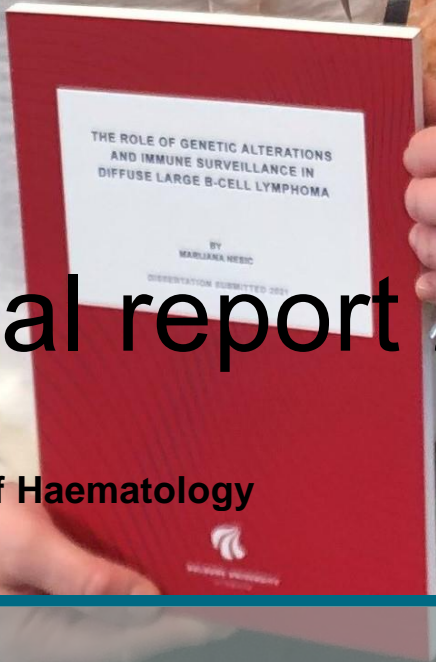




RESEARCH | FUNDING | SCIENTIFIC OUTPUT

# Annual report 2021

Department of Haematology



AALBORG UNIVERSITY  
DENMARK



AALBORG UNIVERSITY HOSPITAL

# CONTENT

<b>1 Research strategy</b> .....	<b>3</b>
Mission .....	3
Vision and goals .....	3
<b>2 Research infrastructures</b> .....	<b>4</b>
Organisation .....	4
Professorship responsibilities.....	4
Core functions .....	5
Haematological Research Laboratory Unit .....	6
Data Science Unit.....	6
Epidemiology & Real-World Evidence Unit.....	6
Clinical Trial Unit .....	7
<b>3 Research projects</b> .....	<b>8</b>
Clinical studies .....	8
Student projects .....	10
<b>4 Research grants and awards</b> .....	<b>14</b>
<b>5 Dissemination of scientific output</b> .....	<b>16</b>
Conference contributions .....	16
<b>6 Scientific output</b> .....	<b>19</b>
Bibliometrics .....	19
<b>7 Publication list</b> .....	<b>21</b>
Publications in 2021 .....	21

**Editors**

Marianne Tang Severinsen, Karen Dybkær, Martin Bøgsted, Tarec C El-Galaly, Mette Gulbæk, Henrik Gregersen, Anne Lindblom Hansen, Lise Tordrup Elkjær  
 Department of Haematology, Aalborg University Hospital

**Photography**

Lene Pedersen, Communication Department, North Denmark Region

**Layout**

Design Department, North Denmark Region

**Bibliometrics**

Maria Pertou Østergaard, Medical Library, North Denmark Region  
 Lise Tordrup Elkjær, Department of Haematology, Aalborg University Hospital

**Front page**

Marijana Nestic, PhD (private photo)

Aalborg, July 2022

# 1 Research strategy

The Haematology Research Section is an integrated division of Department of Haematology at Aalborg University Hospital. In accordance with the overall research strategy and the Danish Health Act, the clinical practice is based on evidence and development in relation to new diagnostics, therapy and follow up.

## Mission

Our mission at Department of Haematology Aalborg University Hospital is to ensure optimal diagnostics, treatment, and care for patients with haematological diseases in the North Denmark Region and furthermore to create a good working environment making Department of Haematology an attractive and inspiring place to work where all staff develop and thrive.

## Vision and goals

We aim to

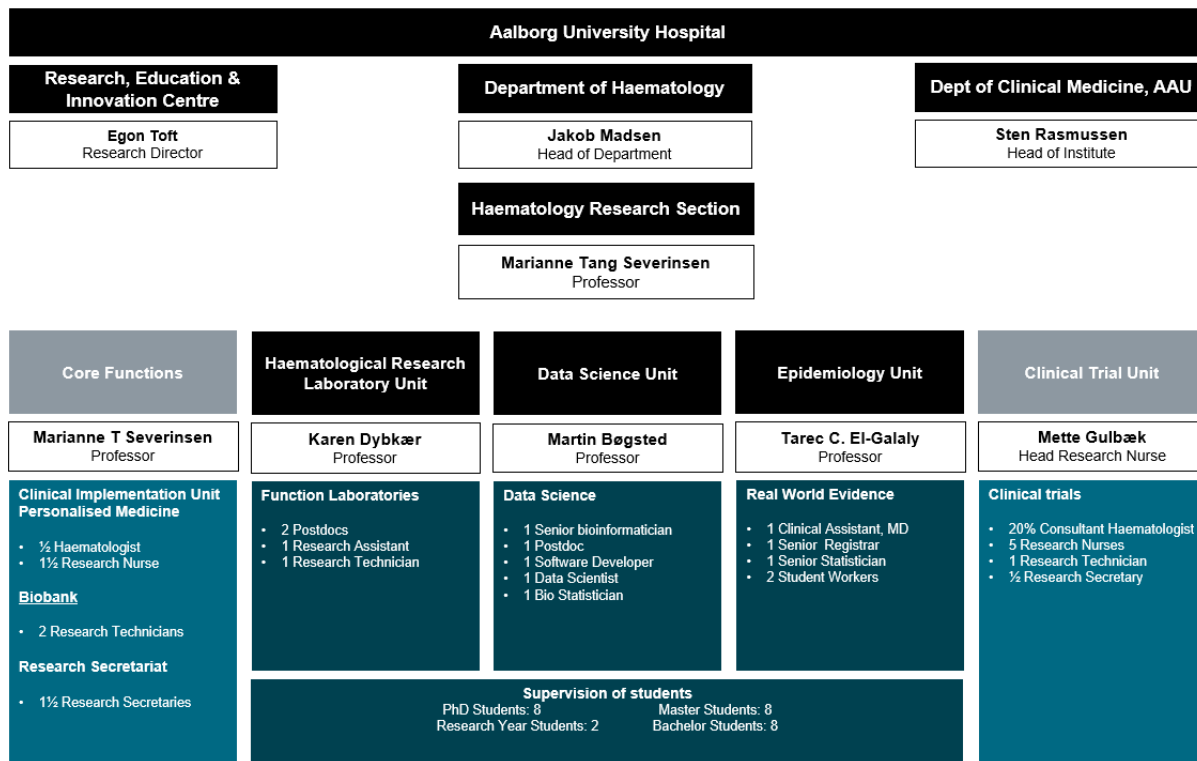
- Understand the mechanisms behind disease pathogenesis and resistance of blood diseases (personalised medicine and tumour cell biology)
- Develop preclinical models, methods, and tools for assignment of individual drug resistance of haematological cancer (personalised medicine and tumour cell biology)
- Generate clinical evidence by relevant end points, before implementation and prospective validation of new diagnostics
- Develop biostatistical models and bioinformatic tools to explain haematological diseases and their course of treatment
- Understand the relation between venous thromboses and cancer diseases and develop algorithms to identify patients at risk (thrombosis prophylaxis)
- Monitor the development in diagnostics, treatment and survival in haematological diseases and their complications by means of cancer epidemiological research methods
- Develop new and less resource demanding methods for follow-up of patients treated for blood diseases (nurse-led research)
- Be an attractive partner for the pharmaceutical industry regarding industry-initiated clinical trials to develop and offer new and experimental treatments for patients with haematological diseases
- Implement and run investigator-initiated clinical trials
- Attract researchers and clinicians from other regions and universities
- Inspire and attract students and young scientists to research in haematology

# 2 Research infrastructures

## Organisation

The research section at Department of Haematology, Aalborg University Hospital, was established in 2005, now including clinical research, epidemiology, laboratories, data science, and a secretariat.

Figure 1 | Organisation plan



## Professorship responsibilities

In June 2021, Marianne Tang Severinsen was appointed professor at Department of Haematology, Aalborg University Hospital and Department of Clinical Medicine, Aalborg University.

We will attain our mission by bridging research and clinical work which is the overarching goal of the Department of Haematology, Aalborg University Hospital. The research section is organised as a unit within the Department of Haematology. The professor and head of research holds a chair at the faculty/Department of Clinical Medicine and works parttime as a consultant haematologist at the clinical department. Furthermore, the professorship involves being responsible for the education of medical students in the field of haematology. The aim is to engage medical doctors and students to do research, but also to give researchers in other fields an insight into the “real world” seen from a patient-doctor perspective.

# Core functions

*Professor Marianne Tang Severinsen*

## Clinical Implementation & PM Unit

Clinical Implementation Unit – specialised in personalised medicine (PM) and prospective trials.

The Clinical Implementation Unit handles screening, information, and inclusion of trial subjects, obtains informed consent, creates clinical databases, and registers clinical data in the REDCap databases created for the individual projects. In addition, the Clinical Implementation Unit has had a coordinating role in relation to collecting biological material, including tissue, blood, and bone marrow samples as well as collecting saliva samples, mouth scrapes and punch biopsies used as normal reference in a personal medicine trial. In addition, the Clinical Implementation Unit has been responsible for collecting and registering patient-reported outcome data (PRO data). A project nurse and a part-time specialist in haematology have been associated in 2021. For personalised medicine, results from the completed molecular genetic studies have been presented and discussed at local tumour conferences for doctors employed at the Department of Haematology, Aalborg University Hospital, at local tumour conferences. During 2021 the Clinical Implementation Unit has, in close collaboration with the Department of Molecular Diagnostics and the Department of Oncology, Aalborg University Hospital, implemented personal medicine as an operational function at Aalborg University Hospital.

## Haematological Biobank

Bone marrow and peripheral blood samples are registered in the Haematological Biobank under Bio and Genome Bank Denmark (RGBG). The Haematological Biobank collects and stores vital frozen single cell suspensions of mononuclear cells, plasma and serum from patients included in current clinical prospective protocols and health science projects and from patients suitable for future research projects.

For current clinical prospective protocols and health science projects approved by a regional or national committee on health research ethics, a project-specific research biobank has been set up for the individual projects. For personalised medicine the Haematological Biobank usually also collects, handles, and registers biological tissue in the form of a saliva sample, mouth scrape or skin punch biopsy. For sample handling and processing, detailed standard operating procedures have been developed, ensuring fast and reproducible logistics and freezing.

From patients with haematological diagnoses, biological material is collected and stored in the haematological biobank if informed consent is given by the patient. The sample material can be used if a future course of treatment requires additional investigations for the individual patient. Sample material can also be used in future research projects if accepted by a committee on health research ethics, given an opportunity for improving diagnostics and treatment methods for future patients is present.

## Research Secretariat

The research secretariat at the Haematology Research Section coordinates and provides secretarial and administrative assistance to professors, researchers and students of the research laboratory, data science and epidemiology units as well as the clinical trial unit, biobank, and the clinical implementation & PM unit.

The research secretariat performs research-related administrative tasks including

- preparation, coordination, translation, and editing of project descriptions, scientific papers, reports, and strategies
- submission of manuscripts for publication, funding proposals and applications for regulatory authorities
- administration of research accounts and preparation of budgets and financial reports
- coordination of travel itineraries, conferences, and meetings
- maintaining office filing systems and web pages

## Haematological Research Laboratory Unit

*Professor Karen Dybkær*

The Haematological Research Laboratory Unit has focus on molecular analyses of haematological cancers and how to use these in combination with clinical information to identify new determinants and mechanisms that affect disease development, sensitivity to therapeutic drugs as well as disease classifications. Based on genome editing with CRISPR-Cas9 technology spanning over genome analyses, functional analyses, biobanking, and participation in prospective clinical trials, we strive towards better treatment and risk stratification of cancer patients. Their projects are all based on interdisciplinarity and collaboration with local, national, and international partners. The Haematological Research Laboratory Unit primarily externally funded, and results are published in high-impact peer-reviewed scientific journals. The group works in an innovative and inspiring research environment from which many PhD, master and bachelor students have already graduated.

## Data Science Unit

*Professor Martin Bøgsted*

The Data Science Unit focuses on research in machine learning for data driven personalised medicine. We are an interdisciplinary team of statisticians, engineers, and doctors finding solutions together for data infrastructure, unsupervised learning for unravelling new disease taxonomies, and supervised learning for dynamic risk prediction.

Based on real world health data and molecular biomarkers, the focus is currently on establishing scalable, national decision support tools for personalised medicine in cancer treatment, chronic diseases, and health economics benefit. The research group participates in the Danish National Research Foundation's Centre for Molecular Prediction of Inflammatory Bowels Disease (PREDICT), the Danish Comprehensive Cancer Centre's Research Centre for Precision Medicine in blood cancer, and the Novo Nordisk Foundation-supported National Health Data Science Sandbox.

## Epidemiology & Real-World Evidence Unit

*Professor Tarek C El-Galaly*

The Epidemiology & Real-World Evidence Unit has focus on conducting high-quality and practice-changing studies in haematology using local, nationwide, or international real-world data. Strong international collaborations and core functions in national and international studies characterise this group. The group is highly experienced in conducting clinical research and implementation of results. The areas of strength, all documented by high impact publications and international collaborations, are dynamic prognostic model development, implementation of decision support tools, survival statistics,

real-world effectiveness of treatment interventions, efficient diagnostic work-up and disease surveillance in haematology and late toxicities. The group is multi-disciplinary with physicians and statisticians working closely together on research with clinical impact.

## Clinical Trial Unit

*Manager, Head Research Nurse Mette Gulbæk & Consultant Haematologist Henrik Gregersen*

The Clinical Research Unit (CTU) is a part of Department of Haematology and aims to support clinical research activity in the department. The unit continuously participates in clinical trials within the large haematological diseases and thereby contribute to gather new knowledge and to improve the quality of patient treatment. A large part of the activity concerns industry-initiated trials and the unit has experience in a large portfolio of studies spanning phase 1A studies to phase 4 studies. Our activities include screening of patients for inclusion in clinical protocols, administration of study drugs, ensuring high data quality, registering data in project databases, and securing that protocols and legislation are complied with.

Another important function of the CTU is participation in investigator-initiated studies, partly studies initiated from other departments and researchers in Denmark, but also local investigator-initiated studies. Consequently, CTU has in recent years built up experience as sponsor, conducting clinical trials locally, nationally, and internationally with preparation of study protocols, applications to regulatory authorities, designing case report forms (CRFs) for registering study data, and other sponsor responsibilities. Additionally, CTU facilitates the conduct of other types of studies such as questionnaire studies, register studies as well as collection of biological samples, thus supporting studies that originating from other units of the haematology research section.



Clinical Trial Unit

# 3 Research projects

## Clinical studies

Investigator-initiated clinical studies conducted by the clinical implementation unit or as part of PhD projects are listed below in alphabetical order. Apart from the studies listed below, the clinical trial unit conducts a large number of industry-initiated clinical trials.

### AmbuFlex

Research Ethics Committee Approval number: Not applicable; quality control project

Title: *AmbuFlex – individualised patient follow-up*

PI: Jakob Madsen, MD, Head of Department of Haematology, Aalborg UH

### CLL

Research Ethics Committee Approval number: S-20160069

Title: *Genetic characterisation of B-cell neoplasia*

PI: Charlotte Guldborg Nyvold, Professor, MSc, PhD, Department of Haematology, Odense University Hospital

Local investigator: Karen Dybkær, Professor, MSc, PhD, Department of Haematology, Aalborg University Hospital

### Covid-19-Haem

Research Ethics Committee Approval number: Not applicable; observational study

Title: *Novel Coronavirus infection in patients with haematological disorders*

PI: Henrik Frederiksen, Professor, MD, PhD, Department of Haematology, Odense University Hospital

Co-investigator: Marianne Tang Severinsen, Professor, MD, PhD, Department of Haematology, Aalborg UH

### GC-MDS-AML

Research Ethics Committee Approval number: N-20210017

Title: *Gastrointestinal complication in Patients with Myelodysplastic Syndrome or Acute Myeloid Leukemia undergoing Treatment with 5-Azacitidin - A clinical follow-up study of Patients with haematological malignancies treated with 5-Azacitidin.*

PI: Marianne Tang Severinsen, Professor, MD, PhD, Department of Haematology, Aalborg UH

Sponsor: Christina Brock, Professor, DVM, PhD, Mech-Sense, Aalborg UH



## **NIPA**

Research Ethics Committee Approval number: N-20190070

Title: *Non-invasive Diagnosis of Invasive Pulmonary Aspergillosis by use of Biomarkers in Exhaled Breath Condensate*

PI: Inger Lise Gade, MD, PhD, Registrar, Department of Haematology, Aalborg University Hospital, Department of Haematology, Aarhus University Hospital

## **NOVIT-1**

Research Ethics Committee Approval number: N-20190068

Title: *Early detection and prevention of Neuropathy and Cognitive Impairment following treatment for Haematological Malignancies (the NOVIT study)*

PI: Marianne Tang Severinsen, Professor, MD, PhD, Department of Haematology, Aalborg UH

## **PE-EBC**

Research Ethics Committee Approval number: N-20180086

Title: *Non-invasive Diagnosis of Pulmonary Embolism by use of Biomarkers in Exhaled Breath Condensate*

PI: Inger Lise Gade, MD, PhD, Registrar, Department of Haematology, Aalborg University Hospital, Department of Haematology, Aarhus University Hospital

## **ProSeq Cancer (Haematology)**

Research Ethics Committee Approval number: N-20200018

Title: *En prospektiv undersøgelse af omfattende genomiske analyser hos patienter med uhelbredelig kræft, med henblik på målrettet behandling*

PI (coordinating): Morten Ladekarl, Professor, MD, PhD, Department of Oncology, Aalborg UH

PI (local): Marianne Tang Severinsen, Professor, MD, PhD, Department of Haematology, Aalborg UH

## **PTH**

Research Ethics Committee Approval number: 1705391 (NVK<sup>1</sup>)

Title: *Targeted treatment of patients with haematological diseases*

PI (coordinating): Kirsten Grønbæk, Professor, MD, DMSc, Department of Haematology, Rigshospitalet, Copenhagen.

Local partners: Anne Roug, Clinical Associate Professor, MD, PhD, Department of Clinical Medicine, Aalborg University; Karen Dybkær, Professor, MSc, PhD, Department of Haematology, Aalborg UH; Martin Bøgsted, Professor, MSc, PhD, Department of Haematology, Aalborg UH

---

<sup>1</sup> National Committee on Health Research Ethics

**RetroGen**

Research Ethics Committee Approval number: N-20140099

Title: *Retrospektiv analyse af kemoterapi-specifik molekylær resistens ved hæmatologiske kræftsygdomme - multiparametriske undersøgelser af arkiveret væv og blod registreret i klinisk biobankdatabase 1990-2020*

PI: Karen Dybkær, Professor, MSc, PhD, Department of Haematology, Aalborg UH

**RetroSeq**

Research Ethics Committee Approval number: 1706295 (NVK)

Title: *Retrospektiv gensekventering og personlig medicin - Afprøvning af ny in vitro gendiagnostik omfattende gensekventering af humant væv med henblik på klinisk validering af personlig medicin-konceptet.*

PI: Karen Dybkær, Professor, MSc, PhD, Department of Haematology, Aalborg UH

**SIESTA**

Research Ethics Committee Approval number: N-20160004

EudraCT: 2015-005688-18

Title: *En randomiseret kontrolleret undersøgelse af Alendronat som forebyggende behandling mod udvikling af glucocorticoid-induceret osteoporose hos patienter der behandles for malignt lymfom.*

PI: Paw Jensen, Consultant Haematologist, Department of Haematology, Aalborg UH

**VTE-Covid-19**

Research Ethics Committee Approval number: N-20200069

Title: *Non-invasive Prognostication of COVID-19 patients by use of Biomarkers in Exhaled Breath Condensate*

PI: Inger Lise Gade, MD, PhD, Registrar, Department of Hematology, Aalborg University Hospital, Department of Hematology, Aarhus University Hospital, Skejby

## Student projects

### PhD projects

**Marijana Nestic, MSc PhD, Department of Haematology**

Title: *The role of genetic alterations and immune surveillance in diffuse large B-cell lymphoma*

PhD defence: 23 April 2021

Supervisor: Karen Dybkær. Co-supervisors: Martin Bøgsted, Inge Søkilde (Department of Molecular Diagnostics), Tarec C. El-Galaly

**Andreas Kiesby Øvlisen, MD PhD, Department of Haematology**

Title: *Socioeconomic impact, late toxicities and long-term outcomes following treatment for haematological cancers*

PhD defence: 2 December 2021

Supervisor: Tarec C. El-Galaly. Co-supervisors: Lasse Hjort Jakobsen, Marianne Tang Severinsen, Martin Bøgsted, Kristian Hay Kragholm (Department of Cardiology)

**Charles Vesteghem, MSc PhD, Department of Haematology**

Title: *Decision Support Tools for Precision Oncology*

PhD defence: 25 March 2022.

Supervisor: Martin Bøgsted. Co-supervisors: Ursula Falkmer (Department of Oncology), Rasmus Froberg Brøndum, Karen Dybkær

**Eva Futtrup Maksten, MD, Department of Haematology**

Title: *Long-term complications following treatment for haematological malignancies: Neuropathy and Cognitive Impairment*

Enrolment: 1 January 2020

Supervisor: Marianne Tang Severinsen. Co-supervisors: Lasse Hjort Jakobsen, Tarec C. El-Galaly, Kristian Hay Kragholm (Department of Cardiology)

**Joachim Bæch, MD, Department of Haematology**

Title: *Late toxicities of steroid-including immunochemotherapy regimens for patients with lymphoma*

Enrolment: 1 May 2020

Supervisor: Tarec C. El-Galaly. Co-supervisors: Lasse Hjort Jakobsen, Henrik Frederiksen (Department of Haematology OUH), Marianne Tang Severinsen

**Issa Ismail Issa, MSc in Biomedicine, Department of Clinical Medicine, Aalborg University**

Title: *Targeting multidrug resistance mechanisms in Diffuse Large B-cell Lymphoma*

Enrolment 1 October 2020

Supervisor: Karen Dybkær. Co-supervisor: Martin Bøgsted

**Lars Børtly Nielsen, MSc in Economics, Department of Haematology**

Title: *Application of individual-based registrations of systemic anti-cancer therapy for monitoring expenditures and access to treatment*

Enrolment: 1 January 2021

Supervisor: Rasmus Brøndum. Co-supervisors: Martin Bøgsted, Marianne Tang Severinsen

**Ahmed Ludvigsen Al-Mashhadi, MD, Department of Haematology**

Title: *Outcomes of rare lymphomas*

Enrolment: 1 September 2021

Supervisor: Tarec C. El-Galaly. Co-supervisor: Lasse Hjort Jakobsen, Thomas Stauffer Larsen (Syddansk Universitet)

**Daniel Kristensen, MD, Department of Haematology**

Title: *REFORM-AML: A nationwide retrospective study of population-based acute myeloid leukemia tumor genetic data*

Enrolment: 1 October 2021

Supervisor: Anne Stidsholt Roug. Co-supervisors: Martin Bøgsted, Marianne Tang Severinsen, Rasmus Froberg Brøndum

**Rasmus Rask Kragh Jørgensen, MSc in Operations Research, Department of Haematology**

Title: *Advanced statistical methods for studies of lymphoma prognosis and treatment outcomes in a real-world setting*

Enrolment: 15 November 2021

Supervisor: Lasse Hjort Jakobsen. Co-supervisors: Tarec Christoffer El-Galaly, Andreas Kiesbye Øvlisen, Marianne Tang Severinsen, Sandra Eloranta (Karolinska Institutet)

**Master student projects****Hulda Haraldsdóttir, MSc, Department of Haematology**

Graduated: June 2022

Title: *The molecular and proteome effects of Cisplatin on DNA damage response in diffuse large B-cell lymphoma*

Supervisors: Karen Dybkær, Linnéa Schmidt, Issa Ismail Issa, Hanne Due Rasmussen, Allan Stensballe and Christopher Aboo (Department of Health Science and Technology, Aalborg University)

**Maja Zimmer, MSc in Health Science and Technology, BSc in nursing, Department of Haematology**

Graduated: June 2022

Title: *Prognostic and predictive biomarkers of response to proteasome inhibitors in multiple myeloma*

Supervisor: Karen Dybkær

**Trine Trab, Medical Student, Department of Haematology**

Title: *Secondary malignancies following high-dose chemotherapy (HDT) with autologous stem cell transplantation in patients with lymphoma*

Supervisor: Tarec C. El-Galaly. Daily supervisor: Joachim Bæch. Co-supervisors: Marianne Tang Severinsen, Andreas Kiesbye Øvlisen, Lasse Hjort Jakobsen

**Lise Dueholm Bertelsen, Medical Student, Department of Haematology**

Title: *Geografisk fordeling af hæmatologiske kræftsygdomme samt risikofaktorer i miljøet - et dansk nationalt kohorte-studie: MGUS og myelomatose*

Supervisor: Marianne Tang Severinsen. Co-supervisors: Lars Børty Nielsen, Henrik Gregersen, Heidi Søgaard Christensen, Martin Bøgsted.

**Mie Nybo Sørensen and Henriette Tranberg Nielsen, Medical Students**

Title: *Palliation of acute myeloid leukemia patents*

Supervisor: Marianne Tang Severinsen. Co-supervisor: Lasse Hjort Jakobsen

**Victoria Sara Zaugg and Ida Marie Nørum Wigh, Medical Students**

Title: *Gastrointestinal Complications in Patients with Myelodysplastisc Syndrome or Acute Myeloid Leukaemia Undergoing Treatment with 5-Azacitidine*

Supervisor: Marianne Tang Severinsen. Co-supervisor: Christina Brock, Mech-Sense, Centre for Pain and Gastroenterology Research

## Research year students

**Freja Tang Severinsen, DARE Research Fellow and Medical Student, Stanford Blood and Marrow Transplantation Division, San Francisco, CA, USA**

Title: *Infektioner efter transplantation og cellulære terapier*

Supervisor: Tarec C. El-Galaly



# 4 Research grants and awards

## External funding 2021

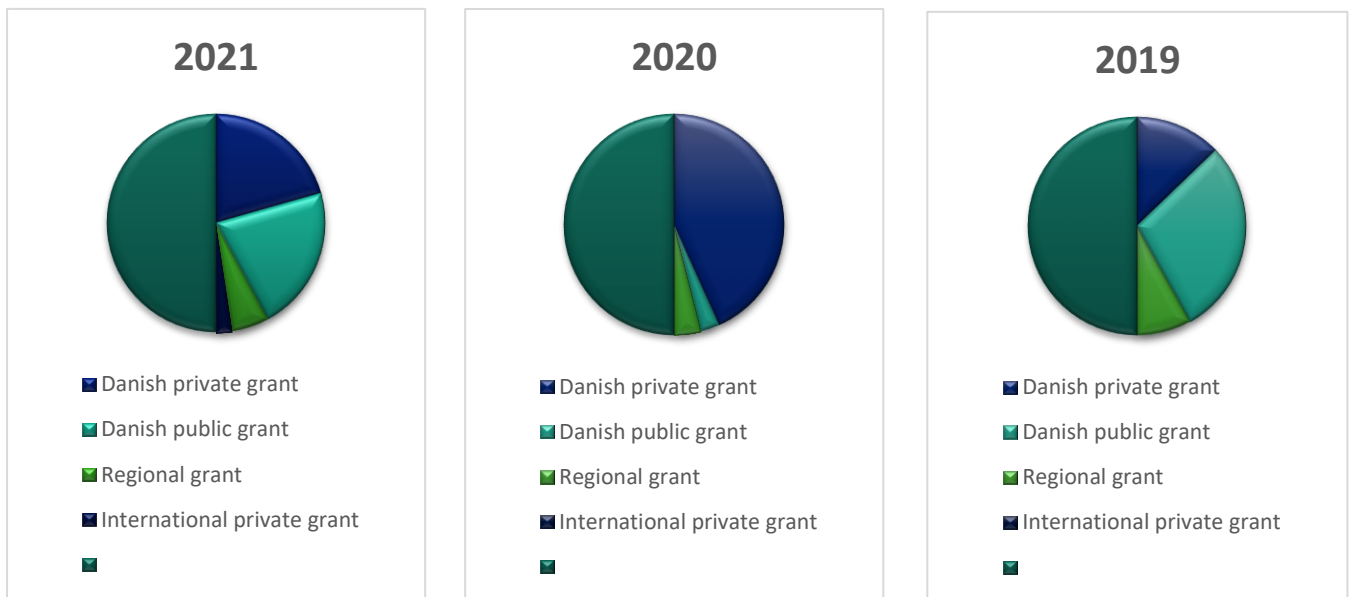
In 2021 the Research Section of Department of Haematology at Aalborg University Hospital was granted a total of 14.7 million DKK from Danish and international private and public funds. Below is an overview of funders and the projects receiving grants.

**Table 1 | Funding secured in 2021**

Funder	Project	Recipient	Type	Duration
Akut Leukæmi Gruppen (ALG)	PhD: REFORM-AML	Daniel Kristensen	Danish Private Grant	2021-2024
Dansk Kræftforskningsfond	PhD: REFORM-AML	Daniel Kristensen	Danish Private Grant	2022-2024
Dansk Lymfomgruppe (DLG)	PhD: DLBCL	Issa Ismail Issa	Danish Private Grant	2021
DCCC - Danish Research Center for Precision Medicine in Blood Cancer (RH/KU)	PrOnco	Martin Bøgsted	Danish Private Grant	2021-2024
Dir. Jacob Madsens og Hustru Olga Madsens Fond	PhD: REFORM-AML	Daniel Kristensen	Danish Private Grant	2022-2024
ForskningsKUBE Aalborg UH	REPAIR	Martin Bøgsted Karen Dybkær	Regional Grant	2022-2024
Gilead Nordic Fellowship Programme	PhD: Ethnicity	Joachim Bæch	International Private Grant	2022-2023
Grundforskningsfonden / Danish National Research Foundation Center of Excellence	PREDICT	Tine Jess, AAU Martin Bøgsted	Danish Public Grant	2021-2027
Klinik Kirurgi og Kræftbehandlings Forskningspulje	NIPA	Inger Lise Gade	Regional Grant	2021
Klinik Kirurgi og Kræftbehandlings Forskningspulje	AmbuFlex	Jakob Madsen	Regional Grant	2021-2024
Kontorchef Gerhard Brøndstedts Rejselegat	Dementia	Eva Futtrup Maksten	Danish Private Grant	2022-2023
Kontorchef Gerhard Brøndstedts Rejselegat	Card-HDT	Joachim Bæch	Danish Private Grant	2022
Kræftens Bekæmpelse / Danish Cancer Society	PhD: Rare Lymphomas	Tarec C. El-Galaly Ahmed Ludvigsen	Danish Private Grant	2022-2024
Kræftens Bekæmpelse / Danish Cancer Society	PhD: Inequality	Martin Bøgsted Lars Børty	Danish Private Grant	2022
Kræftens Bekæmpelse / Danish Cancer Society	PhD: Ethnicity	Tarec C. El-Galaly Joachim Bæch	Danish Private Grant	2022
Nordic Cancer Union (NCU)	RWD Lymphoma	Tarec C. El-Galaly	International Private Grant	2022

Novo Nordisk Foundation (NNF)	Sandbox	Anders Krog, KU Martin Bøgsted	Danish Private Grant	
Region Nordjyllands Sundhedsvidenskabelige Forskningsfond	PhD: Late toxicity	Joachim Bæch	Regional Grant	2022
Region Nordjyllands Sundhedsvidenskabelige Forskningsfond	RWD	Tarec C. El-Galaly	Regional Grant	2022
Reservelægefonden Aalborg UH	ASH 2021	Joachim Bæch	Regional Grant	2021
Svend Andersen Fondens AAU Scholarship	DaMyDa	Marianne T. Severinsen Lise Dueholm Bertelsen	Danish Private Grant	2022-2023
Tømrermester Jørgen Holm og Hustru Elisa f. Hansens Mindelegat	PhD: REFORM-AML	Daniel Kristensen	Danish Private Grant	2022-2024
Tømrermester Jørgen Holm og Hustru Elisa f. Hansens Mindelegat	PhD: DLBCL	Issa Ismail Issa	Danish Private Grant	2022-2023

Figures 1.1, 1.2, 1.3 | Breakdown of types of research grants awarded in 2019, 2020 and 2021



# 5 Dissemination of scientific output

## Conference contributions

### ASH 2021

Department of Haematology participated at the 63rd American Society of Hematology (ASH) Annual Meeting and Exhibition in December 2021 with no less than four oral presentations.



Presenters from left to right: Paw Jensen, Andreas K Øvlisen, Freja T Severinsen, and Joachim Bæch

**Mental Health Among Patients with Non-Hodgkin Lymphoma: A Danish Nationwide Study of Psychotropic Drug Use in 7,201 Patients and 36,005 Matched Comparators.** Presented by PhD Andreas Øvlisen. <https://ash.confex.com/ash/2021/webprogram/Paper150163.html>

**A Randomized Placebo-Controlled Trial of Primary Prophylaxis with Weekly Alendronate Against Glucocorticoid-Induced Osteoporosis in Lymphoma Patients Treated with Steroid-Containing Chemotherapy.** Presented by Consultant Paw Jensen. <https://ash.confex.com/ash/2021/webprogram/Paper144659.html>

**The Impact of Trial Eligibility Criteria on Outcomes in a Nationwide Cohort of Newly Diagnosed DLBCL Patients Treated with R-CHOP.** Presented by Medical student, DARE research fellow Freja Tang Severinsen. <https://ash.confex.com/ash/2021/webprogram/Paper151100.html>



**Risk of Incident Diabetes and Dysregulated Pre-Existing Diabetes Mellitus in Newly Diagnosed Lymphoma Patients Treated with Steroid-Containing Immunochemotherapy: A Danish Population-Based Study.** Presented by PhD student Joachim Bæch. <https://ash.confex.com/ash/2021/web-program/Paper144733.html>

## EHA 2021

Spotlight talks, European Hematology Association, Towards genetic classifiers in Lymphoma (2021), online

## Research stays abroad

### Freja Tang Severinsen

Research fellow (pre-graduate scholarship) at Stanford Blood and Marrow Transplantation Division, San Francisco, California, USA, as part of the Lundbeck Foundation Danish American Research Exchange (DARE). Project: Immune function in lymphoma patients. American mentor: Surbhi Sidana.

Danish Mentor: Tarec C. El-Galaly. August 2021 – July 2022

[Immune function in lymphoma patients | The Lundbeck Foundation \(lundbeckfonden.com\)](https://www.lundbeckfonden.com/en/Research-exchange/DARE)

## Collaborations

Mayo Clinic, Rochester, Minnesota, USA

Stanford University, California, USA

Karolinska Universitetet, Stockholm, Sweden

Oslo University, Oslo, Norway

The University of Western Australia, Perth, Western Australia, Australia

The University of British Columbia, Vancouver, British Columbia, Canada

Duke University, Durham, North Carolina, USA

Universitetet i Tromsø, Norges Arktiske Universitet, Tromsø, Norway

## National and international society memberships and chairs

Dansk Hæmatologisk Selskab (DHS)

Danish Lymphoma Group (DLG)

Acute Leukemia Group (ALG)

Danish Myeloma Study Group (DMSG)

Danish Study Group for Chronic Myeloid Diseases (DSKMS)

Danish National Genome Center (NGC) Research and Infrastructure Committee

Nordic Lymphoma Group (NLG)

Nordic MDS Group (NMDSG)

Nordic AML Group (NAML)

Medical Research Council UK (MRC)

Nordic Myeloma Study Group (NMSG)

European Myeloma Network (EMN)

Scandinavian Thrombosis and Cancer group (STAC)

# 6 Scientific output

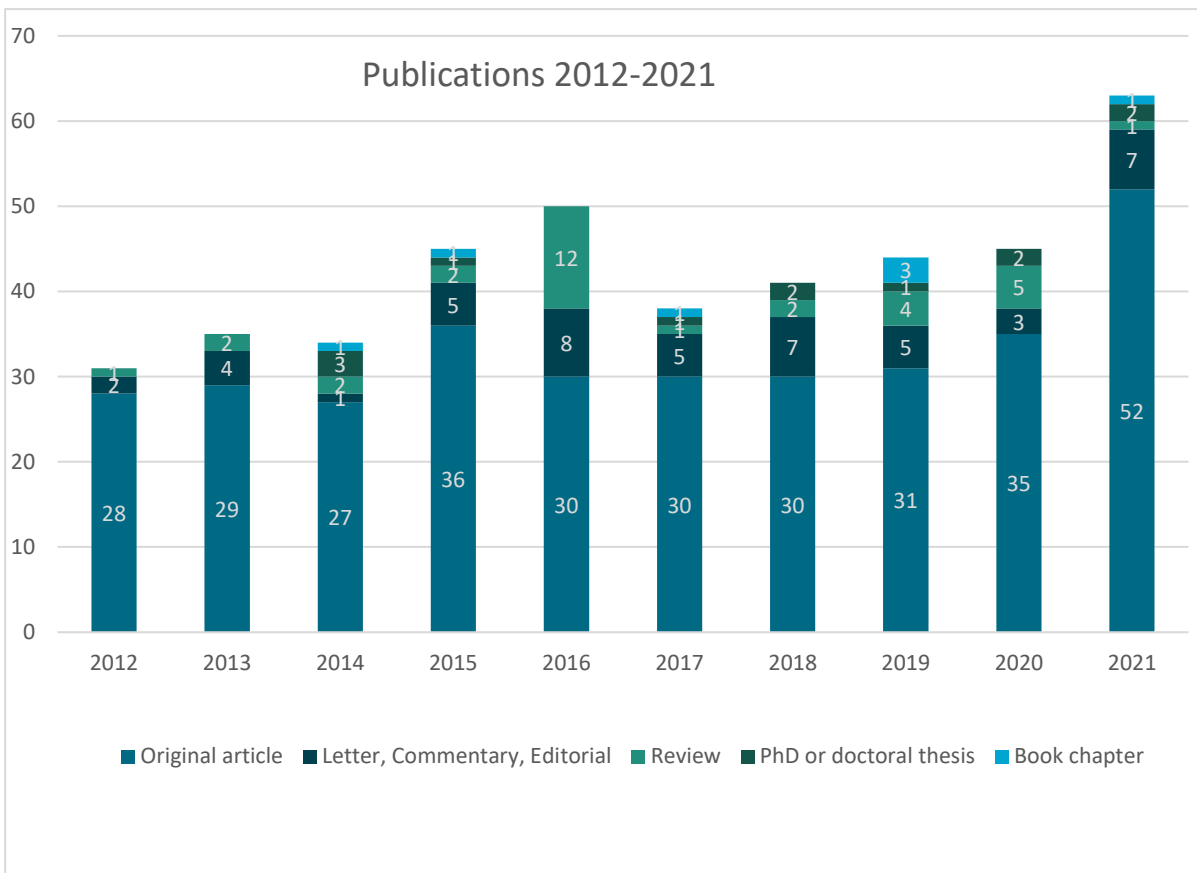
## Bibliometrics

**Table 2 | H-index of research leaders. Indexed publications, citations, and H-index.**

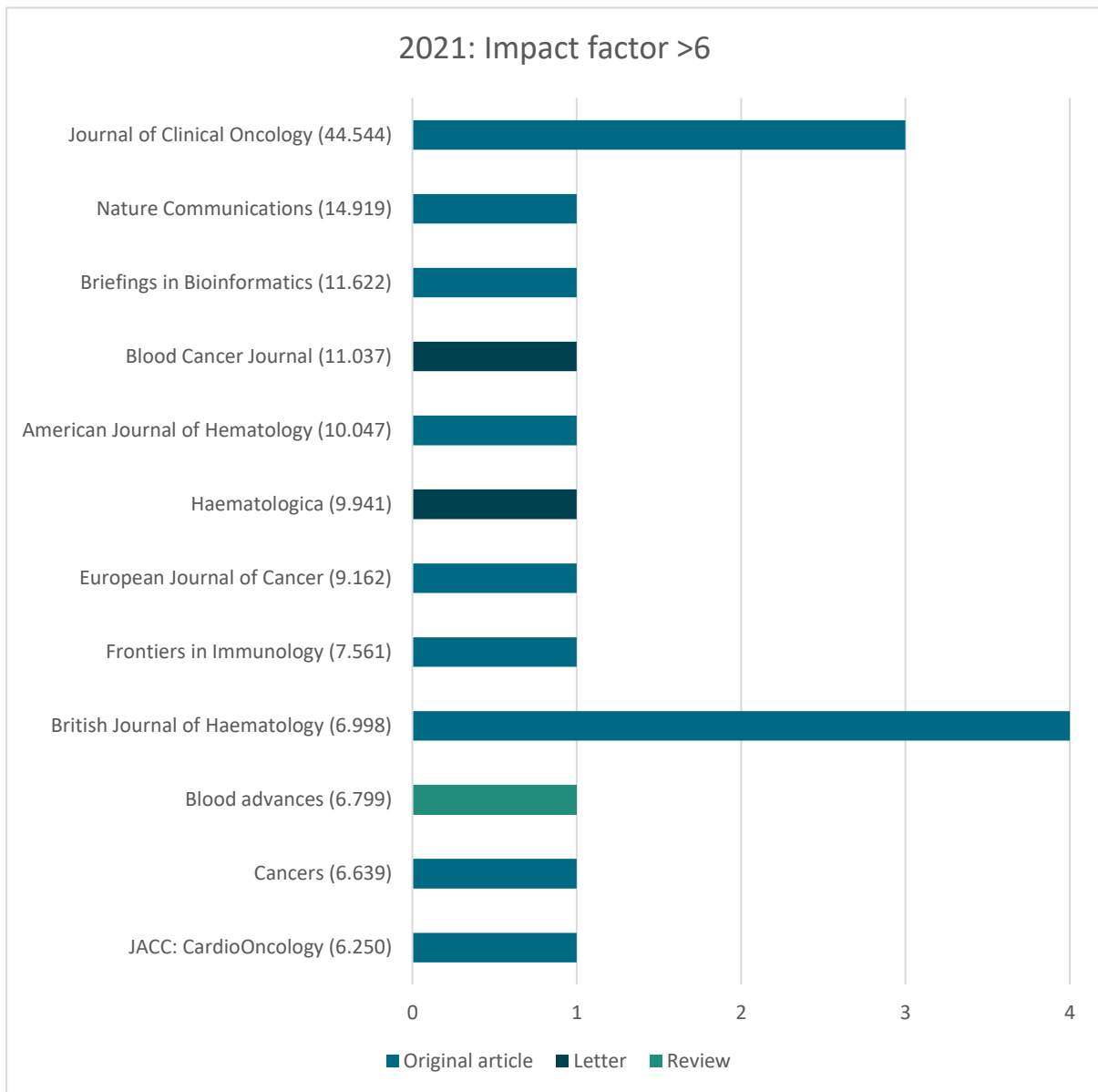
Title	Name	Publications		Citations		H-index	
		Scopus	WoS	Scopus	WoS	Scopus	WoS
Professor	Marianne Tang Severinsen	83	127	1815	1627	20	20
Professor	Karen Dybkær	131	194	3930	3815	32	32
Professor	Martin Bøgsted	159	201	2028	1839	24	23
Professor	Tarec Christoffer El-Galaly	108	178	1584	1529	23	22

Data derived from Scopus and Web of Science (WoS)

**Figure 2 | Number of publications in subcategories in the past 10 years (2012-2021)**



**Figure 3 | Papers published in journals with impact factor (IF) >6 (IF given in brackets) 2021**



# 7 Publication list

## Publications in 2021

### Original articles

#### Impact factor >10

**Follicular lymphoma treated with first-line immunochemotherapy: a review of PET-CT in patients who did not achieve CMR in the GALLIUM study**  
Barrington, S. F., Mir, F., El-Galaly, T. C., Knapp, A., Nielsen, T. G., Sahin, D., Wenger, M., Kostakoglu, L., Trotman, J. & Meignan, M., 2 dec. 2021, (E-pub ahead of print) I: Journal of Nuclear Medicine. (IF 10.057)

**Regression on imperfect class labels derived by unsupervised clustering**  
Brøndum, R. F., Michaelsen, T. Y. & Bøgsted, M., mar. 2021, I: Briefings in Bioinformatics. 22, 2, s. 2012–2019 8 s. (IF 11.622)

**Increased transmissibility of SARS-CoV-2 lineage B.1.1.7 by age and viral load**  
Lyngse, F. P., Mølbak, K., Skov, R. L., Christiansen, L. E., Mortensen, L. H., Albertsen, M., Møller, C. H., Krause, T. G., Rasmussen, M., Michaelsen, T. Y., Voldstedlund, M., Fonager, J., Steenhard, N., Danish Covid-19 Genome Consortium, Kirkeby, C. T., Albertsen, M., Brandt, J., Knutsson, S., Sørensen, E. A., Nymann, T., Petersen, C., Chiche-Lapierre, C. E., Hansen, F. T., Collados, E. F., Berg, A., Remmer Bielidt, S., Mølvang Dall, S., Dvarionaite, E., Hove Hansen, S., Jørgensen, V. R., Nicolajsen, T. B., Saei, W., Østergaard, S. K., Yssing Michaelsen, T., Le-Quy, V., Sereika, M., Kirkegaard, R. H., Andersen, K. S., Andersen, M. H., Hansen, K. K., Boye, M., Bach, M. P., Dissing, P., Drastrup-Fjordbak, A., Collin, M., Büttner, F., Andersen, S., Otte, L. S., Bøgsted, M., Brøndum, R. F., Hose, K., Sagi, T., Pankanec, M., Krarup, H. B., Fuglsang-Damgaard, D. & Mølvadgaard, M., 13 dec. 2021, I: Nature Communications. 12, 1, 7251. (IF 14.919)

**Relapsed / Refractory International Prognostic Index (R/R-IPI): An international prognostic calculator for relapsed/refractory diffuse large B-cell lymphoma**  
Maurer, M. J., Jakobsen, L. H., Mwangi, R., Schmitz, N., Farooq, U., Flowers, C. R., de Nully Brown, P.,

Thompson, C. A., Frederiksen, H., Cunningham, D., Jørgensen, J., Poeschel, V., Nowakowski, G., Seymour, J. F., Merli, F., Haioun, C., Ghesquieres, H., Ziepert, M., Tilly, H., Salles, G., Shi, Q., El-Galaly, T. C. & Habermann, T. M., 1 maj 2021, I: American Journal of Hematology. 96, 5, s. 599-605 7 s. (IF 10.047)

**Burkitt Lymphoma International Prognostic Index**  
Olszewski, A. J., Jakobsen, L. H., Collins, G. P., Cwynarski, K., Bachanova, V., Blum, K. A., Boughan, K. M., Bower, M., Dalla Pria, A., Danilov, A., David, K. A., Diefenbach, C., Ellin, F., Epperla, N., Farooq, U., Feldman, T. A., Gerrie, A. S., Jagadeesh, D., Kamdar, M., Karmali, R., Kassam, S., Kenkre, V. P., Khan, N., Kim, S-H., Klein, A. K., Lossos, I. S., Lunning, M. A., Martin, P., Martinez-Calle, N., Montoto, S., Naik, S., Palmisiano, N., Peace, D., Phillips, E. H., Phillips, T. J., Portell, C. A., Reddy, N., Santarsieri, A., Sarraf Yazdy, M., Smeland, K. B., Smith, S. E., Smith, S. D., Sundaram, S., Zayac, A. S., Zhang, X-Y., Zhu, C., Cheah, C. Y., El-Galaly, T. C., Evens, A. M. & The Burkitt Lymphoma International Prognostic Index consortium, 1 apr. 2021, I: Journal of Clinical Oncology. 39, 10, s. 1129-1138 10 s., JCO2003288. (IF 44.544)

**Consolidation and Maintenance in Newly Diagnosed Multiple Myeloma**  
Sonneveld, P., Dimopoulos, M. A., Beksac, M., van der Holt, B., Aquino, S., Ludwig, H., Zweegman, S., Zander, T., Zamagni, E., Wester, R., Hajek, R., Pantani, L., Dozza, L., Gay, F., Cafro, A., De Rosa, L., Morelli, A., Gregersen, H., Gulbrandsen, N., Cornelisse, P., Troia, R., Oliva, S., van de Velden, V., Wu, K., Ypma, P. F., Bos, G., Levin, M-D., Pour, L., Driessen, C., Broijl, A., Croockewit, A., Minnema, M. C., Waage, A., Hveding, C., van de Donk, N. W. C. J., Offidani, M., Palumbo, G. A., Spencer, A., Boccadoro, M. & Cavo, M., 10 nov. 2021, I: Journal of Clinical Oncology. 39, 32, s. 3613-3622 10 s., JCO2101045. (IF 44.544)

**Parenthood Rates and Use of Assisted Reproductive Techniques in Younger Hodgkin Lymphoma Survivors: A Danish Population-Based Study**

Øvlisen, A. K., Jakobsen, L. H., Eloranta, S., Kragholm, K. H., Hutchings, M., Frederiksen, H., Kamper, P., Dahl-Sørensen, R. B., Stoltenberg, D., Weibull, C. E., Entrop, J. P., Glimelius, I., Smedby, K. E., Torp-Pedersen, C., Severinsen, M. T. & El-Galaly, T. C., 1 nov. 2021, I: *Journal of Clinical Oncology*. 39, 31, s. 3463-3472 10 s. (IF 44.544)

**Impact factor 6-9**

**A randomised evaluation of low-dose cytosine arabinoside (ara-C) plus tosedostat *versus* low-dose ara-C in older patients with acute myeloid leukaemia: results of the LI-1 trial**

Dennis, M., Burnett, A., Hills, R., Thomas, I., Ariti, C., Severinsen, M. T., Hemmaway, C., Greaves, P., Clark, R. E., Copland, M., Russell, N. & National Cancer Research Institute (NCRI) acute myeloid leukaemia (AML) Working Group, jul. 2021, I: *British Journal of Haematology*. 194, 2, s. 298-308 11 s. (IF 6.998)

**Dynamic Intracellular Metabolic Cell Signaling Profiles During Ag-Dependent B-Cell Differentiation**

Díez, P., Pérez-Andrés, M., Bøgsted, M., Azkargorta, M., García-Valiente, R., Dégano, R. M., Blanco, E., Mateos-Gomez, S., Bárcena, P., Santa Cruz, S., Góngora, R., Elortza, F., Landeira-Viñuela, A., Juanes-Velasco, P., Segura, V., Manzano-Román, R., Almeida, J., Dybkaer, K., Orfao, A. & Fuentes, M., mar. 2021, I: *Frontiers in Immunology*. 12, 16 s., 637832. (IF 7.561)

**Temporal changes in survival among adult patients with acute myeloid leukaemia in the period 2000-2016: a Danish population-based study**

Jakobsen, L. H., Roug, A. S., Øvlisen, A. K., Marcher, C. W., Ommen, H. B., Theilgaard-Mönch, K., Møller, P., Schöllkopf, C., Kristensen, D., Naur, T. M. H., Bøgsted, M., El-Galaly, T. C. & Severinsen, M. T., maj 2021, I: *British Journal of Haematology*. 193, 3, s. 482-487 6 s. (IF 6.998)

**Genomic Profiling of a Randomized Trial of Interferon- $\alpha$  versus Hydroxyurea in MPN Reveals Mutation-Specific Responses**

Knudsen, T. A., Skov, V., Stevenson, K. E., Werner, L., Duke, W., Laureore, C., Gibson, C. J., Nag, A., Thorner, A. R., Wollison, B., Hansen, D. L., Ellervik, C., El Fassi, D., de Stricker, K., Ocias, L. F., Brabrand, M., Bjerrum, O. W., Overgaard, U., Frederiksen, M., Kristensen, T., Kruse, T., Thomassen, M., Mourits-Andersen, T., Severinsen, M. T., Sten-toft, J., Starklint, J., Neuberg, D., Kjaer, L., Larsen, T. S., Hasselbalch, H. C., Lindsley, R. C. & Mullally,

A., 10 sep. 2021, (E-pub ahead of print) I: *Blood advances*. (IF 6.799)

**MDM2 antagonist idasanutlin in patients with polycythemia vera: results from a single-arm phase 2 study**

Mascarenhas, J., Passamonti, F., Burbury, K., El-Galaly, T. C., Gerds, A. T., Gupta, V., Higgins, B., Wonde, K., Jamois, C., Kovic, B., Huw, L-Y., Katakam, S., Maffioli, M., Mesa, R. A., Palmer, J. M., Bellini, M., Ross, D. M., Vannucchi, A. M. & Yacoub, A., 21 dec. 2021, (E-pub ahead of print) I: *Blood advances*. (IF 6.799)

**Nationwide Survival Benefit after Implementation of First-Line Immunotherapy for Patients with Advanced NSCLC—Real World Efficacy**

Mouritzen, M. T., Carus, A., Ladekarl, M., Meldgaard, P., Nielsen, A. W. M., Livbjerg, A., Larsen, J. W., Skuladottir, H., Kristiansen, C., Wedervang, K., Schytte, T., Hansen, K. H., Østby, A-C., Frank, M. S., Lauritsen, J., Sørensen, J. B., Langer, S. W., Persson, G. F., Andersen, J. L., Frary, J. M. C., Drivsholm, L. B., Vesteghem, C., Christensen, H. S., Bjørnhart, B. & Pøhl, M., 28 sep. 2021, I: *Cancers*. 13, 19, 4846. (IF 6.639)

**Pre-treatment serum vitamin D deficiency is associated with increased inflammatory biomarkers and short overall survival in patients with pancreatic cancer**

Rasmussen, L. S., Yilmaz, M. K., Falkmer, U. G., Poulsen, L. Ø., Bøgsted, M., Christensen, H. S., Bojesen, S. E., Jensen, B. V., Chen, I. M., Johansen, A. Z., Hansen, C. P., Hasselby, J. P., Holländer, N., Nielsen, S. E., Andersen, F., Bjerregaard, J. K., Pfeiffer, P. & Johansen, J. S., feb. 2021, I: *European Journal of Cancer*. 144, s. 72-80 9 s. (IF 9.162)

**Validation of the UK myeloma research alliance risk profile, a new clinical prediction model for outcome in patients with newly diagnosed multiple myeloma not eligible for autologous stem cell transplantation; a population-based study from the Danish national multiple myeloma registry**

Redder, L., Klausen, T. W., Vangsted, A. J., Gregersen, H., Andersen, N. F., Pedersen, R. S., Szabo, A. G., Frederiksen, M., Frølund, U. C., Helleberg, C., Nielsen, L. K., Pedersen, P. T., Salomo, M., Gimsing, P., Frederiksen, H. & Abildgaard, N., apr. 2021, I: *British Journal of Haematology*. 193, 1, s. 119-124 6 s. (IF 6.998)

**Risk for Myocardial Infarction Following 5-Fluorouracil Treatment in Patients With Gastrointestinal Cancer: A Nationwide Registry-Based Study**

Shanmuganathan, J. W. D., Kragholm, K., Tayal, B., Polcwiartek, C., Poulsen, L. Ø., El-Galaly, T. C., Fosbøl, E. L., D'Souza, M., Gislason, G., Køber, L., Schou, M., Nielsen, D., Søgaaard, P., Torp-Pedersen, C. T., Mamas, M. A. & Freeman, P., dec. 2021, I:

JACC: CardioOncology. 3, 5, s. 725-733 9 s. (IF 6.25)

**Clinical characteristics and outcomes among 2347 patients aged  $\geq 85$  years with major lymphoma subtypes: a Nordic Lymphoma Group study**

Wästerlid, T., Oren Gradel, K., Eloranta, S., Glime-lius, I., El-Galaly, T. C., Frederiksen, H. & Smedby, K. E., feb. 2021, I: British Journal of Haematology. 192, 3, s. 551-559 9 s. (IF 6.998)

**Impact factor <6**

**Direct costs of antineoplastic and supportive treatment for progressive multiple myeloma in a tax-based health system**

Brøndum, R. F., Vestergaard, A. S., Børty, L., Vesteghem, C., Rytter, A. S., Nielsen, M. M., Severinsen, M. T., Jensen, P., Gregersen, H., El-Galaly, T. C., Dybkær, K., Ehlers, L. H., Bøgsted, M. & Roug, A. S., sep. 2021, I: Future Oncology. 17, 25, s. 3331-3341 11 s. (IF 3.404)

**Anti-Tr/DNER antibody paraneoplastic cerebellar degeneration preceding a very late relapse of Hodgkin Lymphoma after 12 years**

Christensen, P. B., Gregersen, H. & Almasi, C., 5 jun. 2021, I: Cerebellum and Ataxias. 8, 1, 4 s., 14. (IF not available)

**Aggressive B-cell Lymphoma with MYC/TP53 Dual Alterations Displays Distinct Clinicopathological Features and Response to Novel Targeted Agents**

Deng, M., Xu-Monette, Z. Y., Pham, L. V., Wang, X., Tzankov, A., Fang, X., Zhu, F., Visco, C., Bhagat, G., Dybkaer, K., Chiu, A., Tam, W., Zu, Y., Hsi, E. D., You, H., Huh, J., Ponzoni, M., Ferreri, A. J. M., Moller, M. B., Parsons, B. M., Hagemester, F., van Krieken, J. H., Piris, M. A., Winter, J. N., Li, Y., Xu, B., Liu, P. & Young, K. H., 1 feb. 2021, I: Molecular Cancer Research. 19, 2, s. 249-260 12 s. (IF 5.852)

**Severity and 1-month outcome of SARS-CoV-2 infection in patients with solid cancers: a Danish nationwide cohort study**

Ehmsen, S., Jakobsen, L. H., Lendorf, M. E., Eefsen, R. L., Bentsen, L., Knoop, A. S., Aggerholm-Pedersen, N., Skuladottir, H., Herrstedt, J., Jensen, L. H., Rotbøl, C., Damm, M. B., Wedervang, K., Glenthøj, A., Ryg, J., Frederiksen, H. & Kodahl, A. R., 2021, I: Acta Oncologica. 60, 7, s. 859-865 7 s. (IF 4.089)

**Development of a multivariable prognostic Prediction model for 1-year risk of FALLing in a cohort of community-dwelling older adults aged 75 years and above (PREFALL)**

Gade, G. V., Jørgensen, M. G., Ryg, J., Masud, T., Jakobsen, L. H. & Andersen, S., 30 jun. 2021, I: BMC Geriatrics. 21, 1, 12 s., 402. (IF 3.921)

**Exhaled breath condensate in acute pulmonary embolism; a porcine study of effect of condensing temperature and feasibility of protein analysis by mass spectrometry**

Gade, I. L., Schultz, J. G., Cehofski, L. J., Kjærgaard, B., Severinsen, M. T., Rasmussen, B. S., Vorum, H., Honoré, B. & Kristensen, S. R., apr. 2021, I: Journal of Breath Research. 15, 2, 026005. (IF 3.262)

**Putative Biomarkers for Acute Pulmonary Embolism in Exhaled Breath Condensate**

Gade, I. L., Schultz, J. G., Brøndum, R. F., Kjærgaard, B., Nielsen-Kudsk, J. E., Andersen, A., Kristensen, S. R. & Honoré, B., 4 nov. 2021, I: Journal of Clinical Medicine. 10, 21, 16 s., 5165. (IF 4.242)

**Venous thromboembolism after lower extremity orthopedic surgery: A population-based nationwide cohort study**

Gade, I. L., Kold, S., Severinsen, M. T., Kragholm, K. H., Torp-Pedersen, C., Kristensen, S. R. & Ridder-sholm, S. J., jan. 2021, I: Research and Practice in Thrombosis and Haemostasis. 5, 1, s. 148-158 11 s. (IF not available)

**Improved survival after allogeneic transplantation for acute lymphoblastic leukemia in adults: a Danish population-based study**

Gjærde, L. K., Rank, C. U., Andersen, M. K., Jakobsen, L. H., Sengeløv, H., Olesen, G., Kornblit, B., Marquart, H., Friis, L. S., Petersen, S. L., Andersen, N. S., Nielsen, O. J., Toft, N. & Schjødt, I., okt. 2021, (E-pub ahead of print) I: Leukemia and Lymphoma. (IF 3.28)

**SARS-CoV-2 infection among patients with haematological disorders: Severity and one-month outcome in 66 Danish patients in a nationwide cohort study**

Glenthøj, A., Jakobsen, L. H., Sengeløv, H., Ahmad, S. A., Qvist, K., Rewes, A., Poulsen, C. B., Overgaard, U. M., Mølle, I., Severinsen, M. T., Strandholdt, C. N., Maibom, J., Kodahl, A. R., Ryg, J., Ravn, P., Johansen, I. S., Helsø, S. N., Jensen-Fangel, S., Kisielewicz, J., Wiese, L., Helleberg, M., Kirk, O., Clausen, M. R. & Frederiksen, H., jan. 2021, I: European Journal of Haematology. 106, 1, s. 72-81 10 s. (IF 2.997)

**Forhøjede blodcelletal og vaskulær sygdom med de myeloproliferative neoplasier som modelsygdomme**

Hasselbalch, H. C., Knudsen, T. A., Sørensen, A. L., Christensen, S. F., Larsen, M. K., Bak, M., El Fassi, D., Cordua, S., Brabrand, M., Thomsen, G., Stentoft, J., Starklint, J., Ellervik, C., Wienecke, T., Bruun, N. E., Eickhardt-Dalbøge, C. S., Kjær, L. & Skov, V., 2021, I: Ugeskrift for Læger. 183, 20A, s. 1969-1973 5 s., V03210282. (IF not available)

**Antigen Expression Varies Significantly between Molecular Subgroups of Acute Myeloid Leukemia Patients: Clinical Applicability Is Hampered by Establishment of Relevant Cutoffs**

Herborg, L. L., Nederby, L., Brøndum, R. F., Hansen, M., Hokland, P. & Roug, A. S., maj 2021, I: *Acta Haematologica*. 144, 3, s. 275–284 10 s. (IF 2.195)

**Outcome of treatment with carfilzomib before and after treatment with daratumumab in relapsed or refractory multiple myeloma patients**

Højholt, K. L., Gregersen, H., Szabo, A. G., Klausen, T. W., Levring, M. B., Preiss, B., Helleberg, C., Breinholt, M. F., Hermansen, E., Rahbek Gjerdrum, L. M., Bønløkke, S. T., Nielsen, K., Kjeldsen, E., Iversen, K. F., Teodorescu, E. M., Kurt, E., Strandholdt, C., Andersen, M. K. & Vangsted, A. J., okt. 2021, I: *Hematological Oncology*. 39, 4, s. 521-528 8 s. (IF 5.271)

**A bendamustine resistance gene signature in diffuse large B-cell lymphoma and multiple myeloma**

Issa, I. I., Brøndum, R. F., Due, H., Schmidt, A. L. A. M., Bøgsted, M. & Dybkær, K., 2021, I: *Cancer Drug Resistance*. 4, 1, s. 208-222 15 s. (IF not available)

**Detecting deviations from the efficacy and safety results of single-arm trials using real-world data: The case of a CAR-T cell therapy in B-cell lymphoma**

Jakobsen, L. H., Callréus, T., Sessa, M., Jerkeman, M., Andersen, M. & El-Galaly, T. C., apr. 2021, I: *Pharmacoeconomics and Drug Safety*. 30, 4, s. 514-519 6 s. (IF 2.89)

**In vivo calibration of the T2\* cardiovascular magnetic resonance method at 1.5 T for estimation of cardiac iron in a minipig model of transfusional iron overload**

Jensen, P-D. M., Nielsen, A. H., Simonsen, C. W., Baandrup, U. T., Jensen, S. E., Bøgsted, M., Magnusdottir, S. O., Jensen, A. B. H. & Kjærgaard, B., 11 mar. 2021, I: *Journal of Cardiovascular Magnetic Resonance*. 23, 1, 16 s., 27. (IF 5.364)

**The Timing of Venous Thromboembolism in Ovarian Cancer patients. A Nationwide Danish Cohort Study**

Kahr, H. S., Christiansen, O. B., Juul Riddersholm, S., Gade, I. L., Torp-Pedersen, C., Knudsen, A. & Thorlacius-Ussing, O., apr. 2021, I: *Journal of Thrombosis and Haemostasis*. 19, 4, s. 992-1000 9 s. (IF 5.824)

**Clinical presentation and mortality in hospitalized patients aged 80+ years with COVID-19-A retrospective cohort study**

Karlsson, L. K., Jakobsen, L. H., Hollensberg, L., Ryg, J., Midttun, M., Frederiksen, H., Glenthøj, A., Kodahl, A. R., Secher-Johnsen, J., Nielsen, L. K., Bofill, N. G., Knudtzen, F. C. & Lund, C. M., jun.

2021, I: *Archives of Gerontology and Geriatrics*. 94, 7 s., 104335. (IF 3.25)

**Long Non-Coding RNAs in Diffuse Large B-Cell Lymphoma**

Karstensen, K. T., Schein, A., Petri, A., Bøgsted, M., Dybkær, K., Uchida, S. & Kauppinen, S., jan. 2021, I: *Non-coding RNA*. 7, 1, 13 s., 1. (IF not available)

**Myelodysplastisk syndrom og akutte leukæmier**

Kristensen, D., Roug, A. S. & Severinsen, M. T., 18 okt. 2021, I: *Ugeskrift for læger*. 183, 20A, s. 1952-1957 6 s., V03210202. (IF not available)

**The Danish Myelodysplastic Syndromes Database: Patient Characteristics and Validity of Data Records**

Lauritsen, T. B., Nørgaard, J. M., Grønbaek, K., Valentin, A. P., Ahmad, S. A., Hannig, L. H., Severinsen, M. T., Adelborg, K. & Østgård, L. S. G., 14 jun. 2021, I: *Clinical Epidemiology*. 13, s. 439-451 13 s. (IF 4.79)

**Optimization of Preanalytical Variables for cfDNA Processing and Detection of ctDNA in Archival Plasma Samples**

Nesic, M., Bødker, J. S., Terp, S. K. & Dybkær, K., 2021, I: *BioMed Research International*. 2021, 5585148. (IF 3.411)

**The mutational profile of immune surveillance genes in diagnostic and refractory/relapsed DLBCLs**

Nesic, M., Sønderkær, M., Brøndum, R. F., El-Galaly, T. C., Pedersen, I. S., Bøgsted, M. & Dybkær, K., 18 jul. 2021, I: *BMC Cancer*. 21, 1, s. 829 12 s., 829. (IF 4.43)

**Prothrombotic abnormalities in patients with multiple myeloma and monoclonal gammopathy of undetermined significance**

Nielsen, T., Kristensen, S. R., Gregersen, H., Teodorescu, E. M. & Pedersen, S., 1 jun. 2021, I: *Thrombosis Research*. 202, s. 108-118 11 s. (IF 3.944)

**Association of smoking and cancer with the risk of venous thromboembolism: the Scandinavian Thrombosis and Cancer cohort**

Paulsen, B., Gran, O. V., Severinsen, M. T., Hammerstrøm, J., Kristensen, S. R., Cannegieter, S. C., Skille, H., Tjønneland, A., Rosendaal, F. R., Overvad, K., Næss, I. A., Hansen, J. B. & Brækkan, S. K., 21 sep. 2021, I: *Scientific Reports*. 11, 1, 18752. (IF 4.38)

**Patterns of Palliative Chemotherapy and Survival in Patients With Pancreatic Cancer Focusing on Age: A Nationwide Real-World Danish Registry Study**

Rasmussen, L. S., Fristrup, C. W., Jensen, B. V., Pfeiffer, P., Weber, B., Yilmaz, M. K., Poulsen, L. Ø.,



Ladekarl, M., Østerlind, K., Larsen, J. S., Skuladottir, H., Bøgsted, M. & Falkmer, U. G., 22 maj 2021, I: *Pancreas*. 50, 5, s. 685-695 11 s. (IF 3.327)

**Mathematical modelling of SARS-CoV-2 variant outbreaks reveals their probability of extinction**

Schiøler, H., Knudsen, T., Brøndum, R. F., Stoustrup, J. & Bøgsted, M., 30 dec. 2021, I: *Scientific Reports*. 11, 1, 24498. (IF 4.38)

**Prothrombotic genotypes and risk of venous thromboembolism in occult cancer**

Skille, H., Paulsen, B., Hveem, K., Severinsen, M. T., Gabrielsen, M. E., Kristensen, S. R., Næss, I. A., Hindberg, K., Tjønneland, A., Brækkan, S. K. & Hansen, J-B., sep. 2021, I: *Thrombosis Research*. 205, s. 17-23 7 s. (IF 3.944)

**Hematological cancer survivors' experiences of participating in a shared care follow-up-an exploratory interview study**

Sommer, M., Frandsen, L., Jensen, P., Bøgsted, M., El-Galaly, T. C. & Grønkjær, M., aug. 2021, I: *Journal of Cancer Survivorship*. 15, 4, s. 620-629 10 s. (IF 4.442)

**Patient-reported outcomes in patients with hematological relapse or progressive disease: a longitudinal observational study**

Sommer, M., Nielsen, L. K., Nielsen, L. B., Brøndum, R. F., Nielsen, M. M., Rytter, A. S., Vesteghem, C., Severinsen, M. T., El-Galaly, T. C., Bøgsted, M., Grønkjær, M. & Jørgensen, L., 4 nov. 2021, I: *Health and Quality of Life Outcomes*. 19, 1, 251. (IF 3.186)

**Comorbidities in multiple myeloma and implications on survival: A population-based study**

Sverrisdóttir, I. S., Rögnvaldsson, S., Thorsteinsdóttir, S., Gíslason, G. K., Aspelund, T., Turesson, I., Björkholm, M., Gregersen, H., Hveding Blimark, C., Landgren, O. & Kristinsson, S. Y., jun. 2021, I: *European Journal of Haematology*. 106, 6, s. 774-782 9 s. (IF 2.997)

**The real-world outcomes of multiple myeloma patients treated with daratumumab**

Szabo, A. G., Klausen, T. W., Levring, M. B., Preiss, B., Helleberg, C., Breinholt, M. F., Hermansen, E., Gjerdrum, L. M. R., Bønløkke, S. T., Nielsen, K., Kjeldsen, E., Iversen, K. F., Teodorescu, E. M., Dokhi, M., Kurt, E., Strandholdt, C., Andersen, M. K. & Vangsted, A. J., okt. 2021, I: *PLoS ONE*. 16, 10, e0258487. (IF 3.24)

**Adjuvant platinum-based chemotherapy in non-small cell lung cancer: The role of relative dose-intensity and treatment delay**

Szejniuk, W. M., Cekala, M., Bøgsted, M., Meristoudis, C., McCulloch, T., Falkmer, U. G. & Røe, O. D., jan. 2021, I: *Cancer Treatment and Research Communications*. 27, 6 s., 100318. (IF not available)

**High-dose thoracic radiation therapy for non-small cell lung cancer: a novel grading scale of radiation-induced lung injury for symptomatic radiation pneumonitis**

Szejniuk, W. M., Nielsen, M. S., Takács-Szabó, Z., Pawlowski, J., Al-Saadi, S. S., Maidas, P., Bøgsted, M., McCulloch, T., Frøkjær, J. B., Falkmer, U. G. & Røe, O. D., 15 jul. 2021, I: *Radiation Oncology*. 16, 1, 131. (IF 3.481)

**High validity of the danish national patient registry for systemic anticancer treatment registration from 2009 to 2019**

Vesteghem, C., Brøndum, R. F., Falkmer, U. G., Pottegård, A., Poulsen, L. Ø. & Bøgsted, M., nov. 2021, I: *Clinical Epidemiology*. 13, s. 1085-1094 10 s. (IF 4.79)

## Letters

**The prognostic impact of anthropometrics in acute myeloid leukemia treated with intensive chemotherapy - A Danish nationwide cohort study**

Kristensen, D., Nielsen, L. B., Roug, A. S., Kristensen, T-C. C., Heath, A., Jacobsen, L. H., Nørgaard, J. M., Jepsen, L. Ø., Schöllkopf, C., Theilgaard-Mönch, K. & Severinsen, M. T., 7 apr. 2021, I: *Leukemia Research*. 106, s. 106567 4 s., 106567.

**Treatment intensity and survival trends among real-world elderly AML patients diagnosed in the period 2001–2016: a Danish nationwide cohort study**

Naur, T. M. H., Jakobsen, L. H., Roug, A. S., El-Galaly, T. C., Marcher, C. W., Nørgaard, J. M., Theilgaard-Mönch, K., Møller, P., Schöllkopf, C. & Severinsen, M. T., 2021, I: *Leukemia and Lymphoma*. 62, 8, s. 2014-2017 4 s.

**Standardization of flow cytometric minimal residual disease assessment in international clinical trials - a feasibility study from the European Myeloma Network**

Op Bruinink, D. H., Oliva, S., Rihova, L., Schmitz, A., Gilestro, M., Te Marvelde, J., Kralova, R., Høholt, H., Broijl, A., Johnsen, H. E., Hajek, R., Boccadoro, M., Sonneveld, P., Omedè, P., Van der Velden, V. H. J. & European Myeloma Network, maj 2021, I: *Haematologica*. 106, 5, s. 1496-1499 4 s.

**Incidence and clinical characteristics of multiple myeloma with low M-protein levels and normal values of hemoglobin, creatinine, calcium, and serum free light chain ratio**

Szabo, A. G., Klausen, T. W., Abildgaard, N., Gregersen, H., Silkjær, T., Pedersen, P. T., Pedersen, R. S., Helleberg, C., Hermansen, E., Schnack, B. I.

& Vangsted, A. J., 7 apr. 2021, I: *Blood Cancer Journal*. 11, 4, 4 s., 70.

## Review

**Impact of R-CHOP dose intensity on survival outcomes in diffuse large B-cell lymphoma: a systematic review**

Bataillard, E. J., Cheah, C. Y., Maurer, M. J., Khurana, A., Eyre, T. A. & El-Galaly, T. C., 11 maj 2021, I: *Blood advances*. 5, 9, s. 2426-2437 12 s.

## Editorial

**Routine imaging for disease surveillance in follicular lymphoma-To comfort the patients or their doctors?**

El-Galaly, T. C., Øvlisen, A. K. & Cheah, C. Y., 15 sep. 2021, I: *Cancer*. 127, 18, s. 3298-3301 4 s.

## Commentaries

**Response to the letter entitled: Re: Pre-treatment serum vitamin D deficiency is associated with increased inflammatory biomarkers and short overall survival in patients with pancreatic cancer: Analysis of the prognostic effect of serum vitamin D on pancreatic cancer: Several confounders**

Rasmussen, L. S., Yilmaz, M. K., Falkmer, U. G., Poulsen, L. Ø., Bøgsted, M., Christensen, H. S., Bøjesen, S. E., Jensen, B. V., Chen, I. M., Johansen, A. Z., Hansen, C. P., Hasselby, J. P., Holländer, N., Nielsen, S. E., Andersen, F., Bjerregaard, J. K., Pfeiffer, P. & Johansen, J. S., nov. 2021, I: *European Journal of Cancer*. 158, s. 248-250 3 s.

**The clinical course and life expectancy of patients with multiple myeloma who discontinue their first daratumumab-containing line of therapy**

Szabo, A. G., Thorsen, J., Iversen, K. F., Levring, M. B., Preiss, B., Helleberg, C., Breinholt, M. F., Hermansen, E., Gjerdrum, L. M. R., Bønløkke, S. T., Nielsen, K., Kjeldsen, E., Teodorescu, E. M., Dokhi, M., Kurt, E., Strandholdt, C. N., Andersen, M. K. & Vangsted, A. J., 29 dec. 2021, (E-pub ahead of print) I: *American Journal of Hematology*.

## Reports

**Aktivetsrapport. Relapsprojektet 2015-2020: Personlig medicin ved hæmatologisk kræft**

Bøgsted, M. (red.), Führer, A., Roug, A. S., Rytter, A. S., Vesteghem, C., Høholt, H., Ildal, J., Dybkær, K., Nielsen, L. B., Elkjær, L. T., Sønderkær, M., Severinsen, M. T., Bøgsted, M., Sommer, M., Jensen, P., Blindum, P. F., Brøndum, R. F., Dahl, S. C. & El-Galaly, T. C., mar. 2021, 1 udg. Aalborg Universitetshospital. 20 s.

Dansk Myelomatose Database (DaMyDa). Årsrapport 2020.

Gregersen, H et al. Dansk Myelomatose Studie Gruppe (DMSG). For opgørelsesperioden 1. januar 2020 - 31. december 2020. [https://www.sundhed.dk/content/cms/89/4689\\_myelomatose\\_aarsrapport\\_2020\\_publiceret.pdf](https://www.sundhed.dk/content/cms/89/4689_myelomatose_aarsrapport_2020_publiceret.pdf)

Dansk Akut Leukæmi Database (ALD) & Myelodysplastisk Syndrom Database (MSD). Årsrapport 2020.

Severinsen, MT et al. Akut Leukæmi Gruppen (ALG). For opgørelsesperioden 1. januar 2020 - 31. december 2020. [https://www.sundhed.dk/content/cms/89/4689\\_ald\\_mds\\_aarsrapport\\_2020.pdf](https://www.sundhed.dk/content/cms/89/4689_ald_mds_aarsrapport_2020.pdf)

Den Danske Studiegroupe for Kronisk Myeloproliferative Sygdomme (DSKMS). Dansk Database for Kroniske Myeloproliferative Neoplasier (DMPN). Årsrapport 2020.

Thomsen, G et al. For opgørelsesperioden 1. januar 2020 - 31. december 2020. Offentliggjort version, 16. November 2021. [https://www.sundhed.dk/content/cms/89/4689\\_dmpn\\_aarsrapport\\_2020.pdf](https://www.sundhed.dk/content/cms/89/4689_dmpn_aarsrapport_2020.pdf)

Dansk Lymfom Gruppe (DLG), Styregruppen for Dansk Lymfom Database (LYFO) og Dansk Kronisk Lymfatisk Leukæmi Database (CLL). Malignt Lymfom og CLL National årsrapport 2020.

El-Galaly TC et al. 1. januar 2020 – 31. december 2020. [https://www.sundhed.dk/content/cms/89/4689\\_aarsrapport-2020-lyfo\\_cll-publiceret.pdf](https://www.sundhed.dk/content/cms/89/4689_aarsrapport-2020-lyfo_cll-publiceret.pdf)

## Doctoral thesis

**Dynamic Prognosis and Clinical Outcomes in Lymphoma during the Rituximab Era.** Maurer MJ. 2021

## PhD theses

**Socioeconomic Impact of Lymphoma with Focus on Fertility and Mental Health Using Danish Nationwide Registers** Øvlisen, A. K. 2021. Aalborg Universitetsforlag. Aalborg Universitet. Det Sundhedsvidenskabelige Fakultet. PhD-Serien


**The role of genetic alterations and immune surveillance in diffuse large B-cell lymphoma**

Nesic, M. 2021. Aalborg Universitet. Det Sundhedsvidenskabelige Fakultet. PhD-Serien, Aalborg Universitetsforlag.

## **Book chapter**

**FoC som værktøj til sygeplejefaglig ledelse**

Riis, M. B. & Korup, J. C., 2021, *Fundamentals of Care: Klinik, ledelse, uddannelse og forskning*. Damsgaard, T. L., Grønkjær, M. & Poulsen, I. (red.). 1. udg. Munksgaard , s. 73-93



## Annual report 2021

Clinic for Surgery and Oncology

Department of Haematology

Research Section

Sdr. Skovvej 15

DK-9000 Aalborg

[www.haematologi.rn.dk](http://www.haematologi.rn.dk)



AALBORG UNIVERSITY HOSPITAL