports both strategic planning and operational management across cancer care services.

In 2025, the TYKS Cancer Centre participated in an EU-funded NextGeneration project entitled “Pilots Supporting the Development of Impact-Based Governance” in the Wellbeing Services County of Southwest Finland. The Cancer data dashboard pilot was implemented as part of this project, building on previous efforts to strengthen data-informed management and impact-based governance in cancer care.

Measuring effectiveness and cost-effectiveness in cancer care provides specialised healthcare with concrete tools for service development and evidence-based decision-making. Data-informed management and impact-based governance require clearly defined impact objectives, reliable indicators, and a strong data foundation.

In cancer care, these needs are particularly critical due to increasing demand, growing treatment complexity, and tightening financial constraints. Addressing these needs is at the core of the pilot.

The development work at Tyks Cancer Centre has been carried out through close multidisciplinary collaboration involving FICAN West development team, clinicians from surgery, medical oncology, and radiotherapy, nursing experts, and personnel of Sustainable Growth Southwest Finland programme technical specialists from the data and knowledge management team and Auria Data Service of the Well-being Services County of Southwest Finland.

The objectives of the pilot were to define and agree on impact indicators and to assess their reliability, to evaluate the usability and visual design of the dashboard in cancer care units, and to test the dashboard as a tool for quality management. A key principle throughout the project was the harmonisation of indicators, data definitions, and coding practices to ensure that the information produced is reliable, transparent, and comparable across all units. During the project, new indicators for cancer care were standardised and consolidated into Power BI-based data system. Following the completion of the project, the aim is for the system to be accessible to all cancer care managers and unit heads, enabling real-time monitoring, analysis, and reporting of key data.

Due to resource constraints, breast cancer was prioritised as the initial focus of the pilot. The development began with a selected set of core indicators, including the annual number of newly diagnosed breast cancer patients and the proportion of metastatic disease,

access to care at different stages of the care pathway from referral or surgery to systemic therapy or radiotherapy, and the implementation of treatments within defined target timeframes. These indicators provide essential insight into care pathways, treatment timeliness, and potential delays or constraints within the system.

In addition to indicator development, the pilot focused on refining the coding systems used in the underlying data repository. This work aimed to ensure the production of reliable and comparable information on the annual number of new cancer patients and the proportion of advanced disease.

While breast cancer served as the initial focus of the pilot, the Cancer Data Dashboard has been designed as a scalable solution. The indicators developed during the project will be further refined and progressively expanded to cover additional cancer types. The long-term goal is to establish a shared indicator framework that supports comprehensive monitoring, quality assessment, and management of cancer care across multiple cancer diagnoses.

The development of the Cancer data dashboard is ongoing and will continue beyond the end of the project. Future work will focus on further validation of indicators, refinement of data content, and ensuring the accuracy and comparability of reported figures. The long-term objective is for the Cancer data dashboard to become a permanent tool supporting the monitoring of cancer care, quality assessment, cost awareness, and strategic decision-making at Turku University Hospital, while also creating a foundation for future collaboration with other hospitals and wellbeing services counties.

PART 2 Patient Treatment

Standardization of patient care

The Tyks Cancer Centre follows ESMO, ASCO and national (FICAN) recommendations on the treatment of cancer.

To standardize and equalize the treatment in Finland, the Finnish Cancer Centre (FICAN) is working to create comprehensive national recommendations for treatment and follow-up of cancer patients. The pilot versions of these recommendations have been published as treatment guidelines for colorectal cancer and renal cell cancer. Current national care recommendations (treatment guidelines) are available at terveysportti.fi intranet, which are limited to health care professionals (Current Care

Guidelines). Our plan is to standardize all cancer-related patient information and treatment instructions of the entire Wellbeing services counties of Southwest Finland, Satakunta and Ostrobothnia. These harmonized instructions are available for professionals at the proprietary intranet of FICAN West (FICANintra).

For citizens, several cancer-related treatment instructions are available in the national web page www.terveyskyla.fi and www.terveysportti.fi. The web page www.hoito-ohjeet.fi, also containing information on treatments for patients and the general public, is maintained by FICAN

West. The websites maintained by FICAN include fican.fi > ficanwest.fi for professionals and patients to provide the following information:

- All recruiting clinical trials of the Cancer Centre.
- Updated information on waiting times for referral to the first treatment contact, to surgery, to chemotherapy and to radiotherapy for the most common cancer types.
- Cancer-specific patient pathways for most common cancers. These pathways include information on the cancer and on how to support and improve patients' understanding on their illness, diagnosis and selfcare. New pathways are being updated continuously.



Examples

New care pathways for 'Melanoma and other skin cancers' and 'Bladder cancer' for patients are published at Tyks Cancer websites

In addition to description of care pathways for professionals at IMS, Tyks Cancer Centre has published Cancer care pathways for patients at websites. The pathways provide an up-to-date overview of the care process from diagnosis to

follow-up. The Cancer care pathways for patients is to support their individual and fluent care, as well as ability to participate in decision-making related to treatment. The patient pathways has already developed for acute leukemia, brain, breast, gastrological, gynecological, head and neck, lung and prostate cancer patients in collaboration with experts from various specialties.

The target of the pathways is to ensure high-quality, consistent, and patient-centered care, as well as to provide sufficient information throughout the entire care journey. During 2025 developed two new patient pathways 'Melanoma and other skin cancers' and 'Bladder cancer'. Explore the care pathways on the Tyks website www.tyks.fi/potilaille-ja-laheisille/hoidot-ja-tutkimukset/syopa

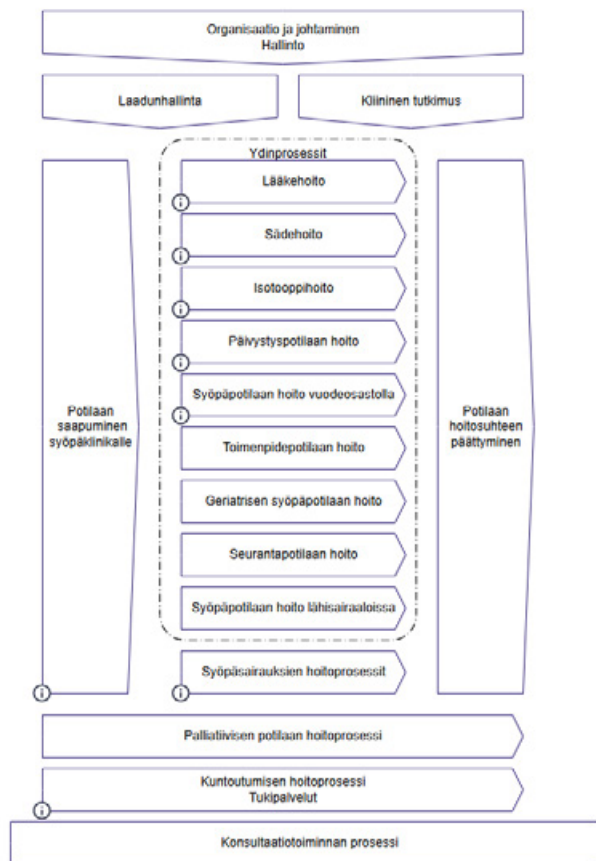
Development of Care Pathway Processes and the IMS Management System at Tyks Cancer Centre

At Tyks Cancer Centre, care pathway process descriptions for cancer patients have previously been created for different cancer types, such as colorectal, bladder, and breast cancer. These descriptions have been developed in a multidisciplinary manner, but they have been stored in various locations within units, and there has not been a unified model in use. This has made it challenging to harmonize care practices and ensure smooth information flow.

In 2025, the IMS (Integrated Management System) was implemented to support quality management, leadership, and organizational transparency. The IMS system is used to document key service processes as well as work and operational instructions, making them accessible to all staff. This ensures that up-to-date process descriptions and guidelines are easily available and can be utilized across unit and professional boundaries.

The main objectives of describing care pathway processes are to:

- Standardize care practices and clarify the stages of the care pathway (prevention, symptoms, suspicion of cancer, diagnosis, treatment, follow-up)
- Ensure the appropriateness and smoothness of care across different units and professional groups
- Support quality management, leadership, and the effectiveness and efficiency of care
- Clarify multidisciplinary collaboration and information flow



- Enable transparency of responsibilities and processes, as well as continuous development
- Ensure that care is based on the latest scientific knowledge and treatment recommendations, regardless of the treating unit or professional

During 2025, the Tyks Cancer Clinic has focused on describing the main processes of cancer patient care in a multidisciplinary way, such as referral handling, intravenous drug therapy, and radiotherapy processes. These process descriptions have been created by teams including physicians, nurses, radiographers, and other

experts. An example of a main process is the intravenous drug therapy process.

In 2026, the description of care pathways for different cancer types will begin in the IMS system. The pilot will start with the care pathway for breast cancer patients, with the aim of assembling a working group and initiating the process description during the year. The goal for these process descriptions is to support the quality, consistency, and continuous development of care, as well as enable the evaluation and measurement of care processes.

Threshold of 1000 Allotransplantations Exceeded in the Turku Stem Cell Transplantation Unit

The Stem Cell Transplantation Unit of Turku University Hospital has a long and distinguished history in transplant medicine. Allogeneic stem cell transplantations (alloSCTs) began in 1981, followed by autologous transplantations in 1991. Since those early years, annual alloSCT volumes have steadily increased to 50–65 procedures, and in autumn 2025 the Unit surpassed the milestone of 1000 allogeneic transplants. In addition to treating our own patients, the Unit serves as one of Finland's two national transplant centres, with two thirds of procedures performed for patients referred from other regions.

AlloSCTs are among the most demanding treatments for haematological cancers. Alongside modern

medical practice, uncompromising quality is essential for successful outcomes. The European transplant community operates under the JACIE/EBMT quality system, which awards accreditation to centres meeting extensive and rigorous criteria. Our Unit has maintained this accreditation since the early 2000s and has now successfully completed its third re-accreditation.

We also collect allogeneic stem cells from volunteer unrelated donors, not only for Finnish patients but through international collaboration for patients across Europe, the USA, and Canada.

High-quality transplant outcomes rely on robust quality control and a highly committed, skilled team. Each year, the EBMT conducts a benchmarking analysis of all reported alloSCTs, adjusting for individual transplant risk using

a comprehensive algorithm that includes diagnosis, patient age, and other factors. Encouragingly, our results over the past two years have ranked among the very best in Europe. As shown in the graphics below, we are a medium-sized centre—yet we consistently achieve top-level outcomes.

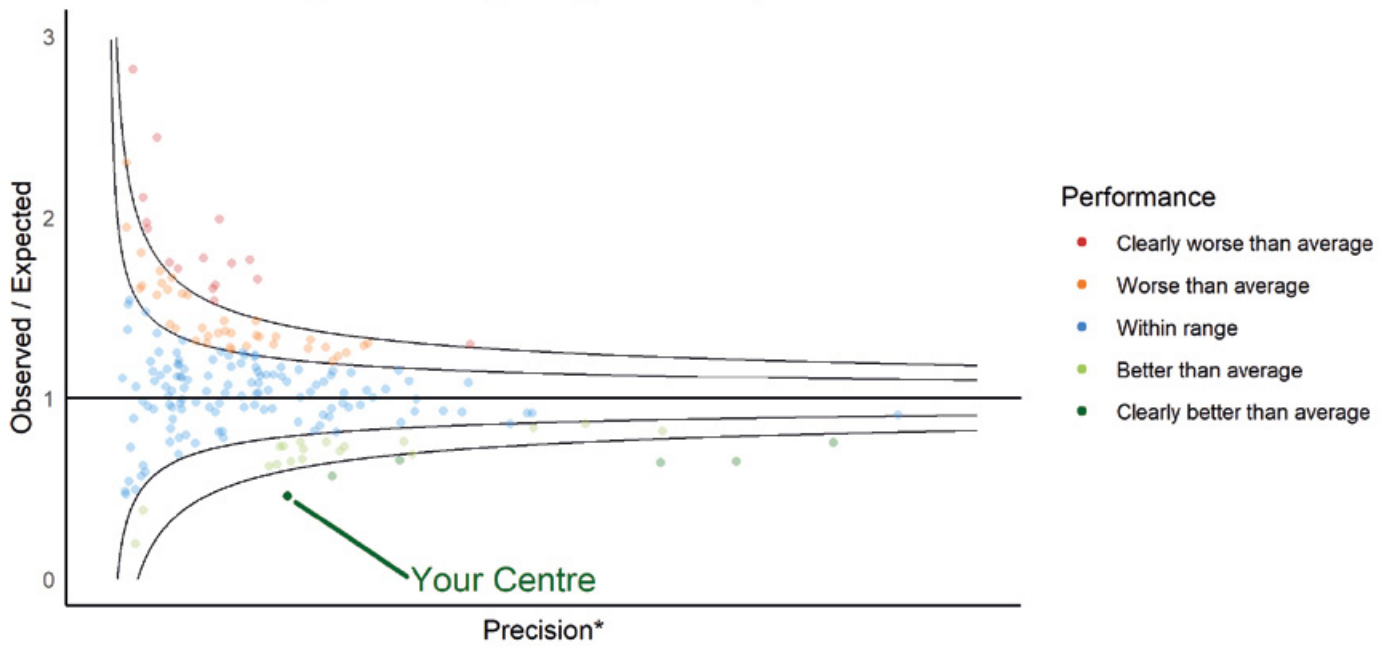
Looking ahead, our mission is to maintain the excellence of our SCT Programme through continuous staff education, adherence to quality standards, and sustained development of our operations. Preserving the strong, collaborative team spirit within our Unit remains essential. Ultimately, every step we take is driven by one goal: delivering the best possible care and outcomes for our patients.

Maija Itälä-Remes, Transplant Programme Director

Renita Mäkinen, Chief Quality Manager



One-year mortality / Allogeneic transplants



Multidisciplinary team (MDT) meetings at the Tyks Cancer Centre and FICAN West

In 2025, 21 regular clinical multidisciplinary team (MDT) meetings focusing on different cancer types were organised at Tyks, 15 of which were online weekly. The MDT includes at least a surgeon, a pathologist, a radiologist, a medical oncologist, a radiation oncologist, and meeting nurses, each specialized to the corresponding cancer type. Meetings on cancer of the head and neck, lung, brain, female genital tract, and gastrointestinal tract exploit the video conference technique connection when communicating with the central hospitals in Pori and Vaasa. The MDT provides recommendations on how individual patients are treated best, and these recommendations are registered in the patient records. The final decision about the treatment is taken face-to-face by the patient's physician and the patient. Each MDT meeting deals with specific tumour types.

We aim to discuss every patient with breast, colorectal or testicular cancer in an MDT either before or after surgery. Patients considered for neoadjuvant therapy, including but not limited to breast, gastric, pancreatic or urothelial cancer, are brought to an MDT to ensure an uninterrupted treatment path from

diagnosis to systemic therapy to surgery. Especially the treatment of brain tumours, head and neck cancers, and lung cancers requires close collaboration between a radiologist, pathologist, surgeon, and radiation oncologist. Lymphoma patients who require high-intensity chemotherapy and stem cell transplantation rely on the collaboration between oncologists and hematologists who also convene at MDT meetings. Challenging cases and uncommon tumor types are typically addressed and decided upon in the MDT meetings. Patients eligible for ongoing clinical trials are often identified at MDT meetings.

Current challenges and opportunities for personalized cancer treatment in Finland - national training

On September 17, 2025, the Western and Southern Cancer Centers organized a training event in Turku, which focused on molecular profiling of cancer and Molecular Tumor Board (MTB) activities. The event was attended by approximately 70 experts on site and an equal number via remote connections. The training was supported by Abbvie, Astra Zeneca, Pfizer and Roche.

Targeted cancer treatment options are increasingly based on precise molecular analysis of the patient's tumor profile. This has increased the need for the use of extensive gene panels and multidisciplinary MTB assessment. The goal is for all patients to have equal opportunities for genetic testing and gene-guided treatment.

The national FINPROVE study promotes and standardizes gene profiling and monitors international developments. However, in Finland, the implementation of genetic testing still varies from hospital to hospital due to lack of funding – unlike in other Nordic countries, where the state funds testing for all patients with metastatic disease.

The event provided practical training on the implementation of gene-guided cancer therapy and the development of MTB activities. Common guidelines and operating models are essential for the Finnish healthcare system to adapt to the rapid development of the field. A follow-up event will be held in spring 2026 to deepen the topic and evaluate practical progress.



FICAN West Molecular tumor board (MTB) – work continues successfully



As comprehensive genomic profiling of solid tumors gets more common, there is a growing need to review gene panel reports at the FICAN West Molecular Tumor Board (MTB) for expert advice. The MTB aims to identify actionable mutations and associated drugs to select targeted treatments and to direct patients in available clinical trials. In addition, the MTB helps confirm diagnoses and identify potential germline variants for further genetic testing and counseling of patients and their family members. In 2025, the MTB met weekly and evaluated approximately 80 patient cases.

The multidisciplinary MTB team comprises cancer physicians, pathologists and molecular pathologists, clinical geneticists, clinical chemists, molecular biology experts, and study nurses. The molecular pathologist interprets the comprehensive genomic profiling reports and presents the functional

effects of the detected genomic alterations to the MTB. The clinicians and the molecular pathologist work together to review the literature on treatment options based on these findings and clinical geneticists consider the heritability of the genetic changes. Study nurses, together with clinicians, attend to the care and needs of the patients offered treatment in a clinical trial.

The MTB of FICAN West has worked closely with the FINPROVE MTB to provide treatment in the FINPROVE trial for cancer patients. FINPROVE is a nationwide Finnish Phase II study that aims to facilitate the patients' access to targeted anti-cancer drugs by evaluating the efficacy of these drugs in treating advanced or metastatic cancers with a known molecular profile.

FINPROVE started recruiting patients in 2022 in FICAN West, with

a growing number of Turku University Hospital patients treated in the FINPROVE study every year. The MTB also plays an important role in the PROEXMET study launched in 2023: the MTB analyzes the results of the comprehensive genetic profiling of tumor samples collected during the study.

FICAN West MTB and European Reference Network collaboration

In 2024, FICAN West MTB discussed their first three patient cases in the European Reference Network (ERN) EURACAN multidisciplinary meetings. ERN EURACAN is a Europe-wide specialist network concentrating on rare cancers, and their domain-specific multidisciplinary boards meet monthly to find treatment options for rare or difficult-to-treat cases. Based on the good experiences from 2024-2025, the MTB predicts an increase in EURACAN consultation cases in the coming years.

Cancer Center Client Board and patient involvement



The year 2025 concluded the sixth year of operation of the Cancer Centre Client Board. The Client Board consisted of 19 members (4 new members) (18 patients, 1 representative of Patient association). As Client Board members, the representatives had the opportunity to give input to the development of the Cancer Centre. Member participation was voluntary. The Development manager of the Cancer Centre chaired the meetings.

In 2025, the development targets were:

1. To take part of research plan development, the first meeting focused on the role of narratives and literature in supporting the psychosocial well being of cancer patients. The Council welcomed a guest from the University of Turku, a researcher in general literature, who introduced an ongoing research project exploring cancer-related narratives. The research team led by Professor Hanna Meretoja has received funding from the Research Council of Finland for the project “Counter Narratives of Cancer: Shaping Narrative Agency” (2023–2027). As part of the project, the researchers are examining how literature circles and writing workshops can

serve as supportive interventions for individuals affected by cancer. Docent Päivi Kosonen provided an overview of the project and presented the thematic focus on literature-based group activities for cancer patients. She described in detail

- the structure of the literature circle sessions
- the practical methods used in group meetings
- the reading and writing activities conducted collaboratively
- the aims of strengthening narrative agency and supporting emotional processing
- how participants engaged with texts and writing tasks during the sessions

The members noted that although participants do not need any background in literature, the question raised important reflections. The groups should be designed to be open to everyone, and members concluded that literature circles support psychological well being regardless of a participant’s previous experience. The members recognized the value of literature circles as a meaningful psychosocial support method for cancer patients. Members highlighted that such activities could be beneficial

beyond the research setting and could serve as part of a broader service offering—for example within cancer organizations. The meeting underscored the importance of creative and narrative based interventions in enhancing patient wellbeing and fostering a sense of agency during the cancer journey.

2. To participate in planning public events at Meri-Karina the Cancer Society of Southwest Finland (LSSY) and the Cancer Centre have organized annually during World Cancer Week. The open-house events focus on cancer prevention, health promotion, and wellbeing, aiming to increase public awareness of the organization and Meri-Karina. This involved two meetings: a) participation to the Wellbeing Path evening providing ideas on how the event could be developed in the future and b) participation and discuss in a Council session of LSSY, planning Exercise Path event targeted especially at families and designed to support shared physical activity for families for next year. The members highlighted that encourage participants to engage in diverse forms of physical activity together with families is an important subject.

The planning group expressed extensive ideas so that the event could potentially expand into a full-day program. Thus we received the ideas for many years.

3. To review patient feedback system and the feedback received at Tyks Cancer clinic. Together with the lecturer Hanna Sisko-Kaukila, Nurse and Clinical Nursing Specialist, we reviewed last year's numerical and written patient feedback and discussed how to respond to the identified concerns (see page 9). The meeting also included Annika Ålgars, Oncologist and Head of the Cancer Clinic. The

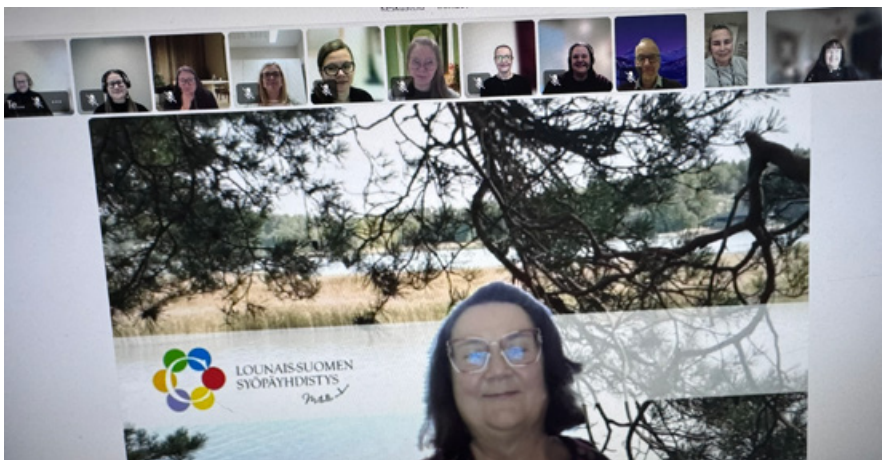
members noted that the results were consistent with their own experiences as well as those reported by peer support volunteers.

According to the feedback, it was particularly important for cancer patients to have a designated physician who knows their case, so that they would not need to repeat their story from the beginning at each visit. The presenters will forward the Council's observations to the respective management groups for further consideration, however, taking into account the organization's available resources.

4. To take part to patient interview of OECI (Organization of European Cancer Institutes) re-akkreditation peer review of Tyks Cancer Centre. The aim of the half hour session by auditors was to discuss patients' involvement in care processes. Three of the Council members take part of the interview. They auditors recognized that patients have possibilities to be active contributors to their own care and safety, acknowledge their expertise and evaluate the involvement process.

5. To give the 'patient voice' lectures at different educational events for professionals and public.

Promoting FICAN West clinical and supportive personnel and cancer patient organizations network



Collaboration with the Cancer Associations in Southwest Finland

The annual joint meeting of FICAN West, the Cancer Society of Southwest Finland (LSSY), and the wellbeing services counties of Satakunta and Ostrobothnia was held on the premises of LSSY. The participants were also welcome after the meeting to stay for the European Cancer Week theme evening for public with theme "Wellbeing Path".

The detailed agenda for discussion and further plans contained topics for joint development was:

- FICAN West; director Pia Viuhinen presented the National Cancer Strategy and coordinator Maijastiina Rekunen presented the FICAN project on the national rehabilitation plan. All participants will take part of the discussion forums.
- Research: "Counter-Narratives of Cancer: Shaping Narrative

Agency" – an Academy of Finland research project (2023–2027) was presented by dosent Päivi Kosonen and Psychosocial Support – research of UTU Nursing Sciences by professor Heli Virtanen. The Empowering Patient Education research team will familiarizes literature circle idea.

- Associations: coordinator Maarit Lehtinen provided updates on SAAVA activities and Teija Kempainen presented the new Kela registration system and its launch. Presentations of adm. manager Henje Hyppänen-Joutsa and charge nurse Teija Kempainen the activities of the Customer Council. Updates of directors Marita Inkinen from the Satakunta and Markku Suoranta Ostrobothnia associations presented also. The progress will be reviewed again at the next year meeting.



Developing care pathways for young adults with cancer – progress in 2025 and future directions

In 2025, the professional network dedicated to improving the care pathways for young adults with cancer continued its systematic and collaborative work. The aim of the network is to promote the wellbeing of cancer patients under the age of 40 and to ensure a smooth, coherent, and needs-based care pathway in close collaboration with Tyks Hospital Services, FICAN West, and the Cancer Society of Southwest Finland.

During the year, the network organised an educational event for healthcare professionals, which attracted approximately 100 participants. The programme addressed key themes related to supporting young adults with cancer, including an introduction to the network, the specific characteristics of young adults as a patient group, experiences from working with young adults at Tyks, services provided by the Cancer Society for young adults, and a young adult's personal account of living with cancer. The event strengthened professional competence, increased awareness of age-specific needs and challenges, and supported the development of multidisciplinary cooperation. Feedback on the training was highly positive.

A major milestone in 2025 was the completion of an initial information package for young adults diagnosed with cancer. The package provides reliable, accessible, and comprehensive information to support patients throughout the entire care pathway—from diagnosis through treatment, rehabilitation, and follow-up—and helps young adults and their families access appropriate support and services at the right time.

The Wellbeing pathway event in collaboration with the Cancer Society of Southwest Finland

At 2025, the theme of European Cancer Week evening organized by jointly LSSY and FICAN West at Meri-Karina was 'Wellbeing Pathway'. The event invited participants to reflect on the factors that support their everyday wellbeing. The program featured presentations on physical activity services and a performance by the Turku Sports Union's Veterans Gymnastics Group, followed by a keynote lecture by dancer and choreographer Jorma Uotinen. Attendees were also able to explore various activity and demonstration points. The event was free and open to all and attracted wide public interest.



Information desk and visits at hospital ward hosted by Cancer Society of Southwest Finland

The Cancer Society of Southwest Finland offers guidance, information and personal support for

anyone affected by cancer — patients, relatives and anyone seeking reliable advice.

At our guidance point, you can:

- Learn about the services and activities of the Cancer Society of Southwest Finland
- Receive support from healthcare professionals
- Meet trained peer supporters and volunteers

Nurse available:

- Wednesdays, 9:00–12:00
- Service also available in English and Swedish.

Membership Coordinator available:

- Wednesdays: 18 March, 15 April and 20 May, 9:00–12:00
- Help with questions related to membership and daily allowance compensation.

Peer Supporters available:

- Tuesdays and Thursdays, 9:00–13:00

Support to hospital ward patients at day room or privately at patient room separately upon request to info desk.

At that time, when nobody is available in the information desk, it is possible for clients and patients to have some information via TV screens and brochures and take with information leaflets of Cancer Society activities.



The network's visibility also increased through the publication of an article in the *Syöpäsairaanhoitaja* journal of the Finnish Oncology Nursing Society, presenting the network's activities and highlighting the importance of developing age-appropriate cancer care.

In 2026, the network will continue its work, focusing on describing the care pathway for young adults with cancer in the IMS system to further clarify structures and processes. In addition, the completed initial information package will be published on the Tyks website and the *hoito-ohjeet.fi* platform for use by both patients and professionals.

Network of professionals of cancer patients' sexual counseling – progress in 2025 and future directions

In 2025, the professional network for sexual counseling in cancer care continued its development work. Sexuality is an essential part of holistic cancer rehabilitation, and every cancer patient has the right to receive sexual counseling tailored to individual needs throughout the entire care pathway. The network's purpose is to strengthen the quality and consistency of sexual counseling across units, develop shared practices, and promote knowledge exchange among professionals.

During 2025, the network completed a comprehensive guide on sexuality for cancer patients,

providing reliable and accessible information to support patients throughout the course of their illness. In addition, the network outlined an initial version of the sexual counseling pathway in the IMS system, defining roles, processes, and points of contact along the care pathway.

Throughout the year, the network continued to refine guidelines, strengthen collaboration, and support professionals in developing their competence in sexual counseling. Input from patients and clinical staff guided the work to ensure that the content responds to the needs identified in clinical practice.

In 2026, the network will continue its efforts, with a focus on publishing the completed guide on organizational platforms for use by patients and healthcare professionals. Further work will also be devoted to advancing the description of the sexual counseling process within the IMS system, ensuring that sexual counseling remains an integrated and clearly defined part of the cancer care pathway.

Educational events

Cancer Nursing Network afternoons

The network organises networking events, training sessions, and workshops and distributes

science-based information electronically. Operations are constantly being developed to respond to the needs of the healthcare staff. Organisationally, the cooperation between patient organisations and the Cancer Nursing Network involves collaboration among three hospitals: the Tyks Hospital and the central hospitals of Pori and Vaasa.

In 2025, the Cancer Nursing Network continued to provide training events that support the professional development of cancer nursing staff across the Western Finland Cancer Centre region. On 6 May, a Cancer Nursing Network afternoon focused on the adverse effects of cytotoxic treatments and their management, with the aim of increasing awareness of chemotherapy-related side effects, their treatment on hospital wards, and the principles of chemotherapy safety precautions. On 9 December, the Western Finland Cancer Centre organised another Cancer Nursing Network afternoon, this time centred on cancer and working life. The purpose of the event was to increase understanding of cancer patients' rehabilitation and return-to-work processes. The online session brought together approximately 80 professionals from across the region and included expert presentations from the Finnish Cancer Patients Association, rehabilitation counselling services in Pori, and an expert-by-experience who shared insights into returning to work after cancer treatment.

The Western Finland Cancer Centre continues to organise two Cancer Nursing Network afternoons annually, each addressing a different theme to support knowledge sharing, professional competence and collaboration in cancer nursing.

Selected highlights in psychosocial and rehabilitation support projects



In 2025, the following measures were taken to improve psychosocial and rehabilitation support:

1. Launch of the Survivorship Care Plan actions, page 22 and Rehabilitation pyramid, page 23. multidisciplinary rehabilitation support team page 24
2. Participation in promotion of multiprofessional networks for children, young people, and young adults page 20 , and sexual networks page 21
3. For professionals who study at the Tyks Cancer Centre, page 25
4. Organizing educational events to support competence of professionals, page 21
5. Promoting integration of rehabilitation and welfare into the everyday life of cancer patients in collaboration with the Cancer Society, page 19–20
6. Being a partner of the EU-4Health Melody project coordinated by the Turku University of Applied Sciences, page 24
7. Focusing the activities of the Patient Council on developing psychosocial support for cancer patients, page 18

Implementing rehabilitation plan (Survivorship care plan) working tools for health care professional

The vision of the Survivorship care plan action is to generate a

rehabilitation plan for every cancer patient in collaboration with the patient. The goal is to increase the awareness of rehabilitation among healthcare workers who treat cancer patients and to promote interdisciplinary collaboration in the field of rehabilitation and support services and achieved through interdisciplinary training sessions and unified guidelines.

The opportunity is that rehabilitation guidelines and rehabilitation services for each unit in the region are present everywhere cancer patients are treated.

In 2023 the Rehabilitation Board was established to develop next actions:

- a. to describe the levels of rehabilitation support and to create a referral–feedback system (Rehabilitation pyramid)
- b. to organize use of the evaluation tool (ESAS) for assessing needs for rehabilitation support
- c. to standardize documentation to patient record system
- d. to organize targeted and national training
- e. to coordinate practical implementation

Levels of rehabilitation support (Rehabilitation pyramid)

- **Level 1: Basic needs**
Cancer care professionals address the patient’s basic rehabilitation needs. Rehabilitation specialists support them through training and consultation.
- **Level 2: Special needs**
If the patient has special or broader rehabilitation needs, cancer care professionals make a consultation referral to rehabilitation specialists. If these measures are not sufficient, the patient is referred to the next level.
- **Level 3: Intensified support** (meeting practice)
Patients who require multi-disciplinary assessment and evaluation by several specialists are referred to the multi-disciplinary rehabilitation team meeting. The team prepares an individual rehabilitation plan and recommends the necessary interventions.
- **Level 4: Demanding needs**
If the patient’s rehabilitation needs are particularly

demanding and the team assesses that external resources are required, the team recommends or requests the use of additional resources. In these cases, a separate referral from the treating unit is needed.

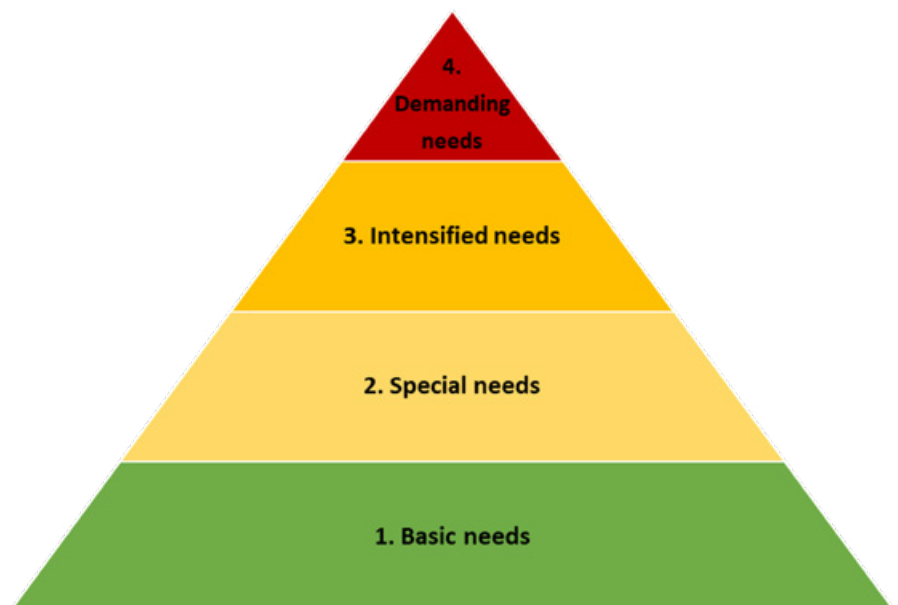
The support of rehabilitation specialist for young adults

In autumn 2023, a need for structured psychosocial support for cancer patients under 40 was identified at TYKS Cancer Clinic. Young adults were often left without age-appropriate support, and staff experienced challenges in meeting the specific needs of this patient group.

The Young Adults’ Support Service was formally established in January 2024. The goal is to prevent psychological distress and support the patient’s return to everyday life. A dedicated full-time psychosocial nurse position was created, supported by three additional

nurses with therapy training who provide psychosocial care alongside their primary roles. The target group was cancer patients under 40, during treatment, after treatment when needed, and, in cases of advanced disease, their families. When a young adult patient enters the clinic, the responsible physician or nurse contacts the psychosocial nurse. Every patient is offered at least one psychosocial assessment to identify support needs early.

In 2025, patient feedback has been consistently positive. Young adults report easy access to support and benefit from practical guidance and emotional help. The service has also significantly reduced the need for psychiatric referrals. The Young Adults’ Support Service has become a vital part of care for patients under 40 at TYKS Cancer Clinic, providing early intervention, reducing mental health burden, and strengthening continuity of care.



Picture: Rehabilitation pyramid (Source: Pia Dellson, Skåne University Hospital)



The Multidisciplinary Rehabilitation Team support

In 2025, the a multidisciplinary rehabilitation team meeting practice was launched, aiming to strengthen the quality and effectiveness of cancer patient rehabilitation throughout the care pathway. The main goal of rehabilitation for cancer patients is to restore or improve well-being, functional capacity, and ability to work. Rehabilitation supports the patient's psychological, physical, and social resources, as well as the adoption of healthy lifestyles, and is an essential part of high-quality cancer care.

Patients are referred to the multidisciplinary rehabilitation team meeting according to a four-level rehabilitation pyramid, when measures at levels 1 and 2 are not sufficient to meet the patient's rehabilitation needs. The meeting practice corresponds to level

3 of the rehabilitation pyramid, i.e., situations where the patient requires intensified support and multidisciplinary assessment by several specialists.

The meeting practice is based on a referral that defines the patient's current functional status and rehabilitation needs. The multidisciplinary team meets once a month and includes a physician, nurse, physiotherapist, dietitian, psychologist, rehabilitation counselor, occupational therapist, social worker, speech therapist, and psychiatrist. Each patient is discussed individually, and the team recommends interventions to support rehabilitation and coping in everyday life.

The effectiveness of the practice is evaluated after a six-month pilot period using the following indicators: number of patients, follow-up of patient cases, identification and definition of problems,

functionality of the referral process, and smoothness of meeting practices. Based on the pilot results, the operating model will be further developed to better meet the needs of patients and staff and to support the rehabilitation of cancer patients even more effectively.

Tyks Cancer Center participates 2024–2027 in the Melodic project: Mental health support for young adults with cancer

The MELODIC project (2024–2027), co-funded by the EU-4Health programme, aims to improve the mental health and well-being of young adults with cancer (18–35 years) and their loved ones through more systematic assessment of symptoms and needs and by strengthening early identification and response to psychosocial challenges during the first year after diagnosis. The



Towards unified psychosocial support: A development project for a specialist nurse model for cancer treatment units

Cancer is often associated with fear and anxiety, and a third of the patients find themselves needing psychosocial support. Due to lacks in integrating psychosocial support into care pathways and fragmented practices weaken the availability of support and its unison. The nurse practitioner has a key role in psychosocial support services as an independent operator. Their performance could be improved by clarifying their job description.

The aim of this thesis was to create a model for nurse practitioners that will unify the practices of psychosocial support system in TYKS cancer care units. This thesis was carried out by the Western Finland Cancer Centre. Qualitative research methods were used to analyze data from semi-structured group interviews. The data was further analyzed using content analysis.

The interviews and literature review highlighted the importance of support system's timeliness, availability and resources, and in addition, the results showed that there is a need for developing the job description. This thesis showed that the practices of offering psychosocial support are incoherent and the lack of clear operating models might have a negative impact on support practices. A new model has been developed based on the results of this study, which aims to unify practices and better integrate psychosocial support into the care process.

Sonja Lehtimäki
Master's thesis 2025
Applied Sciences of Turku

project generates new knowledge about the support needs of young adults and the experiences of healthcare professionals, helping refine assessment practices and early interventions that promote well-being. During 2025, project partners worked in close collaboration, and the project progressed according to plan. Learn more on the project website: <https://melodic.turkuamk.fi>

An intervention combining nature-based group well-being activities and psychoeducation will be developed and tested to support young adults and their families throughout the early phase of their cancer journey. In addition, the project prepares training and recommendations aimed at strengthening healthcare professionals' skills in recognising, assessing and managing the mental health needs of young adults and their families

along the care pathway, thereby helping reduce inequalities in access to support.

The project is carried out by the following partners: University of Galway (Ireland); Erasmus Universitair Medisch Centrum Rotterdam (Netherlands); Escola Superior de Enfermagem de Lisboa (Portugal); Panepistimio Dytikis (Greece); Ministry of Education and Research (Estonia); University of Turku (Finland); Southwest Finland Well-being Region (Finland); Cancer Care West Company Limited (Ireland); Tartu Ulikooli Hospital Foundation (Estonia); European Cancer Organisation (Belgium); Fundatia Youth Cancer Europe (Romania).



Selected highlights of digital development projects

Digital pathway to support the information needs of cancer patients

The cancer center of the TYKS Hospital has maintained a digital treatment path on the Health Village platform since 2019. This service allows patients to communicate with healthcare staff, access information on cancer, rehabilitation and support services, and report symptoms digitally. Nursing staff can use the platform to tailor patient education. For example, patients on immuno-oncological treatments can submit weekly symptom reports, which helps monitor their wellbeing and enables timely intervention when required.

The use of the digital treatment path has continued to grow in recent years. Efforts have been made to standardise the instructional content across different cancer types. A pilot project for patients with gynaecological, prostate and bowel cancers was initially planned but postponed due to staff shortages and organisational changes. The pilot is now anticipated to be launched in 2026.

Data collected through the digital treatment path is stored in a central data pool, which can be utilised for dashboards and various data-driven purposes. Improved automation also ensures that each patient is automatically provided with a digital care pathway.

A pilot project enabling breast cancer patients to book nurse appointments online has also been launched. The pilot remains ongoing, but a usability survey completed in December 2024 and analysed in 2025 showed that the system was generally considered

easy to use. Patients particularly valued the flexibility of being able to schedule and manage appointments independently at any time. Most respondents were active daily users of digital devices and felt comfortable handling health-related matters online. Overall experiences were positive, and many indicated a high likelihood of recommending the service to others. Reported challenges were primarily related to varying levels of digital experience or occasional technical issues, while key benefits included reduced need for phone contact, clearer appointment information and enhanced convenience for patients.

The wellbeing services county of Southwest Finland is progressing toward a more unified digital ecosystem through the introduction of the VARHA mobile application, which will be taken into use in stages during 2025. The application provides residents with a single, secure entry point to health and social care services, including appointment booking, messaging, self-care materials and personalised guidance. For cancer patients, the VARHa app is expected to complement existing digital pathways by offering easier access to information, smoother communication with clinicians and enhanced support throughout follow-up and rehabilitation. The phased rollout enables units to adjust workflows and update instructional materials ahead of implementation, ensuring that the new service integrates seamlessly with digital tools already in use within the cancer center.

As part of a broader multiprofessional initiative, a project aiming to pilot systematic quality-of-life

follow-up for cancer patients is scheduled to begin during 2025 after earlier postponement. However, the start of this project has been further delayed due to the staged introduction of the new VARHa mobile application, which has required the allocation of unit resources to implementation, training and process adjustments. The applicability of the digital pathway as a follow-up tool will be assessed once the project proceeds, helping to define its future role in routine care.

Tyks Cancer Center participates 2023–2026 in the DigiCanTrain project: Digital Skills Training for Oncology Healthcare Professionals

Cancer is one of the most common diseases in Europe. Correct and appropriate use of eHealth technology can be a useful tool for facilitating a dialogue among health care professionals (HCPs) and for health care to aid people affected by cancer to meet their need for care and better health. Digital technology is an inevitable and essential part of future health-care in Europe. Despite the current use of e-technology and despite its positive effects and its potential, most health professionals feel insufficiently trained to deal with the digital revolution.

The project aims at up-skilling and re-skilling the health care workforce regarding cancer care. This will support the development of effective, person-centered health care, digital cancer care services, and the use of contemporary eHealth technology by HCPs.

The project also contributes to shaping the lifelong learning



dimension in higher education (EQF levels 6–8) by integrating micro-credentials to accompany ECTS and CME credit systems. The purpose of the project is to design, pilot, and evaluate the DigiCanTrain education and training programme for trainers, clinical HCPs, and non-clinical HCPs. The ultimate goal is to improve access to continuing professional education and to increase digital skills and the use of eHealth technology of clinical and non-clinical HCPs working and interacting with people affected by cancer.

The project is carried out by the following partners: Turku University of Applied Sciences, Finnish

Institute of Health and Welfare (THL), University of Turku, European Oncology Nursing Society, European Cancer Organisation, University of Galway, Tallinn Health Care College, Turku University Hospital, Wellbeing Services County of Southwest Finland (Varha), Institute Oncologic “Prof. Dr. Ion Chiricuta” Cluj-Napoca, Universitat Oberta de Catalunya, National & Kapodistrian University of Athens, Catalan Institute of Oncology, National Cancer Control Programme Ireland, Cancer Society of Finland CSF, Health Campus Turku and FICANWest.

The project is funded by: EU-4Health programme.

In 2025, the project’s training programme was implemented, and the evaluation of its results and pilot phase will continue in early 2026. Future planning of the project is underway, and the final project seminar will be held in February 2026. The DigiCanTrain project was also presented at the ESMO conference, where the growing importance of digitalisation in cancer care and the development of digital competencies among healthcare professionals was highlighted, read more: <https://www.science-direct.com/science/article/pii/S0923753425021337> and also projects website: <https://digantrain.turkuamk.fi/>

PART 3 Research



Kuva: Mervi Toriseva

Tyks Cancer Centre and FICAN West research cluster

The research at Tyks Cancer Centre covers clinical cancer research at Turku University Hospital (Tyks). Basic and translational cancer research is conducted at the University of Turku (UTU), an equal partner of Tyks Cancer Centre under the umbrella of FICAN West network, administered by the Wellbeing Services County of Southwest Finland. FICAN West connects cancer research and care across Western Finland at Tyks, the Central Hospitals of Pori (Satasairaala) and Vaasa, at Wellbeing Services Counties of Satakunta and Ostrobothnia, respectively, and UTU. It aims to promote and coordinate both basic and clinical cancer research.

Cancer research at Tyks Cancer Centre and FICAN West includes academic laboratory research, investigator-initiated trials, and industry-based clinical trials. The FICAN West Cancer Centre Research Laboratory, located in the Medisiina D building since 2018, is dedicated to basic and translational cancer research with approximately 14 research groups and 70

laboratory researchers hosted by Tyks and the University of Turku. Overall, the FICAN West cancer research network comprises about 35 research groups and 200 scientists working full-time in translational and basic research on the campus. On the hospital side, over a hundred physicians are dedicated to cancer patient treatment, with about half actively involved in clinical trials.

In 2025, the estimated annual research budget for Tyks Cancer Centre clinical research was about 5 million €, with Finnish state research funding contributing about 1 million €. For translational and basic research, the estimated annual budget was around 10 million €, with 47 % funded by national public sources and 53 % by national private sources, EU, other international sources, and commercial cooperation organizations. In 2025, almost 220 cancer-related articles were published in international peer-reviewed journals by the clinical divisions and translational and basic research teams at FICAN West.

Clinical trials are conducted across several hospital divisions. The Tyks Cancer Centre Clinical Trial Unit (CTU) runs studies for the Departments of Oncology and Radiotherapy, Gynecologic Oncology,

Lung Cancer, and Urology. CTU employs 8 study nurses and 2 study coordinators and 2 dedicated physicians (medical oncologist) for clinical trials. In addition, 7 research nurses are employed by other units that treat cancer patients and work together with the CTU. Moreover, physicians from various departments at Tyks and in central hospitals in Pori and Vaasa participate in the trials as principal or sub-investigators. Ongoing clinical trials are listed on the website (<https://fican.fi/lantinen-syopakeskus/>).

Tyks Cancer Centre is a member of the Nordic Network for Early Clinical Trials (NECT) and collaborates with the highly ranked Department of Nursing Science at the University of Turku. Research activities and strategic matters are discussed in the boards of Tyks Cancer Centre and FICAN West. The Scientific Board includes senior members from all cancer-related Tyks divisions, Pori and Vaasa Central Hospitals, and scientists from various departments at the University of Turku. Tyks Cancer Centre's Science and Research Strategy is integrated in the overall strategy of the Tyks Cancer Centre and it is implemented within the FICAN West. Tyks Cancer Centre's science and research strategy is described below.

Western Finland Cancer Centre (FICAN West): science and research strategy 2023–2025

The strategy for 2023–2025 is a part of the strategic planning of the future of the entire FICAN West. It is aimed at securing effective and high-quality treatment, research and training in the field of oncology for the population in the catchment area.

Vision

FICAN West and its Scientific Cancer Board coordinate the cancer research in the FICAN West region and guarantee uninterrupted funding of high-quality cancer research. They secure rapid and effective adaptation of scientific research results into practice and innovations. FICAN West also unifies and develops collaboration in the field of education.

Values

FICAN West operates by the following values:

- Values of the science and research strategy of the Turku University Hospital (Tyks): ethical, critical, patient/client centered and clinically and socially efficient.
- Strategic values of the University of Turku: ethical, critical, creative, open-minded and societal.
- Strategic values of the FICAN West: patient oriented, equal admission to treatment and high-quality care, innovative and capable personnel, high-quality scientific research and comprehensive, innovative and international collaboration networks.

Strategic goals

The strategic goals of the FICAN West Cancer Centre overlap with those of the research activities of the working environment.

1) High-quality scientific research

- supports the strongholds of the working environment: 1) drug development and diagnostics, 2) bioimaging, 3) research into the molecular biology, genetics and immunology of cancer and 4) clinical drug and stem cell trials
- has established functional structures and sufficient material and human resources
- funding is secured and has an established financial strategy which covers the topics and areas needing financing – public financing, foundations, international funding and research collaboration agreements
- has access to vast patient registry data and biobank material
- guaranteed by up-to-date assessment and follow-up of clinical research

2) Improving research effectivity through networking

- functions as the central coordinating unit and integrates cancer research within the FICAN West research environment
- guarantees that research collaboration with the projects undertaken by the Health Campus of Turku functions smoothly and effectively across administrative borders and between universities, faculties and hospital districts
- guarantees that the infrastructure related to cancer research (e.g., Auria Biobank and the Turku Clinical Research Center) functions well

- guarantees smooth cooperation with the functions of the biotechnology business cluster within the region
- takes place with companies only through the FICAN WEST and clinical trial unit (CTU) (one-stop-shop principle)
- guarantees continuity of research through training, clinical scientists' positions and recruitment

3) Promoting application of new information

- Promotes, within its working environment, the transfer of information on cancer research outcomes from basic research to the clinic by communicating and by arranging joint meetings
- manages the introduction of new procedures and quality assessments in the domains of cancer prevention, diagnostics, treatment and rehabilitation, new drug treatments, new diagnostic methods, psychosocial support and patient instruction
- strengthens the knowhow of the personnel and promotes a research-oriented atmosphere
- guarantees patient involvement and adherence to research and development projects

4) Promoting innovation

- supports collaboration with the Health Campus of Turku, VARHA R&D Unit and with its innovation ecosystem platforms
- is strengthened by collaboration with companies and relies on the thematic entity of drug

development and diagnostics within the University of Turku

5) Making a national and international impact

- on the national level, this is done through collaboration within the entire FICAN (national and regional cancer centers)
- collaboration is pursued with cancer organizations and patient organizations
- acts as a member of the

European cancer network OECI (Organization of European Cancer Institutes), the European reference network on rare adult cancers (ERN EURACAN) and the European reference network on pediatric oncology (ERN PAEDCAN) and Genetic Tumour Risk Syndromes (ERN GENTURIS)

- extensive activity (e.g., memberships and specialist assignments) within national and international research teams and teams working to improve and develop cancer treatment

6) Promoting assessment of research effectiveness

- the research strategy is assessed as a part of the overriding science and research strategy, center-of-excellence-strategy and accreditation by the OECI

7) Dissemination of research information

- consists of national and international activity and is part of the overriding strategy of the FICAN
- is presented in plain language for stakeholders and interest groups

Key indicators 2025



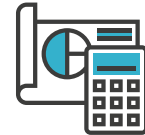
218

Total number of journal publications produced across divisions and basic research.



35

Number of cancer research groups in basic and translational research



5

Academic projects funded by EU



31

Number of publications with impact factor (IF) > 10



€ 15 million

Estimate of total research budget



3

Academic project with other international funding



5

Number of publications with IF > 20



68

Academic projects with national private funding



18

PhDs



128

Number of clinical drug trials



59

Academic projects with national public funding



9

Disclosures of invention



320

Number of all clinical studies



1

Spin-off companies established

Education and networking in cancer research

The environment for pursuing advanced cancer research is excellent. With more than one hundred biotechnology companies, with the first biobank in Finland (Auria), with the nationally leading center of nursing science and with profiling research projects funded e.g. of the Research Council of Finland, cancer research is targeted for success.

FICAN West Science Day - Co-operation in translational cancer research

The third annual FICAN West Science Day, dedicated to advancing cooperation in translational cancer research, was held on April 9th, 2025 at the Haartman lecture hall in Tyks T hospital. The event gathered around 120 registered participants from clinical and biomedical research sectors across Southwest Finland.

The program opened with remarks by FICAN West Scientific Director Panu Jaakkola and moved into a session addressing cancer epidemiology and biomarker based trials. Presentations covered cancer survival across Nordic countries, periappendiceal tumor incidence in a national cohort, and the progression of the FINPROVE study.

Several talks throughout the day—such as those by Vilja Pietiäinen, Tuomas Mirtti, and Emilia Peuhu—were linked to the iCAN Digital Precision Cancer Medicine Flagship, reflecting the strong integration of national precision medicine initiatives into ongoing regional research.

The second session focused on translating biomarker discoveries into patient care, ranging from real world implementation of ovarian cancer research (DECIDER) to functional precision medicine approaches for pediatric patients and advances in spatial biomarkers and computational pathology.

In the afternoon, a brief but memorable diversion from the official program was offered by Hanna Meretoja, who shared reflections from her narrative based research

on cancer experiences—an unexpected but well received contribution complementing her ongoing COUNTER research project on cancer narratives.

The final scientific sessions introduced emerging strategies in translational oncology, followed by the keynote lecture by Professor Colinda Scheele of the VIB-KU Leuven Center for Cancer Biology, who presented new insights on how the menstrual cycle shapes breast cancer formation and treatment response.

The day concluded with remarks by FICAN West Director Pia Vihinen and informal networking over a light dinner. As in previous years, the event was accredited for PhD and medical specialization training, and participants praised both its scientific breadth and collaborative atmosphere.





FICAN Science Webinars 2025

In 2025, the national FICAN Science webinar series continued to promote collaboration and knowledge sharing across Finland’s cancer research community. Each regional FICAN hosted one webinar, resulting in five sessions that highlighted timely advances in precision oncology, prostate cancer biology, and screening research.

The year’s webinars featured leading experts from across the country:

- **Professor Antti Poso**, University of Eastern Finland (FICAN East), on Cancer, VUS and molecular modelling in personal medicine.
- **Professor Aki Manninen**, University of Oulu (FICAN North), on Losing adhesions to promote prostate cancer.
- **Professor Anssi Auvinen**, Tampere University (FICAN Mid), on the ProScreen population based prostate cancer screening trial.
- **Professor Antti Rannikko**, Helsinki University Hospital and University of Helsinki (FICAN South), on MRI based

improvements in prostate cancer detection.

- **Associate Professor Maija Hollmén**, University of Turku, InFLAMES Flagship, and Faron Pharmaceuticals (FICAN West), on immunotherapy targeting Clever 1 in high risk myeloid malignancies.

Attendance remained steady at 60–85 participants, demonstrating the continued national relevance of the series. Overall, the 2025 webinars effectively disseminated up to date scientific findings and supported coordinated cancer research efforts across Finland.

Guest lectures and symposia

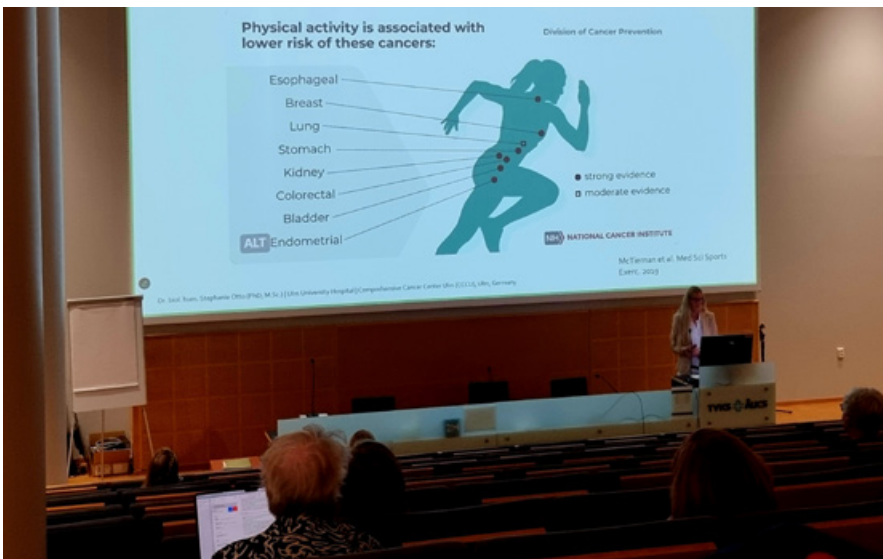
In 2025, FICAN West organized two scientific events that supported knowledge exchange between researchers, clinicians, and professionals working in cancer care.

A guest lecture by Associate Professor Ahmed Al Samadi (University of Eastern Finland; Academy Research Fellow, University of Helsinki) was held on 1 December at Medisiina D. His lecture, “The Immune Microenvironment in Oral

Cancer: From Prognostic Biomarkers to Novel Immunotherapies,” introduced recent insights into immune related mechanisms in oral carcinogenesis and emerging personalized therapeutic strategies.

Earlier in the autumn, on 4 September 2025, a symposium titled Physical activity and exercise in the treatment of cancer patients was organized at Turku University

Hospital, with participation both onsite and online. Ilkka Heinonen, PhD, chaired the event, which brought together international and national experts to discuss exercise physiology, cancer cachexia, immunological mechanisms, and clinical applications of physical activity during cancer treatment. The symposium attracted a broad audience and offered valuable opportunities for scientific exchange and networking.

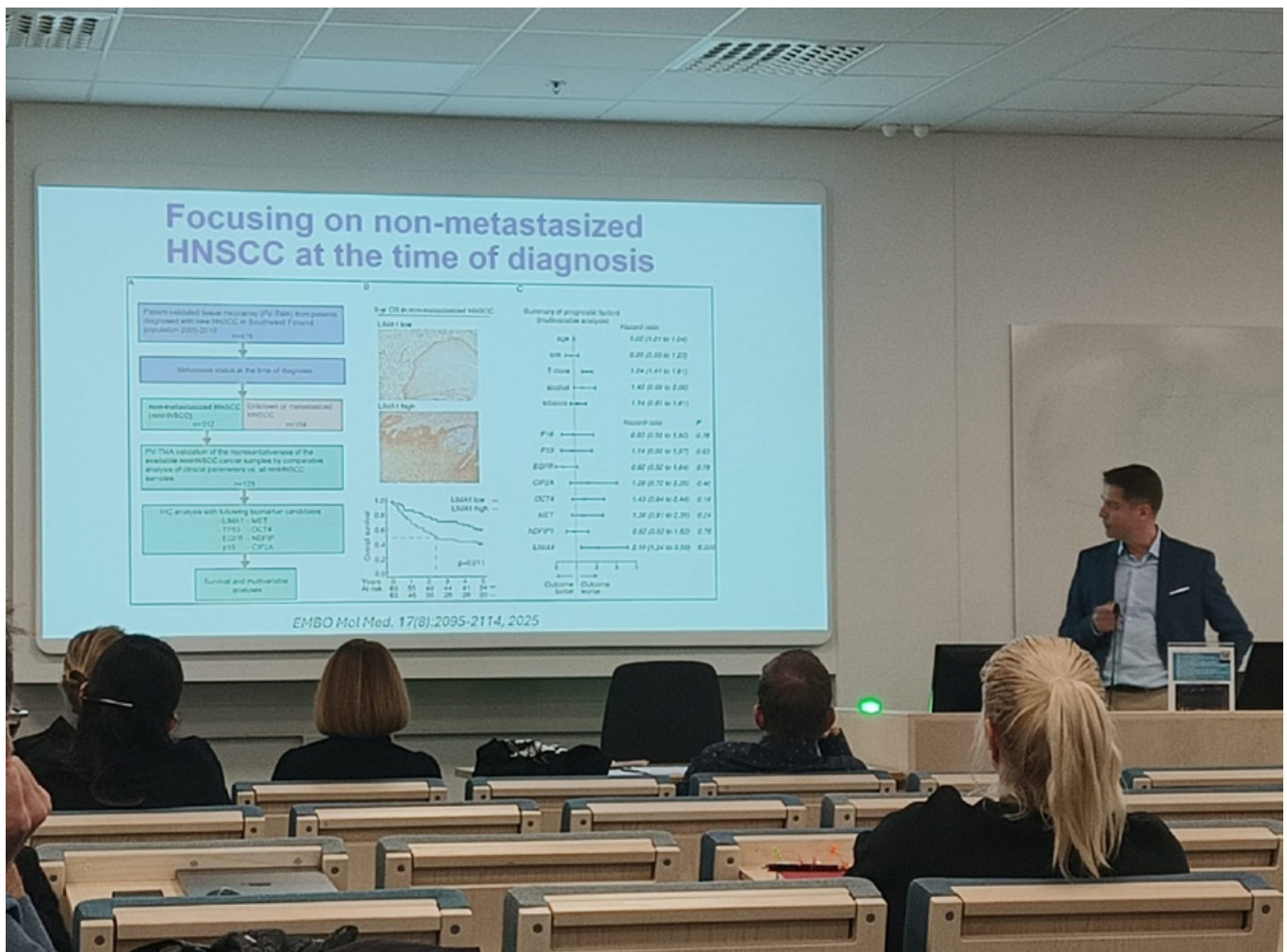


Annual joint seminar with TCRS

FICAN West has been partnering with the Turku Cancer Research Society (TCRS) since 2018 to develop scientific programmes for academic and clinical cancer researchers. The collaboration remains strong through jointly organized seminars and events, including the traditional annual Christmas Seminar and the recently established FICAN West Science Day. In early 2025, Docent Saara Hämälistö, PhD, began her term as the new President of TCRS.

The 2025 TCRS Christmas Seminar gathered over 50 participants on 11 December at Medisiina D. The programme featured presentations by Professor Pekka Taimen and Docent Sami Ventelä, who discussed recent advances in cancer diagnostics and the development of personalized treatments. Dr Anna Knittle provided insights into the development of novel cancer therapies within the pharmaceutical industry and highlighted opportunities for collaboration between industry and academia.

During the event, the TCRS Best Theses of the Year 2025 Awards were presented to Veera Ojala and Mona Wang Meng from the Institute of Biomedicine at the University of Turku. The awards were supported by the Sirpa and Markku Jalkanen Foundation and Misvik Biology Oy. TCRS, active in Turku for over 30 years, continues to bring together researchers and clinicians to discuss the future of cancer treatment and foster scientific exchange.



Cancer Researchers' Mentoring Program

The cross mentoring programme is designed to strengthen local cancer research and collaboration by pairing clinical and academic researchers at similar career stages. Unlike traditional mentor-mentee structures, the programme forms cross disciplinary pairs, enabling researchers to exchange perspectives, develop shared understanding, and build new connections between clinical practice and academic research.

After the successful pilot in 2023, the programme was organized for the second time from autumn 2024 to spring 2025. Although this round included only two

mentoring pairs, the feedback was exceptionally positive: participants highlighted the value of structured dialogue, peer support across disciplines, and the programme's ability to spark concrete ideas for future collaboration.

The six month programme included one to one meetings, joint seminars, and facilitated discussions focusing on common challenges in cancer research, career development, and opportunities for translational cooperation. The flexible structure allowed participants to tailor their mentoring activities to their own goals and schedules.

Encouraged by the strong experiences from the first two

implementations, planning for the third round of the cross mentoring programme is underway, with the next cohort set to begin in early autumn 2026.

Read more: <https://fican.fi/lanti-nen-syopakeskus/tutkimus/tutkijoiden-mentoiointiohjelma/>



iCANDOC doctoral education pilot

The University of Turku participates in the national iCANDOC doctoral education pilot, launched on 1 January 2025 as part of the iCAN Digital Precision Cancer Medicine Flagship. The pilot is funded by the Ministry of Education and Culture and aims to educate a new generation of researchers in precision cancer medicine. In Turku, the programme currently includes ten new doctoral researchers focusing on topics

ranging from molecular profiling to data driven personalised oncology.

The pilot provides a structured training environment that integrates doctoral studies with cutting edge cancer research conducted within FICAN West and Tyks Cancer Centre. National joint activities—such as shared courses, research theme meetings, and flagship level training events—have been accessible to Turku

based students throughout 2025, supporting networking across FICAN and Finnish cancer research hubs.

In addition to iCANDOC, the iCAN Flagship is establishing the iCAN-POD postdoctoral programme, aimed at strengthening early career researcher pathways in precision cancer medicine. Planning for the implementation of the iCANPOD programme within FICAN West is currently underway.



Highlights in basic and translational research activities



Cell adhesion and the extracellular environment in tissue homeostasis and cancer progression

Cancer becomes life-threatening when tumour cells grow uncontrollably and metastasize to distant organs. To do this, cancer cells rely on their cell surface receptors to: i) adhere to and translate cues from their surroundings, ii) move through tissues, iii) survive in the bloodstream, and iv) grow at new sites. Our research focuses on the contribution of cell surface receptors such as integrins and receptor tyrosine kinases, and the properties of the extracellular environment to the different steps of the metastasis cascade. One example of our seminal discoveries is our identification of cancer cell migration towards softer environments, “negative” durotaxis, which we believe supports cancer cell invasion and migration across different tissue rigidities. We have also clarified the previously disputed roles of the actin-binding protein EPLIN in breast cancer. Our work shows that the reported opposing functions of EPLIN arise from the

distinct activities of its two isoforms, EPLIN- α and EPLIN- β . A high EPLIN- α -to-EPLIN- β ratio correlates with a mesenchymal phenotype in patient samples and breast cancer cell migration (Jäntti et al., 2025, *Developmental cell*).

In addition to our research, we also develop methods to expand our biological toolbox for studying cell behaviour. These include, dynamic micropatterns, stiffness-gradient gels and extracellular matrix arrays. We also collaborate with other research groups across the globe to advance our research approaches and with clinicians to translate our findings to patient samples.

Recently, our group was awarded an ERC Advanced Grant to further understand the mechanisms of cancer-cell border crossings using innovative methods.

Cell Adhesion and Cancer Laboratory

<https://ivaskalab.utu.fi/>

Principal investigator:

Academy Professor, Johanna Ivaska, Turku Bioscience Centre, University of Turku and Åbo Akademi University

Publications:

Jäntti NZ, Moreno-Layseca P, Chastney MR, Dibus M, Conway JRW, Leppänen VM, Hamidi H, Eymann K, Oliveira-Ferrer L, Veltel S, Ivaska J (2025). EPLIN α controls integrin recycling from Rab21 endosomes to drive breast cancer cell migration. *Developmental Cell* S1534-5807(25)00403-4.

Conway JRW, Joshi O, Kaivola J, Follain G, Gounis M, Kühl D, Ivaska J (2025). Dynamic regulation of integrin β 1 phosphorylation supports invasion of breast cancer cells. *Nature Cell Biology* 27(6):1021-1034.

Conway JRW, Dinç DD, Follain G, Paavolainen O, Kaivola J, Boström P, Hartiala P, Peuhu E, Ivaska J (2023). IGFBP2 secretion by mammary adipocytes limits breast cancer invasion. *Science Advances* 9(28):eadg1840.

Pathophysiology prediction and novel treatment options for breast-cancer related lymphedema

Treatment of metastatic breast cancer requires surgical treatment and radiation therapy of the axillary lymph nodes. The disruption in the lymphatic flow may cause swelling of the affected limb known as lymphedema. Over time, lymphedema may progress into a chronic inflammatory condition characterized by persistent interstitial fluid accumulation and the gradual, irreversible deposition of fibrotic adipose tissue, which significantly impairs arm function and increases susceptibility to infections. There is no definitive cure or means of prevention.

Our translational group investigates the pathophysiology, prediction, and treatment of breast cancer-related lymphedema. We aim to identify immune cell populations that are central to lymphedema initiation and progression and to characterise their interactions with other cell types using patient samples obtained during surgery and state-of-the-art single-cell

and spatial profiling technologies and 3D cultures of patient-derived cells. We also study the initial inflammatory events occurring after lymphatic damage using wound fluid samples obtained after axillary dissection surgery and proteomic approaches. Our aim is to clarify the key inflammatory events underlying lymphedema and to discover novel therapeutic approaches. Our focus is on our recent discovery on the activity of innate lymphoid cells in this disease. In parallel, our clinical researchers are actively developing and refining surgical treatments for lymphedema.

Hartiala Group

<https://sites.utu.fi/hartialagroup/>

Principal investigator:

Pauliina Hartiala, MD, PhD, chief physician, InFLAMES group leader, Medicity Research Laboratories, InFLAMES Research Flagship, Department of Plastic and General Surgery, Turku University Hospital

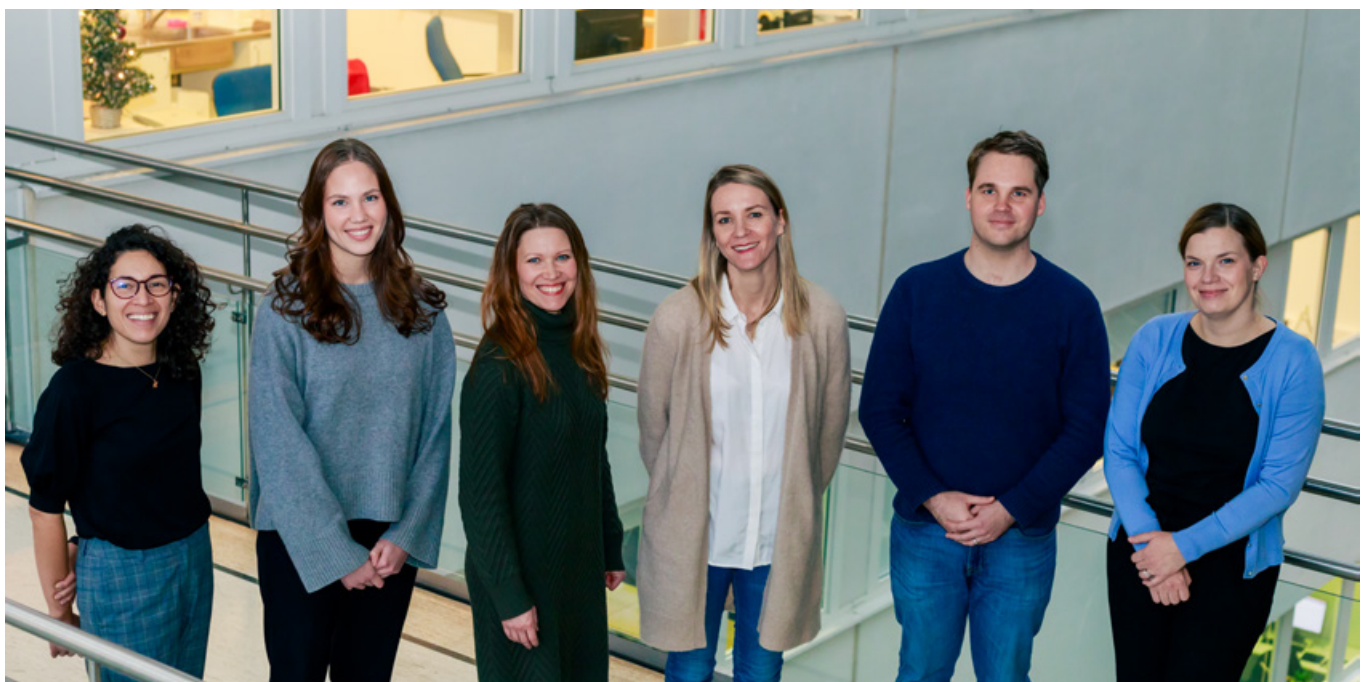
Publications:

Pajula S, Saarikko A, Suominen S, Kaartinen I, Kiiski J, Suominen E,

Viitanen T, Mäki M, Seppänen M, Lahdenperä O, Alitalo K, Hartiala P. Lymfactivin® gene therapy with vascularized lymph node transfer reduces compression-free swelling and enhances quality of life in breast cancer-related lymphedema: Final Phase I trial results. *J Plast Reconstr Aesthet Surg.* 2025, 111:312–321.

Rannikko EH, Pajula S, Suominen SH, Kiiski J, Mani MR, Halle M, Kaartinen IS, Lahdenperä O, Arnardottir TH, Kauhanen SM, Kavola H, Majava M, Niemi TS, Brück NM, Mäki MT, Seppänen MP, Saarikko AM, Hartiala P. Phase II Study Shows the Effect of Adenoviral Vascular Endothelial Growth Factor C and Lymph Node Transfer in Lymphedema. *Plast Reconstr Surg.* 2025, 155(2):256e–267e.

Laukka M, Kauhanen S, Hockerstedt A, Peuhu E, Hartiala P. Tissue-Level Effects of Autologous Fat Grafting in Hypertrophic Scars—A Case Series Study. *J Surg Res.* 2025, 305:246–257.



Research on cancer narratives and reading groups for cancer patients and medical professionals

Cancer is not only a medical phenomenon but also a significant cultural phenomenon. “Counter-Narratives of Cancer: Shaping Narrative Agency” (Research Council of Finland, 2023–2027) is a research project that examines culturally mediated ways of narrativizing cancer. We analyse culturally dominant cancer narratives and counter-narratives that challenge them in contemporary media, life-writing, and literary fiction. We address the role of narratives in shaping conceptions of illness and the challenges that cancer presents for narrative sense-making. The project

involves developing a new model of bibliotherapeutic reading groups for cancer patients and narrative agency workshops for medical professionals. We have organized, for cancer patients and medical professionals connected to the Turku and Helsinki University Hospitals, pilot groups that involve shared reading of literary cancer narratives and creative writing exercises. The aim is to strengthen the participants’ narrative agency, i.e., their ability to engage with cultural cancer narratives in critical and creative ways. The groups provide the participants with tools to deal with a range of affects linked to the experience of going through cancer, ranging from experiences of radical uncertainty to grief, to the ability to embrace randomness, and to the connectedness of life.

The workshops for medical professionals aim at increasing their awareness of different cultural narratives.

In the autumn of 2024, we ran the first pilot group for breast cancer patients, and in 2025 we have organized four narrative agency workshops for medical professionals working with cancer patients in the Turku University Hospital. The project enhances public awareness of the different ways of narrating cancer and contributes to the creation of more capacious cancer imaginaries that open up new possibilities of agency.

Project web pages:

<https://sites.utu.fi/narg-project/en/>
<https://sites.utu.fi/counternarratives/en/>

Principal investigator:

Professor Hanna Meretoja, Department of Comparative Literature and SELMA: Centre for the Study of Storytelling, Experientiality and Memory, University of Turku

Publications:

Joutseno (Swan), Astrid. (2025). ”Glamorous Healing and ‘Rebellious Hope’: Tracing Grief in Transmedial Cancer Life Writing.” *Life Writing*, 1–15. <https://doi.org/10.1080/14484528.2025.2578188>
Kosonen, Päivi, Kinnunen, Eevastiina & Meretoja, Hanna (2025). Kertomusorientoituneen työskentelyn terapeuttisuus – Juhani Ihanus (ed.) *Tarinalliset oivallukset hyvinvointia tukemassa*. In *Terapeuttiset tarinat*, pp. 49–73. Basam Books.

Kosonen, Päivi, Meretoja, Hanna, & Kinnunen, Eevastiina (2025). A Bibliotherapeutic Narrative Agency Reading Group with Breast Cancer Patients. *European Journal for Biblio/Poetry Therapy* 1(3), 61–71.



From left to right: Astrid Joutseno (Swan), Hanna Meretoja, Eevastiina Kinnunen ja Päivi Kosonen.



Thestra – From academic discovery to precision diagnostics

Thestra exemplifies how long term collaboration between Turku University Hospital (Tyks) and the University of Turku can translate academic discoveries into tangible clinical solutions. Emerging from over a decade of joint biomarker research led by docent Sami Ventelä and professor Jukka Westermarck, the company focuses on solving a critical unmet need in the diagnosis of head and neck squamous cell carcinoma (HNSCC). Despite its global prevalence, reliable tools for identifying aggressive disease forms have been lacking.

Thestra's proprietary EPLINEx® method addresses this gap by providing a novel diagnostic approach that helps clinicians assess tumor aggressiveness at the time of diagnosis. This enables more accurate patient selection for surgery only treatment, reducing the need for toxic adjunct therapies and improving quality of life. The technology, protected by the

University of Turku and validated across Finnish university hospitals, demonstrates the strength of regional expertise when academic insight and clinical practice converge.

Thestra represents a model pathway for translational innovation within the Tyks–University ecosystem. The company's development has been further accelerated by dedicated entrepreneurial expertise and investment, allowing rapid progression from laboratory findings to practical patient oriented diagnostics.

Looking ahead, Thestra aims to expand the EPLINEx® platform beyond its current focus, integrating artificial intelligence driven tissue analysis and exploring applications in additional cancer types. These efforts altogether support a broader strategic vision by Tyks Cancer Centre to improve patient outcomes through evidence-based precision diagnostics. The Finnish Medical Society

Duodecim selected Westermarck and Ventelä as among the most influential health sector figures of 2025.

Principal investigators:

Professor Jukka Westermarck, MD, PhD, Turku Bioscience Centre, University of Turku and Åbo Akademi; Founder, CSO, Thestra oy
Docent Sami Ventelä, MD, PhD, Associate chief physician, Department for Otorhinolaryngology, Head and Neck Surgery, University of Turku and Turku University Hospital, Turku Bioscience Centre, University of Turku and Åbo Akademi; Founder, CMO, Thestra oy

<https://thestra.fi/>

Publications:

Qiao, X., Routila, J., Tienhaara, M. et al. LIMA1-alpha staining predicts curative intent surgery response in HPV negative head and neck cancer. *EMBO Mol Med* 17, 2095–2114 (2025). <https://doi.org/10.1038/s44321-025-00266-8>

Selected abstracts of doctoral theses



The effects of acute exercise on immune cells in patients with cancer

Tiia Koivula,
Disputation: 2025-05-02

Exercise has many systemic effects. Epidemiological studies show that exercise improves cancer prognosis, but the mechanisms are largely unknown. In animal models, exercise slows tumor growth by enhancing anti-tumor immunity. The purpose of this doctoral research was to investigate the effect of acute exercise on circulating immune cell and cytokine levels in cancer patients.

The study included a total of 15 lymphoma patients (mean (SD) age 59 (17) years) and 39 breast cancer patients (57 (10) years), half of whom performed a 10-minute exercise and the other half a 30-minute exercise with bicycle ergometer on a resistance of their own-choosing. The patients were just diagnosed; thus they had not started any cancer treatments. Blood samples were taken before, during and after pedaling. Circulating immune cell levels were analysed with flow cytometry and cytokines with a cancer-specific cytokine assay.

Exercise increased circulating immune cells, especially lymphocytes, with levels returning to baseline within 30 minutes after exercise. Natural killer cells and CD8+ T cells increased in both patient groups, during the 10- and 30-minute exercises. Altogether, immune cell responses were fairly similar during 10- and 30-minute exercises, but the changes in immune cells correlated positively with the intensity of exercise. Further, chemokine IP-10 increased during exercise in both patient groups.

Even 10 minutes of moderate intensity exercise mobilizes immune cells in cancer patients. Further research should determine where these cells migrate after exercise and whether the mobilization can slow tumor growth in humans, as shown in mice.

Original Publications:

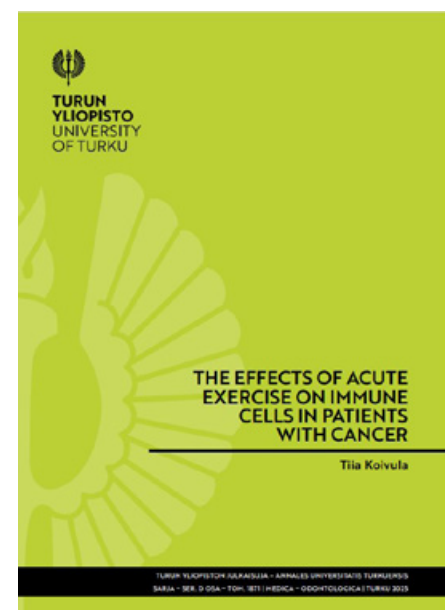
1. Tiia Koivula, Salla Lempiäinen, Petteri Rinne, Maija Hollmén, Carl Johan Sundberg, Helene Rundqvist, Heikki Minn, Ilkka Heinonen. Acute exercise mobilizes CD8+ cytotoxic T cells and NK cells in lymphoma patients. *Frontiers in Physiology*, 2023; 13: 1078512.
2. Tiia Koivula, Salla Lempiäinen, Petteri Rinne, Jenna H Rannikko, Maija Hollmén, Carl Johan Sundberg, Helene Rundqvist, Heikki Minn, Ilkka Heinonen. The effect of acute exercise on circulating immune cells in newly diagnosed breast cancer patients. *Scientific Reports*, 2023; 13(1): 6561.
3. Tiia Koivula, Salla Lempiäinen, Joona Neuvonen, Jooa Norha, Maija Hollmén, Carl Johan Sundberg, Helene Rundqvist, Heikki Minn, Petteri Rinne, Ilkka Heinonen. The effect of exercise and disease status

on mobilization of anti-tumorigenic and pro-tumorigenic immune cells in women with breast cancer. *Frontiers in Immunology*, 2024; 15: 1394420.

4. Tiia Koivula, Jooa Norha, Maija Hollmén, Eeva Juhanoja, Carl Johan Sundberg, Heikki Minn, Helene Rundqvist, Petteri Rinne, Ilkka Heinonen. Immunological changes in the circulation of cancer patients in response to 10- and 30-minute acute exercise. (Manuscript)

Supervisors: Adjunct Professor Ilkka Heinonen, Turku PET Centre, University of Turku, Turku, Finland
Adjunct Professor Helene Rundqvist, Department of Laboratory Medicine, Karolinska Institutet, Stockholm, Sweden
Adjunct Professor Petteri Rinne, Institute of Biomedicine, University of Turku, Turku, Finland

Opponent: Professor Satu Mustajoki, Translational Immunology Research Program, University of Helsinki and Helsinki University Hospital Comprehensive Cancer Centre, Helsinki, Finland





Adenosine metabolism in cancer: unveiling new therapeutic opportunities

Karolina Losenkova Mingeaud,
Disputation 2025-03-07

Immune suppression in the tumor microenvironment (TME) is a major obstacle in cancer treatment. Among the key mechanisms driving this suppression is the accumulation of adenosine (Ado), a purine nucleoside that inhibits immune cell function. Ado is primarily produced by ectoenzymes CD39 and CD73, and activates adenosine receptors (ARs) on immune cells. Despite the promise of targeting the CD39-CD73-AR axis, clinical success has been limited.

This study investigates cell-type-specific Ado metabolic pathways in the TME, identifying a network of various purine-converting ectoenzymes, including CD39, CD73, and ENPP1, with distinct cell-specific expression. Endothelial cells primarily rely on the CD39-CD73 pathway for Ado generation, while cancer cells use an alternative ENPP1-CD73 axis. T-cell expression of CD39 and CD73 is activation-dependent, with CD73 on naïve T cells and CD39 on

activated T cells. Hypoxia further modulates these pathways in a cell-specific manner, highlighting their dynamic nature.

Additionally, the study reveals the often-overlooked role of intracellular Ado metabolism. Extracellular Ado uptake via the ENT1 transporter reduces tumorigenesis in cancer cells but suppresses T-cell immunity.

Together, these findings emphasize the coordinated activity of both extra- and intracellular Ado metabolism, underscoring the need to consider its cell-type specificity and metabolic plasticity within the TME to optimize Ado-based therapies and enhance their therapeutic efficacy.

Original Publications:

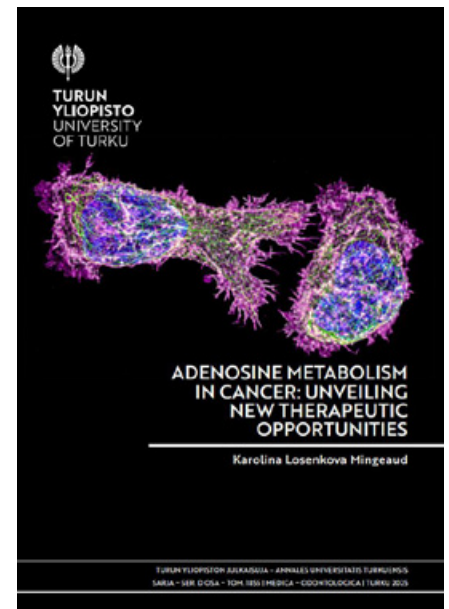
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2. Losenkova K., Zuccarini M., Karikoski M., Laurila J., Boison D., Jalkanen S., Yegutkin G.G. Compartmentalization of adenosine metabolism in cancer cells and its modulation during acute hypoxia. *Journal of Cell Science*, 2020; 133(10): jcs241463.
3. Losenkova K., Kreisig N., Svärd S., Weiler C., Jalkanen S., Takeda A., Yegutkin G.G. Adenosine suppresses T cell function through cellular uptake via equilibrative

nucleoside transporter ENT1 and intracellular metabolism. Manuscript.

Supervisors: Docent Gennady Yegutkin, PhD, MediCity Research Laboratory, Institute of Biomedicine, University of Turku, Turku, Finland

Academician Sirpa Jalkanen, MD, PhD, MediCity Research Laboratory, Institute of Biomedicine, University of Turku, Turku, Finland
Docent Akira Takeda, PhD, MediCity Research Laboratory, Institute of Biomedicine, University of Turku, Turku, Finland

Opponent: Professor Simon Robson, MD, PhD, Department of Anaesthesia, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA





Novel immune and genetic drivers of melanoma: Integrative and new preclinical models to uncover the impact of new chromosomal and transcriptomic changes on tumor progression and immunity

Wang Meng,
Disputation 2025-06-09

Melanoma progression and resistance to immune checkpoint therapy are driven by genetic instability and tumor-immune interactions. This thesis aimed to identify key immune and genetic drivers of aggressiveness in cutaneous (CM) and uveal melanoma (UM), and to establish translational models for therapeutic development.

In CM, integrative transcriptomic analyses of immunotherapy-treated patient cohorts revealed that resistance was associated with impaired antigen presentation and reduced β 2-microglobulin (β 2M). β 2M loss correlated with poor clinical response and was epigenetically regulated together with CD1D, affecting natural killer T cell-mediated immunity. These findings highlight actionable pathways to enhance immunotherapy efficacy.

In UM, molecular profiling demonstrated that BAP1 loss is a consistent driver of aggressive disease across populations, while South-east Asian tumors showed distinct chromosomal features linked to prognosis. To mechanistically investigate BAP1-driven tumor-immune changes, CRISPR-engineered BAP1-deficient mouse melanocyte models were developed. These models recapitulated lipid metabolic reprogramming and immunosuppressive phenotypes characteristic of high-risk UM, providing a novel immune-competent pre-clinical platform.

This work bridges patient-derived molecular discoveries with functional validation, establishing a translational framework to improve immunotherapy strategies in melanoma.

Original publications:

1. Wang MM, Koskela SA, Mehmood A, Langguth M, Maranou E, Figueiredo CR. Epigenetic control of CD1D expression as a mechanism of resistance to immune checkpoint therapy in poorly immunogenic melanomas. *Frontiers in Immunology*. 2023;14.
2. *Chen C, *Wang MM, Lim AST, Heng EYH, Tien SL, Yu SS, Tan G, Chan JY, Chan ASY. Genetic Landscape of Uveal Melanoma in Southeast Asia: High 1q Gains and Unique Patterns of Metastasis Risk. *Eye and Vis*. 2025 Apr 16;12(1):15.*Equal contribution
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Surveillance and Tumor Profiling. *Frontiers in Molecular Biosciences*. 2021;7(422).

4. Wang MM, Li Y, Ho C, Yu W, Coupland S, Chan A, Figueiredo C. Novel CRISPR-Cas9 BAP1 Knockout Pre-Clinical Tumor Model Recapitulates Human Melanoma Tumor-igenesis and Immune Evolution. *Commun Biol*. 2026 (final revision).

5. Wang MM, Coupland SE, Tero A, Figueiredo CR. Resistance to immune checkpoint therapies by tumour-induced T cell desertification and exclusion: key mechanisms, prognostication, and new therapeutic opportunities. *British Journal of Cancer*. 2023

Supervisor: Associate Professor Carlos Rogerio Figueiredo, Institute of Biomedicine, University of Turku, Turku, Finland

Opponent: Professor Roger Chammas, Comprehensive Center for Precision Oncology, University of São Paulo, São Paulo, Brazil





Novel dosimetry methods for small photon fields in external beam radiation therapy

Jarkko Niemelä,
Disputation 2025-05-09

Small photon beam dosimetry is crucial for modern high-precision radiotherapy, where conventional methods designed for 10×10 cm² fields are not directly applicable. The purpose of this thesis was to develop and comprehensively evaluate novel dosimetric approaches suitable for small photon fields in external beam radiation therapy.

The study introduced the dose-area product ratio (DAPR_{20,10}) as a new beam quality specifier and investigated the performance of a small-cavity ionization chamber in small photon beams. Experimental measurements with large-area plane-parallel ionization chambers, radiochromic film and various point detectors were combined with Monte Carlo simulations to

validate the methodologies and to determine correction factors and field output factors in clinically relevant beam conditions.

The results showed that DAPR_{20,10} is largely independent of field size and shape but dependent on beam energy, supporting its use as a replacement for the conventional TPR_{20,10} in small field beam quality specification. The small-cavity ionization chamber demonstrated feasible performance, although positioning and polarity uncertainties were notable in very small fields (e.g. 5×5 mm²), requiring repeated setups and appropriate corrections.

Overall, the thesis advances the standardization of small photon beam dosimetry and paves the road towards more accurate and reliable dose delivery in stereotactic and other high-precision radiotherapy.

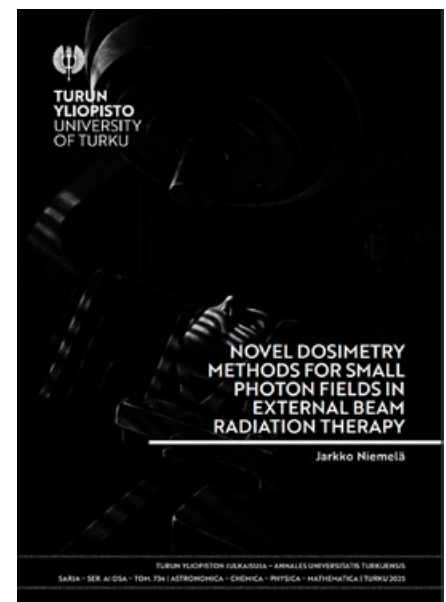
Original publications:

1. Niemelä J, Partanen M, Ojala J, Sipilä P, Björkqvist M, Kapanen M, Keyriläinen J. Measurement and properties of the dose-area product ratio in external small beam radiotherapy. *Physics in Medicine and Biology*, 2017; 62(12): 4870–4880.
2. Partanen M, Niemelä J, Ojala J, Keyriläinen J, Kapanen M. Properties of IBA Razor Nano Chamber in small beam radiation therapy using 6 MV FF, 6 MV FFF, and 10 MV FFF photon beams. *Acta Oncologica*, 2021; 60(11): 1419–1424.

3. Niemelä J, Partanen M, Ojala J, Kapanen M, Keyriläinen J. Dose-area product ratio in external small beam radiotherapy: beam shape, size and energy dependencies in clinical photon beams. *Biomedical Physics & Engineering Express*, 2021; 7(3): 035019.

Supervisors: Associate Professor Jani Keyriläinen, Department of Medical Physics, Turku University Hospital, Turku, Finland; Associate Professor Jarkko Ojala, Department of Medical Physics, Tampere University Hospital, Tampere, Finland.

Opponent: Conjoint Professor Joerg Lehmann, School of Information and Physical Sciences, University of Newcastle, Australia; Adjunct Professor, School of Physics, The University of Sydney, Australia.



Highlights in clinical research activities



Clinical cancer trial unit

Strong patient recruitment and intake of new cancer trials continued at the Tyks Cancer Centre Clinical cancer trial unit (CTU) during 2025. Thirteen new trials were started and recruitment of new patients proceeded as expected. In 2025, the CTU had 55 open trials of which 39 were drug trials. Of the 55 trials, 47 were sponsored commercial trials and the rest were academic researcher-initiated trials. 27 were actively recruiting trials and the rest were in the follow-up phase. One phase 1 (First-in-man) dose escalation trial started recruitment

during 2025 and another first-in-man trial was also recruiting in 2025.

The clinical trial unit employed twelve full-time personnel; two study coordinators, eight study nurses, and two trial-dedicated investigators on top of approximately 10 part-time PIs and sub-investigators. All CTU personnel were funded by the income from sponsored clinical trials. In addition to those working at the CTU, the hematology unit employs 3 research nurses, the pediatric hematologic cancer unit employs 2

research nurses, and the urology unit employs 2 research nurses, all of whom collaborate with the CTU. The estimated turnover, excluding drugs, was over one million euros. There have been marked savings in cancer drug costs for the hospital. It is worth mentioning that just the immuno-oncological drugs given in clinical trials during 2017–2020 have been estimated to be worth of 1,5 million euros.

Director of the Tyks Cancer Centre CTU: Prof. Panu Jaakkola, MD, PhD



Turku Urology Research Unit

The Urology Research Team has an extensive and long-standing record in clinical, translational, and basic research, with a particular focus on uro-oncology, especially prostate and bladder cancers. The team comprises academic urologists, clinical and translational research coordinators, and research nurses, supported by a dedicated data manager/biostatistician. The team actively conducts both pharmaceutical-sponsored and academic trials. Drs. Boström, Ettala, Seikkula and Anttinen serve as the principal investigators for several national prospective randomized trials. Detailed information

about ongoing research activities is available at <https://urologyresearch.utu.fi/>.

Prostate Cancer Research

The team's clinical research on prostate cancer has recently emphasized advanced medical imaging techniques. Key areas of focus include:

- The use of MRI in prostate cancer detection.
- The application of PSMA-PET imaging for primary staging of high-risk prostate cancer.
- Investigating TULSA (transurethral ultrasound ablation of the prostate) as an innovative treatment for localized prostate cancer.

Bladder Cancer Research

Bladder cancer studies primarily center on:

- BCG therapy for non-muscle-invasive bladder cancer.
- Markers and quality parameters of muscle-invasive bladder cancer treated with radical surgery.

Translational And Basic Science Projects

In addition to clinical research, our team is actively engaged in numerous translational and basic science initiatives. Among these, the Turku Prostate Cancer Consortium Study (TPCCS) (<https://tpcc.utu.fi/>) and the PROstate cancer screening and prevention with MICrobiomics, radiomics, and genetics (PROMIC) study stand out as the two largest collaborative research endeavors. These studies capitalize on the extensive resources and expertise of the high-volume university clinical unit dedicated to prostate cancer diagnosis and treatment in South-west Finland.

Principal investigator: Peter Boström, MD, PhD



Clinical Hematology Research Group

Our research group includes several physicians serving as principal investigators, co investigators, and sub investigators, as well as three study nurses. All of our physicians

conduct research projects and clinical trials alongside their routine clinical duties.

The Clinical Hematology Research Group is committed to conducting innovative research in stem cell

transplantation and hematological diseases, including hematologic malignancies such as acute and chronic leukemias and multiple myeloma. We actively participate in and collaborate on both international and national research,

including academic studies and pharmaceutical industry-sponsored interventional phase I-IV clinical trials. Our researchers have also contributed to several real world evidence (RWE) registry-based projects that advance patient care.

We report the outcomes of our stem cell therapies to the registry of the European Society for Blood and Marrow Transplantation (EBMT). Each year, we participate in numerous EBMT registry studies on stem cell transplantation/therapy, as well as in prospective EBMT studies.

In 2025, we had approximately 20-25 ongoing clinical or translational trials, including seven industry sponsored clinical trials and additional academic clinical or translational trials. Three new clinical trials were initiated: the QUINTESSENTIAL-2 CAR T trial and MAGNETISMM-32 in multiple myeloma, and HO177 in AML. Our goal was to increase and maintain research activity and to participate in major clinical trials, enabling patients to access state of the art, effective treatments free of charge. Excellent examples of this are the CAR T cell therapy studies QUINTESSENTIAL-2 and CARTITUDE-5.

PRESENT CUTTING EDGE TRIALS

QUINTESSENTIAL 2. A phase 3, randomized, open label, multicenter study evaluating the efficacy and safety of BMS 986393, a GPRC5D directed CAR T cell therapy, compared with standard treatment regimens in adult patients with relapsed or refractory, lenalidomide exposed multiple myeloma. The study commenced at Tyks in November 2025. Patients enrolled in the trial may receive a GPRC5D targeted CAR T construct that has demonstrated exceptional activity in phase 1 studies. The target protein is of particular interest,

as most current novel therapies in multiple myeloma focus on BCMA. Notably, prior exposure to GPRC5D targeted therapy does not diminish the efficacy of subsequent BCMA directed treatments. Pharmaceutical industry sponsored. Principal Investigator at Tyks: Juha Ranti, MD.

CARTITUDE 5. A multicenter, randomized phase 3 clinical trial for newly diagnosed multiple myeloma patients who are not candidates for autologous stem cell transplantation. The study compares bortezomib, lenalidomide, and dexamethasone followed by BCMA targeted CAR T therapy (ciltacabtagene autoleucel) with the same induction regimen followed by lenalidomide and dexamethasone maintenance. In CARTITUDE 5, the cilta cel construct is used in the frontline setting. Cilta cel has shown outstanding efficacy in relapsed disease, with indications of potential curative benefit. Administering the therapy earlier in the disease trajectory may further improve outcomes. The study began at Tyks in June 2022. Pharmaceutical industry sponsored. Principal Investigator at Tyks: Juha Ranti, MD.

CLL17. A prospective, multicenter, randomized, open label phase 3 trial comparing ibrutinib monotherapy with fixed duration venetoclax + obinutuzumab and fixed duration venetoclax + ibrutinib in previously untreated CLL. This is currently the most significant global CLL trial, evaluating fixed duration targeted therapies head to head for the first time. Initial results were published in The New England Journal of Medicine in December 2025. The study began at Tyks in June 2021. Investigator-initiated international Principal Investigator at Tyks: Juha Ranti, MD.

PET Imaging of Cancer Patients

Using ⁶⁸Ga DOTA Siglec 9. Vascular adhesion protein 1 (VAP 1) is highly

expressed in the endothelium of inflamed bone marrow and contributes to the release of reactive oxygen species (ROS), which impair hematopoietic cell expansion. This study investigates the distribution of VAP 1 in the body using PET/CT imaging before and after allogeneic stem cell transplantation. The PET tracer ⁶⁸Ga DOTA Siglec 9 targets VAP 1 and is rapidly excreted through the urinary tract. It has demonstrated safety and feasibility in several other inflammatory conditions. Academic translational research (Tyks PET Centre). Co investigators: Joni Järvenpää, MD; Maija Itälä Remes, MD, PhD, Prof.

Immunology of Allogeneic Stem Cell Transplantation at the Single Cell Transcriptomic Level.

A clinical doctoral research project currently in the planning phase and scheduled to begin in 2026. The study will collect samples from grafts used in related donor transplants for AML and MDS, as well as blood and bone marrow samples from patients after transplantation. Samples will undergo single cell RNA sequencing and TCR sequencing to trace the migration of lymphocyte subpopulations from the graft into the blood and bone marrow and to characterize post transplant cellular changes. The project aims to deepen understanding of the mechanisms underlying GVHD, GVL, and immune tolerance. Academic translational study. Researchers: Joni Järvenpää, MD; Associate Professor Tapio Lönnberg; Professor Maija Itälä Remes.

PHARMA INDUSTRY-SPONSORED TRIALS

EXCALIBER RRM. A multicenter, randomized, controlled, open label phase 3 study comparing iberdomide (a cereblon modifying agent), daratumumab, and dexamethasone with the globally used combination of daratumumab, bortezomib, and dexamethasone in patients

with relapsed or refractory multiple myeloma. Iberdomide is the first CELMoD agent to enter clinical trials. Participation in this study has enabled patients to access this novel oral therapy in the relapsed/refractory setting. The study began at Tyks in October 2022. Pharmaceutical industry sponsored. Principal Investigator at Tyks: Mervi Putkonen, MD, PhD.

GOLDEN GATE. A phase 3, randomized, controlled, open label, multicenter study evaluating blinatumomab (a bispecific antibody) alternating with low intensity chemotherapy versus standard of care in older adults with newly diagnosed Philadelphia negative B cell precursor acute lymphoblastic leukemia. Blinatumomab has shown strong efficacy in younger patients, and this study investigates its suitability for older adults. The study began at Tyks in January 2024. Pharmaceutical industry sponsored. Principal Investigator at Tyks: Pia Ettala, MD.

MAGNETISMM 5. A randomized, multicenter, open label phase 3 study evaluating the efficacy and safety of elranatamab (a bispecific antibody) as monotherapy and in combination with daratumumab, compared with daratumumab + pomalidomide + dexamethasone in patients with relapsed or refractory multiple myeloma who have received one to three prior lines of therapy, including lenalidomide and a proteasome inhibitor. Elranatamab is a novel bispecific antibody that has demonstrated strong activity across treatment lines. It is administered subcutaneously, offering a convenient option for patients. The study started at Tyks in June 2022. Pharmaceutical industry sponsored. Principal Investigator at Tyks: Mervi Putkonen, MD, PhD.

MAGNETISMM 7. A phase 3 study comparing elranatamab with lenalidomide in patients with

newly diagnosed multiple myeloma following autologous stem cell transplantation. The primary endpoint is progression free survival. Lenalidomide is the current standard maintenance therapy, and this study evaluates whether elranatamab can deepen post transplant responses. Given the strong association between depth of response and long term outcomes, this approach may become clinically relevant in future practice. The study began at Tyks in August 2022. Pharmaceutical industry sponsored. Principal Investigator at Tyks: Juha Ranti, MD.

MAGNETISMM 32. A phase 3, open label, randomized, multicenter study comparing elranatamab monotherapy with three standard regimens—elotuzumab + pomalidomide + dexamethasone, pomalidomide + bortezomib + dexamethasone, or carfilzomib + dexamethasone—in patients with relapsed or refractory multiple myeloma previously treated with anti CD38 therapy. The study began at Tyks in November 2024. Pharmaceutical industry sponsored. Principal Investigator at Tyks: Mervi Putkonen, MD, PhD.

ACADEMIC RESEARCH

Treosulfan-fludarabine conditioning regimen with post-transplant high-dose cyclophosphamide. GVHD prophylaxis with post-transplant cyclophosphamide (PTCy) is widely accepted in the setting of haploidentical donors, but nowadays used in other types of allogeneic transplantations as well. Our aim has been to evaluate outcomes with treosulfan and PTCy-based strategies in allotransplants. Aura Arola, MD, Lotta Tapana, MD, Maija Itälä-Remes, MD, PhD, Prof.

DNA-based qPCR technique in NPM1mutated AML. Kinetics and negativity as prognostic markers in

setting of intensive chemotherapy and allogeneic transplant. Pia Ettala, MD, Vesa Juvonen, PhD, Kari Remes, MD, PhD, Prof emer, Maija Itälä-Remes, MD, PhD, Prof.

HO177. A prospective, randomized, partly blinded, multicenter study evaluating revumenib in combination with azacitidine and venetoclax in adult patients with newly diagnosed NPM1 mutated or KMT2A rearranged AML who are ineligible for intensive chemotherapy. The study began at Tyks in October 2025. Investigator-initiated, international multicentre clinical trial. Principal Investigator at Tyks: Pia Ettala, MD.

Geriatric Pathway in Hematological Patients. An academic, investigator initiated, prospective oncogeriatric study examining how comprehensive geriatric assessment can be integrated into the care pathway for older hematology patients, and what clinical and economic effects this integration may have. The study began at Tyks in April 2025 and represents one of the first hematogeriatric trials in the Nordic region. Academic study. Principal Investigator at Tyks: Maija Valta, MD, PhD.

HO141 Vision. A prospective, multicenter phase 2 trial of ibrutinib plus venetoclax in patients with relapsed or refractory chronic lymphocytic leukemia (CLL) and creatinine clearance ≥ 30 ml/min, with or without TP53 aberrations. This study has provided patients with access to a highly effective combination of two targeted agents. Results have been published in leading journals, including *Lancet Oncology* and *Blood*. The study has been ongoing at Tyks since late 2017. Investigator-initiated clinical study. Principal Investigator at Tyks: Juha Ranti, MD.

ALLTogether1. An international clinical trial aimed at improving

treatment for children and young adults (up to 45 years) with newly diagnosed acute lymphoblastic leukemia (ALL). The study tailors treatment intensity based on relapse risk, reducing therapy for low risk patients and introducing novel agents for high risk groups. The trial is conducted in collaboration with the Department of Pediatric and Adolescent Hematology. The study began at Tyks in June 2021. Investigator-initiated clinical study. Principal Investigator at Tyks: Pia Ettala, MD.

VEX AZA Study. A Nordic, academic, single arm, multicenter phase 2 study evaluating the efficacy and safety of azacitidine in patients with VEXAS syndrome (EU CT number: 2024 510715 30 00). VEXAS syndrome is a recently identified disease caused by acquired mutations in the UBA1 gene within hematopoietic stem cells. The primary endpoint is to determine the safety and therapeutic efficacy of azacitidine in this patient population. Investigator-initiated trial. Principal investigator at Tyks: Maija Valta, MD, PhD.

NMSG 23/15 IRD MM. A national, multicenter, prospective phase 2 study assessing minimal residual disease following treatment with ixazomib, lenalidomide, and dexamethasone (IRD) in newly diagnosed, transplant eligible multiple myeloma patients. The study has been ongoing at Tyks since 2018. Investigator-initiated trial. Principal Investigator at Tyks: Mervi Putkonen, MD, PhD.

EBMT (European Society for Blood and Marrow Transplantation) TRIALS

Tyks participates in multiple EBMT operated studies in collaboration with major European transplant centers. These include registry based analyses and prospective EBMT trials focusing on stem cell

transplantation and cellular therapies. Investigator-initiated trials. Principal Investigator at Tyks: Maija Itälä Remes, MD, PhD, Prof.

Health and quality of life in patients with early age onset cancer

In addition to many international academic (**ALLTogether, CHIP-AML2022, LBL-2018, B-NHL2013**, etc) or pharma (Amgen blinatumomab study on follow-up of transplanted ALL-patients) initiated treatment studies, there are several ongoing projects at the department of paediatric and adolescent haematology/oncology which aim at recognising and alleviating the adverse effects of cancer and its treatment. Another research focus is genetic background of malignancies and sequelae of their treatment.

Milli-C (Microbiota and later life of childhood cancer patients) evaluates the association between immune reconstitution and metabolic adverse effects (e.g., obesity) and changes in the gut microbiota. Project is led by Anu Huurre and Liisa Järvelä.

A local project, called Digital tools in detecting late effects in adult childhood cancer survivors (**LER-ACA**), has published on the use of datalakes. One of these publications is describing the possibilities of using text-mining in prediction of need for psychosocial support after the end of cancer treatment. A PhD-project (**LaNSyMySe**) on organizing late-effect follow-up clinic activity using digital tools was started in 2024. RN Mira Pomrén is the PhD-student promoting this initiative.

A Nordic project on the late effects of high-risk acute lymphoblastic leukaemia survivors,

the **HALLON-study**, has started recruitment in 2022 together with another late-effect study (ALLStar) that examines low and intermediate risk ALL-patients. Project leaders for high-risk study are professor Arja Harila-Saari from Uppsala University and Päivi Lähteenmäki from University of Turku. Liisa Järvelä and Tuomas Lähteenmäki Taalas are conducting the procedures.

Palliative care is also one main topic of our research group, and here the principal investigator is MD, PhD Marika Grönroos for both local and national projects.

The multicenter study Personal Crisis and Cancer Predisposition Syndromes (**PeCCaPS**) studies how parents experience the genetic panel testing process and its consequences when their children are tested for cancer predisposition gene variants (<https://sites.utu.fi/peccaps/>). At the core of the study are parents' informational needs, support for decision-making, enabling informed choices, and the development of practices in genetic counseling. In addition, the project examines the psychological burden and personal crises associated with the testing process. All university hospitals in Finland are participating in the PeCCaPS study. Principal investigator for this project is MD, PhD Laura Korhonen.

iCAN-PEDI (Functional Precision Medicine For Pediatric Solid Tumors) is a project led by docent Minna Koskenvuo in Turku and Vilja Pietiäinen in Helsinki. The project aims to improve the selection of right treatment for a right patient by studying how a patient's tumor cells respond to the drugs, and what are the molecular alterations resulting in cancer. New analytical methods are developed to improve diagnosis and treatment of patients with pediatric solid cancers. For next term, the



aim is to further utilize the findings by directing the patients to clinical trials based on the molecular and functional profiling, and by establishing novel clinical trials.

Local academic studies on immunosuppression, vaccinations and infections after non-SCT treatment of childhood cancer patients are led by MD, PhD Linnea Schuez-Havupalo.

PACS (Pregnancy associated cancer and survival) is a Nordic study on the short-term and long-term consequences of pregnancy-associated cancer in women and their offspring. The study runs in collaboration with scientists from Denmark, Sweden and Norway. PhD student in this project is MD Riikka Kuvaja

Dr Lähteenmäki is the principal investigator of a Nordic study on the epidemiology, biology, treatment and survival of children with cancer and severe haematological diseases (**NOPHO-CARE**).

Project on “Immune reconstitution in children after allogeneic stem cell transplantation (SCT)” is led by docent Minna Koskenvuo with Helsinki University Hospital. Here, the first aim is to bring forth

new knowledge of immune system regeneration following HSCT, with special focus on the susceptibility to viral reactivations along with the T cell reconstitution. The second aim is to gather data on the effects of reduced intensive conditioning on immune reconditioning and to compare it to the immune reconstitution after myeloablative conditioning. The third aim of the study is to perform detailed functionality tests on T-cells following HSCT. The fourth aim is to discover new connections between genetic predisposition and risk of HSCT complications, such as infection, viral reactivation, and graft versus host disease (GvHD).

Another SCT-related project by docent Koskenvuo is called: Monitoring the hemostasis following allogeneic HSCT. It focuses on changes in hemostasis and thrombin generation followed by HSCT. The detailed studies concerning the thrombin generation has been done in collaboration with professor Riitta Lassila, Helsinki University.

Our unit is also a partner in an EU-funded **e-QuOL-project** (<https://equolproject.eu/>) that aims at providing children, adolescents and young adults who have

survived cancer with e-health tools designed specifically for and with them to help them manage their health. Involved researchers from our unit are Päivi Lähteenmäki, Liisa Järvelä, and Mira Pomrén.

Furthermore, our unit is leading a project called **QOL-HYVA** that is partly financed by Sustainable Growth Programme for Finland, and it pilots PROMIS™-measures in evaluating and following-up the well-being and quality of life of children needing specialized care.

A new project **EMPOWER**, financed by the Finnish Academy ACCTIVE call, starts recruiting young children with cancer into a feasibility study aiming to enable and promote age-appropriate physical activity opportunities during cancer treatments. This is a collaboration project with Turku University of Applied Sciences and principal investigators are docent Lähteenmäki and FT Niina Katajapuu.

<https://www.tyks.fi/tietoa-tyksista/tyksin-organisaatio/potilas-hoidon-toimi-ja-palvelualueet/lasten-ja-nuorten-10>

Senior scientists: Päivi Lähteenmäki, docent, MD, PhD, and Minna Koskenvuo, docent, MD, PhD

Project leaders: Anu Huurre, MD, PhD; Liisa Järvelä, MD, PhD; Marika Grönroos, MD, PhD, Laura Korhonen, MD, PhD, Linnea Schuez-Havupalo, MD, PhD

PhD students: Riikka Kuvaja, MD, Tuomas Lähteenmäki Taalas, MD, Mira Pomrén, RN (UAS), Aino Kytömäki, MD



TYKS Gynaecologic Oncology Unit

The TYKS Gynaecologic Oncology Unit conducts both clinical and translational research and actively participates in international multicenter clinical trials. Our team contributes scientifically to these trials, with publications by Sakari Hietanen (ORCID: 0000-0003-4734-4743).

Ovarian Cancer Research

We maintain a high-quality prospective sample collection for translational research, focusing on tumor biology and personalized treatments.

The DECIDER trial (NCT04846933) investigates mechanisms of chemoresistance in high-grade serous ovarian cancer, the most lethal gynecologic malignancy, and explores personalized treatments for resistant patients. Trial is coordinated by the University of Helsinki, with partners across Europe. TYKS is a key partner, leading patient recruitment and treatment.

To date, more than 600 patients have been recruited, with fresh tumor samples collected for genome analysis, 3D organoid culturing, and longitudinal blood samples for ctDNA studies. Patients with

relevant germline variants are referred to genetic counseling, and eligible chemoresistant cases are directed to the national personalized medicine trial, FINPROVE.

In 2025, our main results on HRD subtypes were published in Cancer Discovery journal and findings on chemorefractory HGSC in Cell Rep Med journal (links below).

Funding: EU Horizon 2020 grant No. 965193.

Principal Investigator (TYKS): Johanna Hynninen Adj prof, MD, PhD, <https://hynninenlab.utu.fi>

Read more:

<https://www.deciderproject.eu/>

<https://clinicaltrials.gov/study/NCT04846933?term=hynninen&rank=1>

<https://doi.org/10.1158/2159-8290.CD-25-0652>

<https://doi.org/10.1016/j.xcrm.2025.102316>

The DYNAMITE Trial is a new three-year project based on the hypothesis that distinct cellular states, regulated by specific transcription factors, drive chemoresistance in ovarian cancer. The study uses ATAC-seq-based chromatin accessibility profiling and DECIDER samples collected at TYKS to support translational analyses and the development of personalized therapies. The project is coordinated by the University of Oslo. Funding: EP PerMed.

Principal Investigator (TYKS):

Johanna Hynninen Adj prof, MD, PhD, <https://hynninenlab.utu.fi>

Read more: <https://dynamite.sahulab.org/>

Functional DNA Repair in Ovarian Cancer

We examine how ovarian cancer tumors develop resistance to chemotherapy-induced DNA damage in an investigator-initiated translational study. Through global collaborations, we are building the largest HGSOc patient-derived

organoid (PDO) library to advance research and clinical translation.

We analyze tumor responses to platinum-based chemotherapy and PARP inhibitors, using ex vivo experiments on clinical tumor tissues, including tissue ex-plant cultures (TEXs). Cutting-edge molecular analyses focus on drug transport, metabolism, DNA repair proficiency, bioenergetics, mitochondrial function, and PARP activity.

Funding: Research Council of Finland, Cancer Foundation Finland.

Principal Investigator: Sakari Hietanen, Prof., MD, PhD

ENDOMETRIAL CANCER RESEARCH

Endometrial cancer is the most common gynecologic malignancy, with surgery often curative at early stages. However, current risk assessment for adjuvant therapy remains suboptimal, and recurrent cases have poor prognoses.

ENDOMOL: Molecular Classification and Targeted Therapies Our research leverages next-generation sequencing (NGS) to classify tumors and identify actionable mutations. We analyze archival endometrial cancer samples (2008–2021, Turku University Hospital) to identify molecular predictors of recurrence in low-grade, low-stage endometrioid cancers and perform TCGA-based molecular classification. Funding: VTR-funding.

Principal Investigator: Sakari Hietanen, Prof., MD, PhD

PETREC: Personalized Treatment for Endometrial Carcinoma PE-TREC

PETREC is a national, multicenter phase 3 trial assessing whether molecular classification can guide adjuvant therapy in high-intermediate and early-stage high-risk endometrial cancer, comparing vaginal brachytherapy vs. whole pelvic radiotherapy (MMRd and NSMP) and chemotherapy vs. chemoradiotherapy (p53abn and non-endometrioid). Participants are randomized 1:1 to treatment arms. The trial is coordinated by Helsinki University Hospital.

Principal Investigator (TYKS): Tit-ta Joutsiniemi, MD, PhD

ARTS: Avoiding Risks of Thrombosis and Bleeding in Surgery In

2025, we joined the ARTS multicenter, blinded, randomized study comparing apixaban with placebo in patients undergoing urologic, gynecologic, or general surgery at intermediate risk of venous thromboembolism and bleeding. We enroll patients undergoing minimally invasive surgery for endometrial cancer to compare apixaban versus no anticoagulation from postoperative day 1 to day 28. This trial is coordinated by Helsinki University Hospital. Funding: VTR-funding.

Principal Investigator (TYKS): Heikki Seikkula, urologist, Adj prof, MD, PhD



Turku PET Centre research

The Oncology research group assesses prospectively new hybrid imaging technologies and acquisition protocols with standard and new tracers at the Turku PET Centre. The aim is to increase the clinical impact and diagnostic accuracy of PET imaging and PET-related research. Moreover, possibilities of new AI technologies with deep learning capabilities are being investigated for facilitating and improving diagnostic analysis of oncological PET images.

Innovations through translational research by local and international collaborators are being evaluated for immune cell interaction studies, for circulating tumor DNA and microenvironment in relation to molecular imaging, which may guide immunotherapy, for biologically planned adaptive radiotherapy, and for particle therapy.

We are currently studying the development of chemotherapy resistance and hypoxia in ovarian cancer with PET imaging in clinical studies by developing artificial intelligence methods to identify effective treatment modalities. Hypoxia is one of the most important drivers of chemoresistance in cancers. Tumor hypoxia can be evaluated preoperatively with PET with the tracer EF5 (18F-[2-82-nitro-1-H-imidazol-

1-yl)-N-(2,2,3,3,3-pentafluoropropyl) acetamide]).

Prostate specific membrane antigen (PSMA) targeted PET/CT or PET/MRI represents a very promising imaging method for prostate cancer diagnosis, staging, and treatment response evaluation. To improve the diagnostic accuracy in staging of high-risk prostate cancer, we have multiple ongoing studies comparing the new novel imaging methods to conventional guideline imaging (Bone scintigraphy and CT) in primary staging of prostate cancer.

Fibroblast activation protein (FAP) is a very promising molecular target for imaging and therapy in cancer. ¹⁸F-labelled FAP inhibitors PET-CT/MRI research will be one of the major interests of our group in the near future in various types of cancers. We have set up the synthesis of ¹⁸F-FAPI-74 for this purpose and the first human studies were started in 2024 and are ongoing. At the moment already dozens of scans have been performed with this tracer and it seems to very promising. We expect that ¹⁸F-FAPI-74 will be another “work horse” (in addition to ¹⁸F-FDG) for clinical cancer diagnostics in the future.

Theranostics refers to the use of molecular probes that have both

diagnostic and therapeutic properties. These probes, such as ¹⁸F-rh-PSMA-7.3, that we have been developing together with Blue Earth Diagnostics and which they have now commercialized (trade name Posluma), can have another radionuclide attached for treatment purposes, e.g., ¹⁷⁷Lu or ²²⁵Ac. We are also studying PSMA receptors and somatostatin receptors in phase I trials and in archival biobank material for their potential as targets for alpha- and beta-emitting radionuclide therapy. We are participating in several phase III clinical trials in prostate cancer patients.

We also have ongoing prospective studies to investigate the effects of physical activity and acute physical exercise on the immunological responses and circulatory effects in the tumor, as well as to anticancer treatment in different tissues. These studies are supported by the Research Council of Finland.

In June 2022, a new total body PET/CT scanner, Siemens Vision Quadra was installed in Turku PET Centre. The scanner has been highly used both in clinical diagnostics and in oncological research. This scanner allows dynamic whole torso imaging in patients with cancer as well as significantly reduces scanning time and improves accuracy in diagnostic scans. These will further enhance our possibilities for both academic and commercial cancer research.

Besides the Research Council of Finland, our cancer research is supported by Finnish Cancer Organization, the Nordic Cancer Union, and European Union among other smaller funders.

<https://turkupetcentre.fi/>

Professor Juhani Knuuti, Director of Turku PET Centre



Clinical Research Activities at Vaasa Cancer Clinic

The Vaasa Cancer Clinic, housed within Vaasa Central Hospital and integrated with FICAN West, delivers active cancer treatment to around 3 000 patients annually, including 1,200 patients receiving radiotherapy. Our clinical research unit, established in 2012, maintains a robust research portfolio with 6 concurrently active clinical trials and 10 development projects defined to improve cancer treatments.

Our research team combines GCP-certified physicians and specialized trial nurses with an in-house cell biologist who advances

our genomic analysis capabilities. As an EMA-approved study site, we lead clinical drug development trials and hospital-wide initiatives to advance cancer care. This encompasses implementing novel diagnostics and treatments while optimizing existing protocols. We specialize in precision medicine through gene-targeted therapies and have refined patient monitoring systems for both active treatment and follow-up care

Compact size of our clinic and adaptable structure enables rapid and efficient implementation of pilot treatments and innovative research programs. We pioneered DPD enzyme deficiency screening

in Finland for fluoronucleoside-based treatments, benefiting patients in both adjuvant and metastatic settings. Our commitment to scientific advancement yields approximately ten peer-reviewed publications annually. Current initiatives include developing proprietary research protocols, such as stereotactic radiotherapy for oligometastatic disease. In addition, we participate actively in making national treatment guidelines. The Vaasa Clinical Cancer Research Unit has become a preferred destination for University of Umeå students pursuing diploma work, with research spanning treatment outcomes in melanoma, lung, and breast cancers, as well as the impact of socioeconomic factors on treatment decisions.

Principal Investigator: Professor, Chief Physician Antti Jekunen, MD, PhD

Investigators: Ravichadra Ravi, MD; Heidi Andersen, MD, PhD; Natalja Eigeliene, MD, PhD; Jatta Saarenheimo, PhD; Nelli Nähls, MD; Vasileios Karagiannis, MD; Wahid Nesna, MD; Ella Saaranen, MD; Juha Saarinen, MD

Study nurses: Helena Ingo, BHC; Niina Salo, BHC, MSci; Emma Dahlgren BHC, MPhil

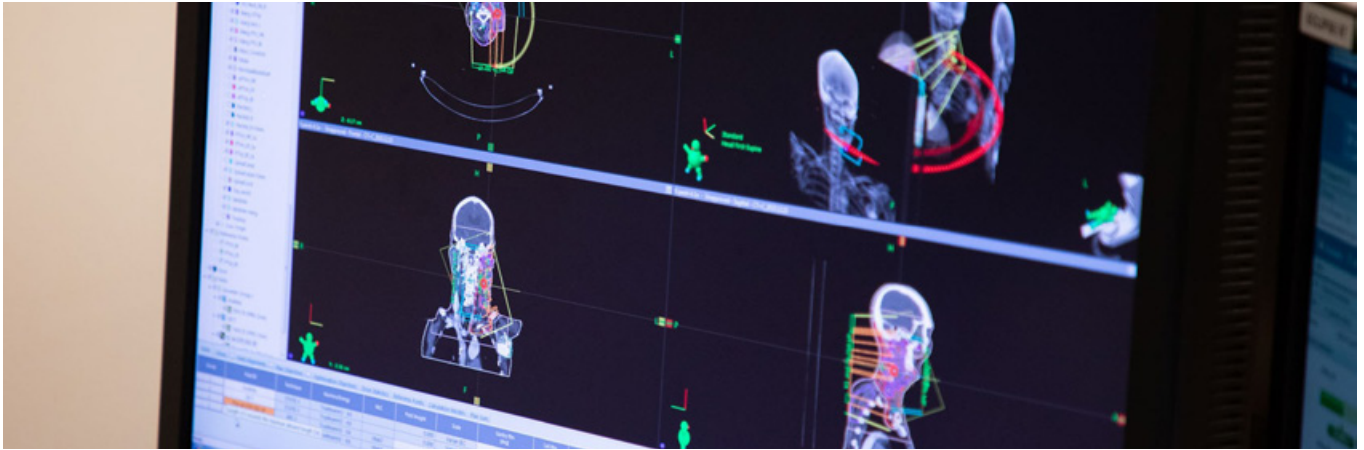


Clinical Cancer Research Activities at Satasairaala

The clinical research group of the Cancer Unit of Satakunta Wellbeing Services County is involved in drug treatment studies of breast cancer, colon cancer and GIST tumors.

Principal Investigator: Kalevi Pulkkanen, Chief of Oncology, M.D., Ph.D.

Physics research in radiotherapy



Four physics projects are based on collaboration between local actors, national and international hospitals and institutes, the national radiation safety authority, and manufacturers. One of the main objectives is to produce postgraduate degrees for physics students, in particular for those targeting a vocational certified degree in medical physics. Currently, there are three postgraduate physics students working in the projects described in the following sections.

1. Radiotherapy: dosimetry and dose calculation

The effect of radiation therapy (RT) is based on the cellular dose response, i.e., the response of the biological object to ionizing radiation. The dose-response relationship varies depending on the type of cell, and the difference between the response of tumour cells and the response of normal cells is the base on which all the doses for clinical treatment are selected. The clinical requirements for dose accuracy are based on evidence from dose response curves for tumor control probability (TCP) and for normal tissue complication probability (NTCP). The steepness of the given TCP or NTCP curve versus dose defines the change in response expected for a given delivered dose change. Thus,

uncertainties in delivered dose translate into either reduction in TCP relative to the optimised expected value or increases in NTCP relative to the optimised expected value, both of which worsen the clinical outcome.

Treatment with ionising radiation with small photon fields has been an established practice in stereotactic RT for many years. At the same time, there has been an increasing availability of novel treatment units designed specifically for intensity-modulated RT or volumetric-modulated arc therapy treatments. These technical improvements implicitly encourage the use of small treatment field sizes on equipment originally designed and commissioned for treatments based on traditional, broad photon fields. An experimental determination of small field dosimetric data is challenging and the use of radiotherapy planning (RTP) systems and treatment units not designed nor commissioned for small fields can introduce significant errors in the delivery of treatments.

This project is designed to investigate and understand the physics and challenges related to small photon fields in terms of measurement, calibration, and calculation.

The most suitable equipment, detector systems, and methods to determine dosimetric parameters as well as quality assurance aspects relevant to the use of narrow collimated fields are reviewed. The overall objective is to improve the accuracy of RT for cancer patients. Two matters are especially studied: 1) factors that influence the accuracy of measurement and determination of absorbed dose distribution in a tissue-equivalent phantom and 2) calculation accuracy of the RTP system particularly of small and composite fields. The studies are carefully carried out with extensive measurements by several types of radiation detectors and subsequently compared to the most accurate Monte Carlo simulations. The project is run by the physicists working in the Tampere and Turku University Hospitals and at the Radiation & Nuclear Safety Authority (Helsinki, Finland).

One doctoral dissertation in physics with its roots in this project has been published (in 2023) (Saikkonen A. Determination of absorbed dose by radiophotoluminescence dosimetry and Monte Carlo simulations) and another is being reviewed (Niemelä J. Novel dosimetry methods for small photon fields in external beam radiation therapy).

2. MRI-only for radiotherapy planning

Superior soft-tissue contrast may be obtained by magnetic resonance imaging (MRI) compared to other clinical imaging methods. MRI enables more accurate definition and delineation of the treatment target and the organs at risk (OAR). Monitoring of treatment outcome and evaluation of treatment response can be accurate by MRI.

Current RTP with MR images requires co-registration of computed tomography (CT) and MR images. MRI provides additional anatomical detail, while CT is needed for dose calculation (which is based on electron density information available by CT). The use of two different imaging modalities requires, of course, additional work and raises costs. Also, the error associated with co-registration may impact on treatment accuracy. Obviously, the ideal situation would be to need and use only a single imaging modality.

The overall objective of this project is to improve the accuracy of target and OAR definition. The specific aim is to examine the effect of geometric distortion on the accuracy in MRI-only-based RTP. Significant distortions are possible in MRI registrations, especially when larger fields-of-view are used. A particular branch of study is to

assess the magnitude of geometric distortions generated during diffusion-weighted MRI (DW-MRI). When imaging sequences are rapid, the gradient magnetic fields required for image encoding produce local eddy currents that cause permanent distortions to both geometry and image intensity. This complicates the precise definition of treatment volume and reduces the usability of DW-based imaging techniques for MRI-only RTP.

In this project, MRI is used for dose calculation to treat pelvic, brain, and head and neck cancers. The question now arises: Does this reduce the need for CT? MR images differentiate tumour and other structures better than CT images, but MRI lacks information on electron density which is required for dose calculation. The MRI scanner at the RT department of the Turku University Hospital is equipped with software to produce so-called synthetic CT images based on MR image information. These images can be used directly in a clinical RTP system. This project is conducted in close co-operation with other hospitals and the MRI manufacturer Philips (Amsterdam, The Netherlands).

In addition to reduced radiation exposure to patients (non-ionizing radiation is used), MRI-only in radiotherapy planning reduces the number of hospital visits for

patients and the workload of the personnel. This may generate significant savings in time and cost. The clinical advantage for patients is improved target and OAR definition. In the long term, this may reduce complications, since the probability of tumour control increases. The ultimate answer would require a substantial clinical study including a long follow-up.

This project has yielded one doctoral dissertation in physics (Ranta I. MRI-only radiotherapy treatment planning of the brain).

3. Automated segmentation tools for radiotherapy using deep learning algorithms

Manual segmentation of the OARs per patient can be very time-consuming, even for an experienced clinician and vary from a few minutes to an hour, depending on the tumour and its location. When accurate and robust automated segmentation algorithms are used, several hours of segmentation work may be automated, relieving clinicians to work with other important tasks, such as clinical patient work.

The automated segmentation tool uses branches of machine learning called deep learning (DL). DL is a subfield of machine learning based on models inspired by the structure and function of the brain, i.e., artificial neural networks. DL models look for good multiple level representations of the unknown input distribution in a hierarchical fashion, similarly as, for example, in the human visual cortex. These automatically learned abstract features allow the constructed multi-dimensional functions to produce an output from the input without the features of human designed functions. In this project, the problem distribution is a medical imaging dataset and the target outputs (to be learned by the artificial



Adj. Professor Jani Keyriläinen, PhD, Department of Medical Physics, Turku University Hospital

neural network) are segmented contours of regions of interest, such as target and OARs.

We study, develop, and validate a tool capable of producing automatically segmented targets and OAR structures on CT and MR images. This pertains to several cancer sites, like prostate, breast, and brain. The overall objective is to automate the entire process of target and OAR segmentation required for RTP. Hundreds of anonymous CT and MR images with manually segmented target and OAR structures are retrospectively collected and used as an input distribution for level-feature learning of the DL algorithm.

The processes of retrieval and anonymisation of patient images and segmentations from an image database can be automated by a database daemon script.

This project is run in a close collaboration with other hospitals and with MVision AI Oy Ltd. (Helsinki, Finland) to provide the development work and training for a DL-based workflow. Evaluation, validation, and testing are put into action by clinicians and physicists. Traditional evaluation metrics, e.g. dice coefficient, volume differences, and the 95% Hausdorff distance, are used to compare the outcome with the ground truths defined by clinicians. Obviously, the project also includes fitting the application into a clinical workflow, which is a requirement for significant reduction of the hours of work spent for image segmentation.

4. Other clinically oriented research

The RT department collaborates with the Oslo University Hospital to develop clinical tools for estimating the patient-specific treatment toxicity of head and neck

radiotherapy. Previous research includes dose painting by numbers for head and neck cancer patients based on the hypoxic agent EF5, and acetate-based dose escalation of intraprostatic lesions. Long-term evaluation of treatment outcomes of stereotactic radiotherapy for metastatic disease is also ongoing.

Standardisation of patient care

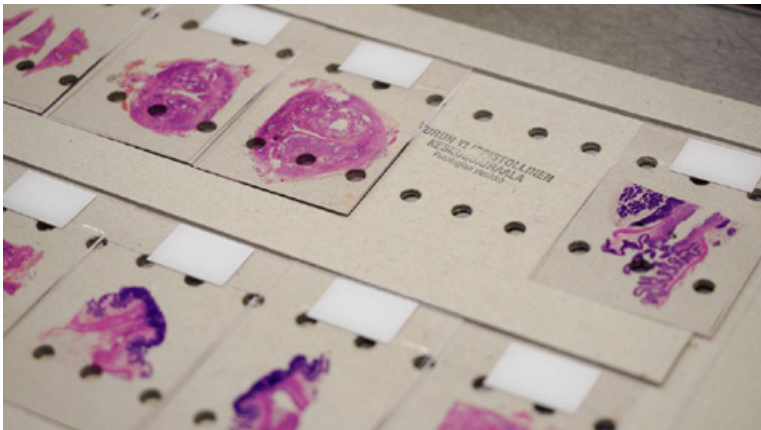
The Finnish Familial and Hereditary Pancreatic Cancer (FinFHPC) research consortium was founded in 2020 with an aim to standardize pancreatic cancer screening in high-risk individuals. It also wants to raise the awareness of the disease and to improve the prognosis of patients with familial and hereditary pancreatic cancer in Finland. The principal investigator, Sini Keskinen, MD, has led the group since 2022. The FinFHPC research consortium unites medical experts from the university hospitals of Helsinki, Kuopio, Tampere, Oulu, and Turku. The disciplines of clinical genetics, gastroenterology, gastrointestinal radiology, gastrointestinal surgery, oncology, and biostatistics are represented in the multidisciplinary consortium. In September 2024, FinFHPC published the first national guidelines on pancreatic cancer screening for high-risk individuals (1). The guidelines were developed by combining the expert opinion within the working group and the relevant scientific literature. The guidelines work as best-practice guidance for helping clinicians recognize high-risk individuals and for referring the right patients for assessment by the Department of Clinical Genetics. The aim is to harmonise germline testing and the indications for pancreatic cancer screening nationally. Centralising the screening program to the university hospitals will ensure a high level of expertise and technical capabilities, including endoscopic

ultrasound (EUS) and magnetic resonance imaging (MRI).

The FinFHPC research consortium has published the indications for referring patients to the Department of Clinical Genetics (1). The Department of Clinical Genetics provides genetic counselling services and offers genetic testing to pancreatic cancer patients who fulfil the germline testing criteria. The healthy relatives defined as high-risk individuals will be referred for screening, which includes typically MR imaging annually starting at age 50 years (1). The screening program includes two different high-risk groups to enhance the cost-effectiveness of the screening program in the public health care system. The genetic background of the person defines the risk group. The FinFHPC research consortium will update the national guidelines regularly in the future.

The purpose of the FinFHPC research consortium is to raise the public awareness of familial and hereditary pancreatic cancer. Patients participating in the screening program will be recruited for a multicentre prospective study. The study aims to establish the effectiveness and psychosocial impact of the screening program. To ensure cost-effectiveness of the screening program, it is important to identify accurately all high-risk individuals. It is equally important that the guidelines are updated regularly, as new study results emerge, and the literature evolves. A biomarker study aims to improve early detection of pancreatic cancer. Better screening methods with higher specificity and sensitivity for detecting early-stage pancreatic cancer will improve the prognosis of patients with pancreatic cancer. In the future, the FinFHPC research consortium will establish a base for familial and pancreatic cancer research in Finland.

Highlights in research infrastructure



Auria Biobank

Auria Biobank is the oldest Finnish hospital biobank established in 2012 by University of Turku and the hospital districts of Southwest Finland, Satakunta and Vaasa. Auria got the permission to operate in 2014 and is the operating biobank in the respective wellbeing services counties. The aim of biobanks is to promote health by providing a research infrastructure for biomedical research. Biobanks collect biological samples and related clinical data, from patients who have given biobank consent, to be used for research purposes.

Auria Biobank, part of Turku University Hospital's Laboratory Division, achieved the ISO 20387:2020 accreditation for Human material biobanking in December 2022. Auria was accredited by the Finnish accreditation service FINAS. The current scope of accreditation includes acquisition, processing, storage and distribution of whole blood, plasma, serum, urine, and CSF samples as well as DNA, for biobank studies. Accreditation verifies the impartiality and consistent operation of the biobank.

Key factors that have enabled successful biobanking in Auria include

the advanced Finnish Biobank Act with broad consent, hospital-integrated consent and sample collection providing clinical quality, and the possibility to link samples with clinical data collected as part of patients' treatment in the hospital. Over 1,5 million human biological FFPE tissue samples are stored at Auria Biobank. There is also an ongoing collection of other sample types such as plasma, serum, CSF, urine and DNA. In addition to samples specifically collected for biobanking, Auria Biobank also enriches its collections with samples derived from diagnostic leftover material. Genotype data is available for approx. 85 000 persons.

Approximately one fourth of Auria's tissue samples are from cancer patients. Auria Biobank collaborates with FICAN West in collection and molecular profiling of fresh tumor samples from patients treated and operated in Turku University Hospital. The aim is to improve patient stratification for more personalized treatment and to reveal novel prognostic biomarkers and druggable targets for certain cancer types.

Auria has extensive experience in serving both academic researchers

as well as pharmaceutical and diagnostic industry. Auria has provided high quality samples and related clinical data for over 300 biobank studies, of which over 60% are related to oncology. The abstracts of the biobank studies are collected at Auria's web pages (www.auria.fi/biobank). Data generated in biobank studies is returned to the biobank, and can be used in new studies. The research produces understanding of mechanisms behind diseases which can lead to identification of new drug targets and development of novel treatment practices and personalized medicine. Further, clinically significant findings can be returned to consented donors. Recently, genetic data of pathogenic breast, ovarian and prostate cancer gene variants has been returned to the donors who consented for receiving the genetic information. The patients were directed to health care for individual monitoring, prevention, and treatment.

<https://www.auria.fi/biopankki/en/>

Lila Kallio, Director
Merja Perälä, Project Manager

Turku Center for Disease Modeling

The TCDM is a research and re-research service organization within the Faculty of Medicine in the University of Turku. It is also a part of the Biocenter Finland “Model Organisms” network. TCDM provides state-of-the-art research facilities and specialized expertise for studies involving experimental animals to support preclinical research for both academic and industry partners. In vivo rodent studies are essential for elucidating the mechanisms of tumor development and

therapeutic responses. TCDM offers comprehensive expertise, including 1) generation and characterization of various type of xenograft models in mice, 2) generation and maintenance of genetically modified mouse models for cancer research, and 3) implementation of chemically induced cancer models in mice. TCDM personnel are fully qualified to conduct a wide range of surgical and pharmacological interventions required in preclinical studies. The experimental studies in rodents are further supported by several imaging techniques

such as optical, PET and ultrasound imaging that enable longitudinal monitoring of tumor growth. To strengthen its capabilities in in vitro modeling, TCDM has recently established two new units, 3D cell culture unit and iPS cell unit, expanding the variety of services available to researchers.

<https://www.tcdm.fi/>

Petra Sipilä, Adjunct Professor, Director of TCDM
Adjunct Professor, Director of TCDM



Auria Clinical Informatics

Auria Health Data Services (AHDS) supports scientific research, innovation activities and the generation of educational datasets in accordance with the Finnish Act on the Secondary Use of Health and Social Data. AHDS supports a broad spectrum of research, ranging from basic scientific research to industry-sponsored applied studies. The services include:

- Feasibility Assessments: Reporting on data availability and density.
- Methodological Support: Guidance on study design and cohort formulation.
- Analytical Services: Advanced statistical analysis and data anonymization.
- Secure Infrastructure: Access to Atolli, a Findata-audited

Secure Processing Environment (SPE).

Cancer registry studies often require close collaboration between AHDS and local clinicians to ensure the technical and clinical validity of patient records. For this purpose, AHDS has established an extensive network of oncologists, surgeons, and pathologists within the Wellbeing Services County of Southwest Finland.

AHDS has supported more than 120 cancer register studies during 2019–2025, and, in the future, we see an increasing demand for real world data in such studies. One rising trend is to form the control cohorts in clinical studies directly from the existing EHR data.

Between 2019 and 2025, AHDS supported over 100 cancer registry studies. Moving forward, we anticipate a growing demand for Real-World Data (RWD), particularly the emerging trend of utilizing Electronic Health Record (EHR) data to construct synthetic control arms for clinical trials. Additionally, AHDS has a supporting expert role in the formulation of public statistics for TYKS Cancer Center. <https://www.auria.fi/tietopalvelu/en/>

Arho Virkki
Chief Analytics Officer at the Wellbeing services county of Southwest Finland
Head of Auria Clinical Informatics



Turku PET Centre

Turku PET Centre is a Finnish National Research Institute for Positron Emission Tomography (PET) imaging. The centre is jointly owned by the University of Turku, the Åbo Akademi University, and the wellbeing services county of Southwest Finland.

The mission of Turku PET Centre is to promote the use of short-lived positron emitting isotopes and apply multimodality imaging in the field of medical research. Correspondingly, the vision of Turku PET Centre is to be the leading international centre in the strategically selected research fields especially in the development of new PET tracers and PET, CT, and MR imaging methods as well as in the application of these for research and clinical use. Oncological research is one of the three clinical main research areas in Turku PET Centre. Also the non-clinical research areas,

Preclinical and translational research, Radiochemistry research, Instrumentation, modelling, and data science research provide important complimentary support for Oncological research.

Currently TPC employs more than 90 staff members as well as hosts more than 120 affiliated researchers. Turku PET Centre has own building located in the Turku University Hospital campus area (building nr. 14.) and has facilities for research besides that in the Biocity and Aurum buildings. The clinical PET scanners are located in the main building and include one total-body PET/CT scanner, two normal PET-CT scanners, and a PET/MRI scanner. Preclinical scanners are located in the Biocity building and include a small animal PET/CT scanner, a small animal PET/MRI scanner, and portable Molecubes PET and CT devices, which can easily be relocated to PET Centre main building

when using very short-lived tracer that are not possible to transport to Biocity. All these seven scanners are used in oncological research. For production of radioisotopes, Turku PET Centre has three cyclotrons (used for production of ^{18}F , ^{11}C , ^{15}O) and two ^{68}Ga -generators. For production of the radiopharmaceuticals/tracers, TPC has totally 26 hot cells and numerous automated devices. Fifteen of the hot cells are located in the clean room area enabling production of the tracers at GMP level for clinical use. The rest are used in the R&D and in production of the tracers for preclinical use.

<https://turkupetcentre.fi/>

Professor Juhani Knuuti, Director of Turku PET Centre
Adjunct professor Kari Kalliokoski, Research Service Manager of Turku PET Centre

Research services of Varha and TurkuCRC

The goals of the research services of Varha and Turku Clinical Research Center (TurkuCRC) are to reinforce the prerequisites of scientific research, to guarantee the quality of research, to ease the workload of the study groups by managing the administration of the research and to make co-operation with external stakeholders faster and more efficient.

The tasks of research services include:

- Processing of Varha's research permits, thesis permits and data permits
- Organisation of the activities of the Regional Committee on Medical Research Ethics
- Contracts relating to scientific research
- Management of government research funding and organisation of project funding application rounds

- Management and reporting of research funding
- Monitoring services to investigator-initiated research projects
- Publication data collection
- Advisory services for various research-related questions
- Biostatistician services

<https://www.varha.fi/fi/tieto-a-varhasta/tieteellinen-tutkimus/tutkimuspalvelut>



Finnish Functional Genomics Centre

Finnish Functional Genomics Centre (FFGC) is a national core facility for genomics services and a testing laboratory No. T351 accredited by FINAS Finnish

Accreditation Service for production of sequence raw data for various further analyses from genomic DNA with next-generation sequencing (accreditation requirement SFS-EN ISO 17025:2017).

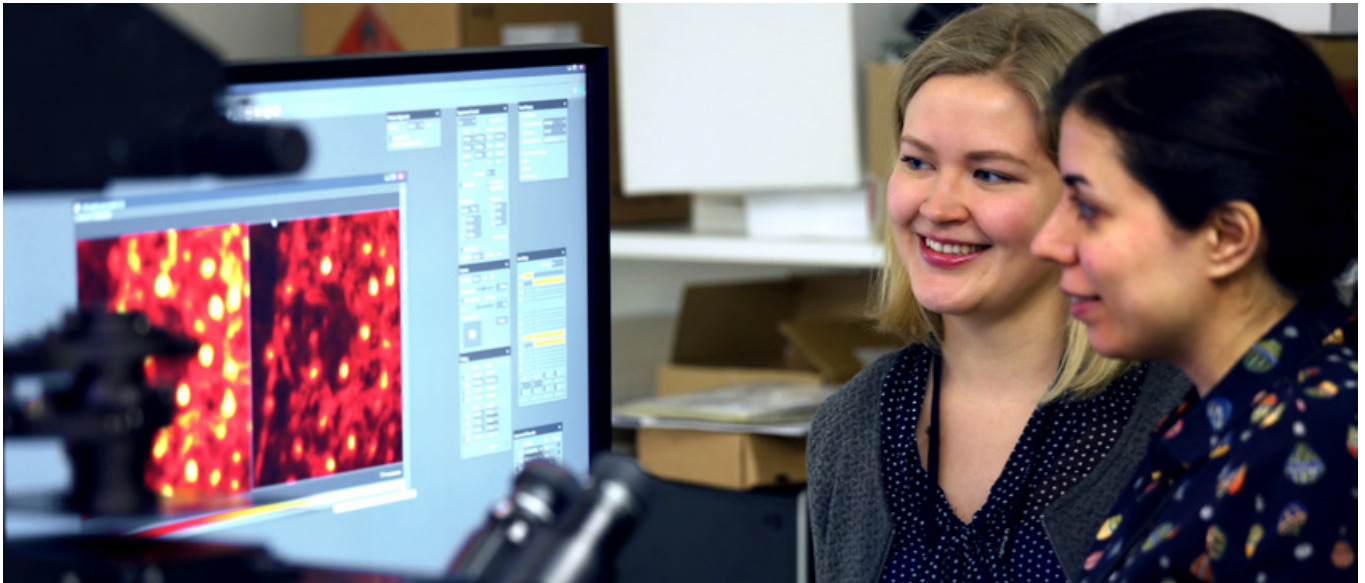
FFGC operates at the Turku Bioscience Centre, which is a joint department of University of Turku and Åbo Akademi University and belongs to the national Biocenter Finland infrastructure network. FFGC supports high level research by providing open access to the state-of-the-art technologies and services with the latest methods available for genome analysis. Currently the most important services include next-generation sequencing based analysis of genomes, exomes, transcriptomes, epigenomes and metagenomes.

Increase of laboratory automation and sequencing capacity enable

more cost-efficient services especially for whole genome sequencing. The service users include academic and government's research units, health care units and organizations from private sector. FFGC continuously develops and improves the provided services in close collaboration with the key stakeholders.

<https://bioscience.fi/function-al-genomics/services/>

Minna Kyläniemi, PhD, Head of FFGC



Turku BioImaging

Turku BioImaging (TBI, www.bio-imaging.fi) is an umbrella organization connecting Turku-based biological and medical imaging activities, facilities, and people, and integrally linking them with national and international imaging organizations and projects. TBI has its own Operations Team, which takes care of coordination tasks and directly provides some of the services, and TBI-associated imaging facilities encompass state-of-the-art technologies, ranging from molecular and cellular imaging to high content analysis and whole animal and human imaging.

TBI coordinates the collaboration of different imaging facilities in Turku. Internationally, TBI leads Euro-BioImaging Finland (www.eurobioimaging.fi), the Finnish service organization of the Euro-BioImaging infrastructure (www.eurobioimaging.eu). Euro-BioImaging, hosted by Finland and Turku, provides open access to imaging technologies, training, and data services across Europe. Euro-BioImaging Finland is one of only six national “lighthouse” infrastructures on the national roadmap, and one of the leading imaging expertise clusters in Europe. Euro-BioImaging Finland provides

imaging services also within the canSERV initiative, where user projects related to cancer research and translation into personalized oncology get support and free access to cutting-edge imaging services. TBI has been very successful in getting canSERV applications to Finland.

Together with its national and international partners, TBI is also very active in several other networks and projects, such as BioImage Informatics Finland, Global BioImaging, and ISIDORE, and collaborates with both Finnish and international units of several European life science infrastructures, such as EU-OPENSREEN and ELIXIR.

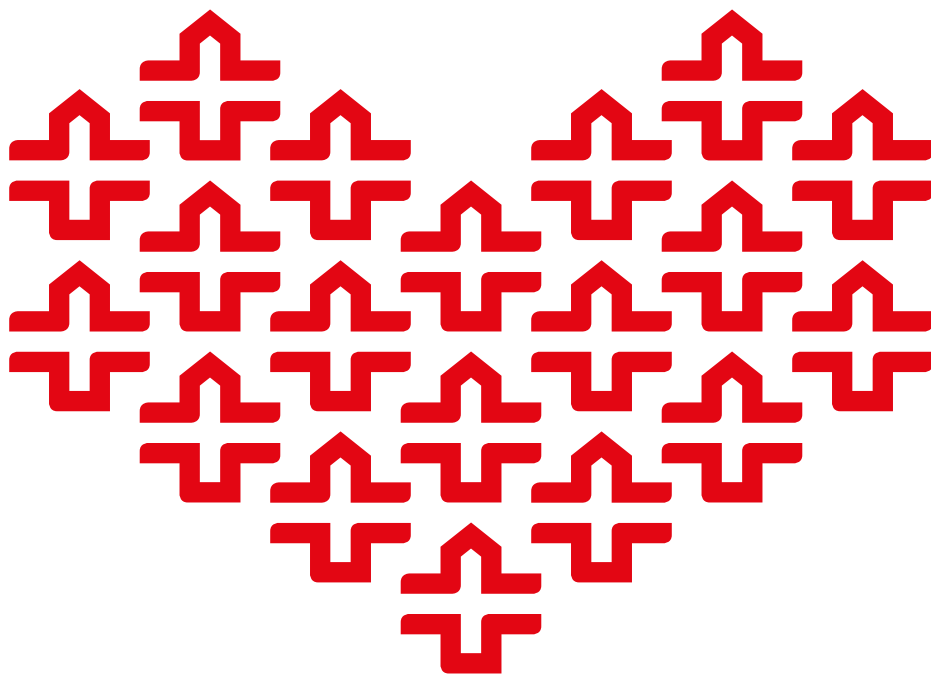
TBI coordinates the most significant imaging funding proposals for the whole Finland, the latest one for Euro-BioImaging Finland bringing in 28 M€, of which over 10 M€ to Turku for new instruments, staff salaries, and service development to Åbo Akademi University, University of Turku, and Turku University Hospital. TBI also provides open-access image analysis, deep learning, and data management services, organizes workshops and imaging-related events, operates an international MSc

programme in biomedical imaging (BIMA), and leads Field of View, a research program of BioCity Turku focused on imaging. Both the University of Turku and Åbo Akademi University are active in TBI, with numerous services offered by units such as the Cell Imaging and Cytometry Core of Turku Bioscience Centre and Turku PET Centre.

Imaging, on all different levels, plays a fundamental role in cancer research. For instance in Turku PET Centre, oncology research aims to increase the clinical impact and diagnostic accuracy of PET imaging. Multidisciplinary research teams develop and evaluate novel PET ligands and explore new hybrid imaging technology and acquisition protocols as well as new treatments. As an example, researchers of Turku PET Centre are currently investigating the role of physical exercise in treatment outcomes of breast cancer both in patients and animal models.

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Parannamme joka päivä