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Center for Molecular Medicine

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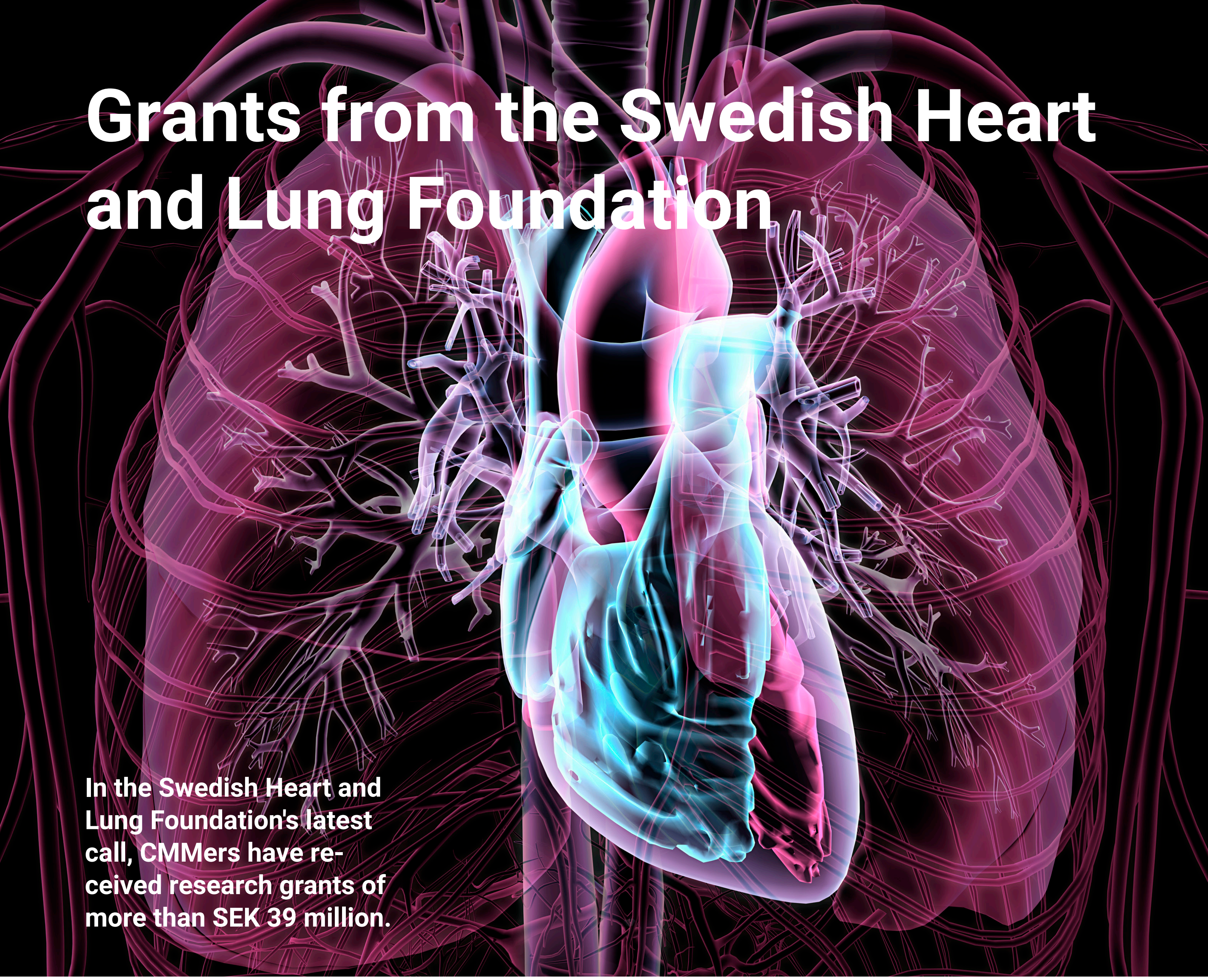
Editor: Magdalena Lindén
Layout: Edna Fagerstedt

CMM

Grants from the Swedish Heart and Lung Foundation



In the Swedish Heart and Lung Foundation's latest call, CMMers have received research grants of more than SEK 39 million.

Image: iStock

Carolina Hagberg received a grant of SEK 1,500,000 during 3 years for the project "Elucidating the contribution of adipose tissue to atherogenic dyslipidemia to reduce cardiovascular risk among patients with obesity". **Carolina Hagberg** also received SEK 570,000 during 3 years within the category of research position/research months.

Apostolos Bossios received a grant of SEK 810,000 during 2 years for the project "Severe Asthma with bronchiectasis – exploring the role of regulatory T cells." This grant will be added to previous ones from HLF to explore the role of T regulatory cells in airway diseases.

Tong Jiao received SEK 912,000 during 2 years within the category of postdoc position/research months for the project "Erythrocyte-derived microRNA-210 in diabetic infarct heart: role of extracellular vesicles".

John Pernow received a grant of SEK 6,600,000 during 3 years for the project "The red blood cell as a mediator and therapeutic target in cardiovascular disease".

Zhichao Zhou received SEK 720,000 for 2 years to be used for a PhD student within the project "Erythrocyte-derived microRNAs as mediators and biomarkers of diabetes-related vascular complications".

Anna Smed-Sörensen received a grant of SEK 6,000,000 during 3 years for the project "Deciphering the immunopathogenesis of sarcoidosis to identify patients at risk of severe disease - studies of TNF production, granuloma composition and autoantibody responses".

Hanna Björck received a grant of SEK 3,900,000 during 3 years for the project "Ascending aortopathy and aortic valve disease -underlying molecular and genetic mechanisms and clinical outcomes". **Hanna Björck** also received SEK 594,000 during 1 year to be used for a PhD student within the project "Ascending aortic aneurysm – implications of aortic valve phenotype".

Grants from the Swedish Heart and Lung Foundation

Rebecka Hultgren received a grant of SEK 6,000,000 during 3 years for the project "How can we identify women and men with a high risk to develop aneurysm disease and prevent rupture and death?".

Christopher Sundling received a grant of SEK 6,000,000 during 3 years for the project "Investigating the host-response in tuberculosis to identify disease mechanisms and diagnostic biomarkers in children and adults".

Oskar Kövamees received SEK 800,000 during 2 years within the category of research months for the project "Perivascular adipose tissue, a key behind residual cardiovascular risk in diabetes?".

Magnus Sköld received a grant of SEK 1,000,000 during 2 years for the project "From loci to function: mapping the molecular basis of idiopathic pulmonary fibrosis in Sweden". **Magnus Sköld** also received SEK 540,000 during 1 year to be used for a PhD student within the project "Impact of pulmonary fibrosis on daily life".

Aida Collado received SEK 1,140,000 during 2 years within the category of research months for the project "Erythrocyte-derived extracellular vesicles as mediators of vascular complications in type 2 diabetes".

Stephen Malin received SEK 360,000 during 1 year to be used for a PhD student within the project "From lipids to lesions: mapping the cellular origins of atherosclerosis".

Ljubica Matic received SEK 720,000 during 2 years to be used for a PhD student within the project "The biology and targeting of smooth muscle cells for therapeutic approaches in vascular disease".

Elin Rönnberg Höckerlind received SEK 1 200 000 during 2 years for the project "The role of mast cells in bronchiectasis".

Image: iStock

Grant from Åke Wiberg Foundation

Aida Collado has received a project grant of SEK 500,000 from ÅkeWiberg Foundation for the project "Red Blood Cell-Derived Extracellular Vesicles as Novel Contributors to Vascular Injury in Type 2 Diabetes."

New CMMers

Fabian Fond is a new research assistant in Liv Eidsmo's Group, holding a M.Sc. in Biotechnology Engineering from Lund University. He will assist the group in characterizing the phenotype and mechanisms of T cells in inflammatory skin diseases. Outside of science, he enjoys skiing/hiking, competitive cheerleading, and cooking.

Kelun Zhang (Crane) is a new postdoctoral fellow in Liv Eidsmo's group at CMM. She earned a PhD from Yonsei University in South Korea, with a specialization in skin immunology. In this role, Dr. Zhang will primarily focus on investigating the plasticity and function of skin-resident memory T cells, contributing to a deeper understanding of their role in skin immunity.

Charles Cassius is a dermatologist and immunologist in Saint-Louis hospital in Paris, France. He is doing research on autoinflammatory skin diseases and joined the Liv Eidsmo Group for a post-doctoral fellowship focused on hidradenitis suppurativa. Apart from medicine, he loves yoga, kite-surfing, sailing and modern art!

Welcome to CMM!

Carolina Hagberg awarded ERC Consolidator Grant

FUNDING AND GRANTS

Carolina Hagberg. Photo: Stefan Bladh

CMM Group Leader Carolina Hagberg has been awarded a prestigious ERC Consolidator Grant following a fiercely competitive application process. She will be using the money to further scientific knowledge about obesity-related cardiovascular disease.

The Consolidator grants are awarded by the European Research Council under the EU's programme for research and innovation. Amongst this year's grant recipients is Carolina Hagberg, senior researcher and docent of cell and molecular biology at Karolinska Institutet, as well as CMM Group Leader, who has been awarded EUR two million (roughly SEK 20 million) for five years.

When fat tissue affects the heart
Carolina's group's project, WATs-UP, explores the role played by adipose tissue in the development of obesity-related cardiovascular disease. Even though the association is a well-known one, what drives it has so far largely eluded scientists.

"Obesity gives rise to insulin resistance, high blood pressure and elevated levels of blood lipids, often simultaneously, which makes it hard to ascertain the exact role that the fat tissue has," explains Carolina Hagberg.

To come to grips with the problem, the group combines unique mouse models, a 3D model of human fat tissue and fat biopsies from patients with cardiovascular morbidity. In so doing, they are able to study how the uptake of lipids by the adipose tissue affects the earliest pathogenic changes in the vascular wall of the aorta.

"Our hypothesis is that it is altered lipid uptake into the adipose tissue, rather than just lipid release, that's one of the main culprits," says Carolina Hagberg.

While the project is at the level of basic research, it has the clear potential to pave the way for future therapies.

"We hope to unravel unknown disease mechanisms and identify novel opportunities to protect people with obesity against cardiovascular comorbidities. That said, we also hope this will open up the adipose tissue as a niche for the development of new types of drugs to combat these diseases."

Looking ahead
Dr Hagberg hopes that five years down the line, the project will have greatly improved the understanding the role adipose tissue plays in cardiovascular morbidity and their work will have opened up new research avenues. She describes the potential as great:

"We're convinced that the project will generate a lot of new knowledge and inspire exciting new future projects."

The text is based on an article from the Karolinska Institutet News website.

Camilla Engblom one of this year's Wallenberg Academy Fellows

FUNDING AND GRANTS

CMM Team Leader Camilla Engblom is one of the four young and promising researchers at Karolinska Institutet who have been selected to receive five-year basic research grants from the Knut and Alice Wallenberg Foundation. This funding provides young researchers with the opportunity to contribute groundbreaking new knowledge by tackling long-term and difficult research questions.

In total, 288 researchers have been appointed Wallenberg Academy Fellows since 2012. Their applications all underwent rigorous evaluation by a large number of international evaluators. This year's Wallenberg Academy Fellows will be tackling innovative research questions.

Camilla Engblom will use the funding to study a piece of the puzzle that could help develop more precise and personalized treatments for cancer and inflammatory bowel disease.

Camilla Engblom. Photo: Stefan Zimmerman. Background: Alexander Grey.

"We will study B cells, the antibodies they produce, and their microenvironment. By linking gene expression and interactions between B cells, their molecular specificity, and the surrounding environment, we can gain a deeper understanding of how these cells develop and change during disease progression. Understanding this could make it possible to develop more precise treatments, and we hope that our research can pave the way for new immunotherapies and personalized medicines for cancer and inflammatory bowel disease."

The grant will enable Camilla and her research team to use advanced technologies to map B cells in tissue and further analyze their molecular properties using mouse models and patient samples. They will also produce antibodies based on the B-cell receptors we identify, to explore what they react to. The grant also makes it possible to expand the research group and recruit more curious and talented people to the lab.

The text is based on an article from the Karolinska Institutet News website.

KID Funding

KID-funding is a block grant for partial financing of doctoral education at Karolinska Institutet and is intended to cover the doctoral student's salary costs. In the 2025 KID call, a total of 70 applications were granted funding, 15 of which had a principal investigator affiliated with CMM as main supervisor.

FUNDING AND GRANTS

Here is the list of granted applications from CMMers:

Main supervisor: Hanna Björck; Project: Thoracic aortic aneurysm and associated heart valve disease – molecular mechanisms and clinical prognosis; Co-supervisors: Anders Franco-Cereceda, Bahira Shahim.

Main supervisor: Anna Smed Sörensen; Project: Age-related differences in immune responses in blood and airways during influenza virus infection; Co-supervisor: Karin Loré.

Main supervisor: Gustavo Monasterio; Project: The role of the new retropharyngeal salivary gland in homeostasis and heterostasis in the upper gastrointestinal tract; Co-supervisors: Marie Wahren-Herlenius, Anne Marie Lynge Pedersen.

Main supervisor: Joakim Dahlin; Project: Single-cell-based mapping of basophils in health and disease; Co-supervisors: Gunnar Nilsson, Stina Söderlund.

Main supervisor: Taras Kreslavskiy; Project: Dissecting the complex nature of B cell memory; Co-supervisors: Karin Loré, Joan Yuan.

Main supervisor: Richard Rosenquist Brandell; Project: Mapping resistance mechanisms to targeted therapies in chronic lymphocytic leukemia; Co-supervisors: Cecilia Österholm Corbascio, Fredrik Wermeling.

Main supervisor: Karin Loré; Project: Immunity to respiratory syncytial virus after infection and vaccination in older adults; Co-supervisors: Helena Hervius Askling, Peter Delputte.

Main supervisor: Susanne Gabrielsson; Project: The role of leukotrienes in the immunogenicity of extracellular vesicles; Co-supervisors: Fredrik Wermeling, Amir Sherif.

Main supervisor: Karine Chemin; Project: Mapping of tissue regulatory T cell signatures in rheumatic diseases: Implications for ; Co-supervisors: Vivianne Malmström, Carina Strell.

Main supervisor: Anna Färnert; Project: Studies of immunity and severity in malaria; Co-supervisors: Christopher Sundling, Francis Ndungu.

Main supervisor: Eduardo Villablanca; Project: Mapping intestinal healing in IBD: Multimodal spatial analysis of mouse models and human tissues; Co-supervisors: Charlotte Hedin, Camilla Engblom.

Main supervisor: Catharina Lavebratt; Project: The gut-brain axis in children with ADHD; Co-supervisors: MaiBritt Giacobini, Miranda Stiernborg.

Main supervisor: Liv Eidsmo; Project: Controlling cancer and triggering inflammatory skin diseases—mechanisms of T cell-initiated pathology in; Co-supervisors: Fredrik Wermeling, Onur Parlak.

Main supervisor: Maria Needhamsen; Project: Molecular strategies for tracking neuronal damage in neurodegenerative diseases; Co-supervisors: Fang Fang, Maja Jagodic.

Main supervisor: Eric Herlenius; Project: Genesis of Inspiration - Birth, development of Breathing and role of inflammation in autonomic control; Co-supervisors: Michael Hageman, Athina Samara.

Timing is Everything in Biology

From Dynamic Integration of Fast Molecular Processes in Living Cells to In Vitro Diagnostics

TECHNOLOGY AND FUNDING

Vladana Vukojevic and her research group have developed massively parallel fluorescence correlation spectroscopy (mpFCS), a technology that maps molecular concentrations, diffusion, and interactions with high precision. It is available to the CMM community through the imaging core facility at floor 01. The team now advances mpFCS instrumentation under SSF funding, aiming for clinical use in early blood-based Alzheimer's and amyloid diagnosis.

Back row from left: Stanko Nikolic, Aleksandar Krmpot, Sho Oasa, Vladana Vukojevic, Lars Terenius, Agneta Laurent. Middle row: Ann Tiiman. Front row: Borislav Stoyanov (exchange student via ERASMUS+).

Living cells are complex dynamical systems that tightly control the spatial distribution and temporal behaviour of their constituent molecules through two coupled basic processes, chemical reactions and molecular transport. Through reaction-transport processes, biomolecules in living cells are integrated into spatially organized, dynamic networks of molecular interactions. These networks are complex: they include many different molecules; they are tightly intertwined, as products of some biochemical reactions become reactants in others; they are dynamically controlled through feedback loops formed when products of some reactions act as reactants or catalysts/inhibitors in other reactions; and they are spatially organized through transport processes that couple these reactions across space within the cell. Consequently, these complex biochemical networks can acquire a new quality, the capacity to self-regulate, i.e., to adjust their essential variables, giving rise to coherent biological functions, such as gene expression.

To understand how biological functions emerge through complex reaction-transport dynamical networks of molecular interactions, the concentration and mobility of interacting molecules, which are in addition to chemical reactivity the determinants of chemical kinetics, need to be quantitatively characterized in living cells, where the number of molecules of interest is low in comparison to the number of surrounding molecules (concentrations often < μM), kinetics of molecular interactions span a broad range of timescales (rate constants 10-2 – 108 M-1s-1), the life time of transient molecular complexes is short (< 10-3 s), and molecules move rapidly across the cell by diffusion (10-13 m2s-1 < D < 10-10 m2s-1). (For example, the thermal speed of motion of a small metabolite like glucose is at the order of 100 - 1000 km/h, and its effective displacement across a typical cellular distance of ~ 1 μm occurs on millisecond timescales.)

Technology available at CMM

To resolve this complex molecular behaviour, quantitative analytical methods with high spatial and temporal resolution and ultimate sensitivity are needed. To this aim, Vladana and her research group members Sho, Aleksandar and Stanko, have developed massively parallel fluorescence correlation spectroscopy (mpFCS) [1-3]. By extending FCS, a quantitative analytical method with single-molecule sensitivity, to imaging and integrating it with fluorescence lifetime imaging microscopy (mpFCS/FLIM), simultaneous mapping of molecular concentrations, diffusion, and interactions across many positions within a cell was made possible, while also providing information about the local environment via fluorescence lifetime measurements [1-3].

This unique instrumentation is available to the research community through the CMM imaging core facility "Laboratory for Functional Fluorescence Microscopy Imaging (fFMI)" (CMM L8:01 room 056).

Under the grant by the Swedish Foundation for Strategic Research (SSF), call "Instrument, technology and method development", the team continues to advance instrumentation development, with a particular focus on translating the massively parallelized approach to the clinic for early blood-based diagnosis of Alzheimer's disease and other amyloid-related disorders [4]. The massively parallelized setup enables shorter measurement times compared to conventional single-beam systems, allowing quantitative characterization of amyloid aggregate concentration and size within a clinically feasible timeframe.

Potential clinical applications

By detecting the pathological amyloid aggregates while they are still small and dispersed in biological fluids, this approach offers an advantage over amyloid-PET imaging, which visualizes only large, amyloid-rich deposits typically exceeding 1 mm that have formed over many years of disease progression. The possibility to detect the imbalance in amyloid homeostasis early on, holds the potential to enable timely diagnosis, intervention and monitoring of therapeutic responses, which is difficult to achieve with currently available methods.

Text by Vladana Vukojevic.

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Amyloidogenic nanoplaques in blood serum of patients with Alzheimer's disease revealed by time-resolved Thioflavin T fluorescence intensity fluctuation analysis.
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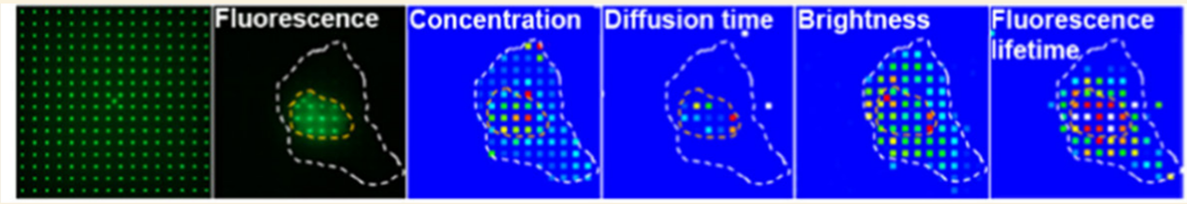

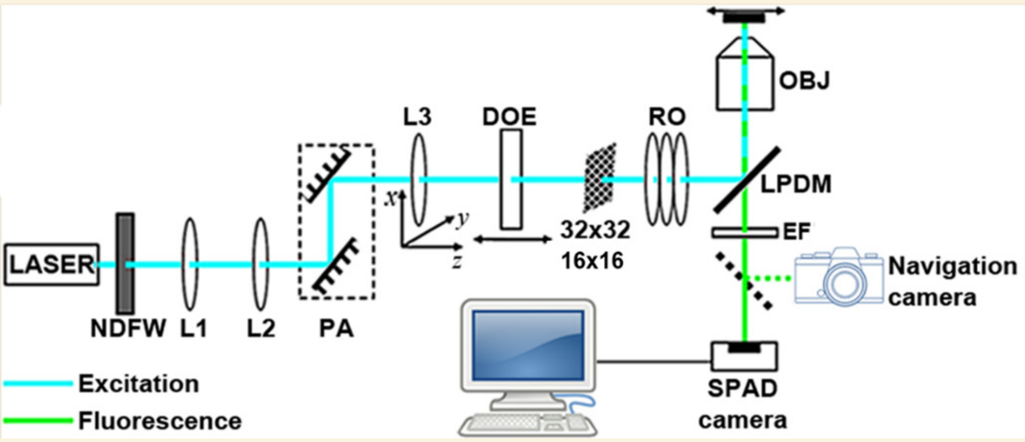

Schematic drawing of the mpFCS/FLIM system.

Richard Rosenquist Brandell recognized as Pharmaceutical Profile of the Year

AWARDS

Richard Rosenquist Brandell has been named Pharmaceutical Profile of the Year 2025 for his dedicated work in building a national infrastructure for precision medicine. The award is presented by Läkemedelsmarknaden in collaboration with Dagens Medicin and Dagens Industri.

Richard Rosenquist Brandell is a senior consultant in clinical genetics at Karolinska University Hospital, Professor at the Department of Molecular Medicine and Surgery, Karolinska Institutet and CMM Group Leader. In addition, he is the director of Genomic Medicine Sweden (GMS).

The Pharmaceutical Profile of the Year award recognizes individuals who build bridges between healthcare, industry, research, and patients, and who involve patients in development efforts within healthcare.

Christina Kennedy, Dagens Medicin, Richard Rosenquist Brandell and Jonny Sågänger Photo: Cecilia Österholm Corbascio

Motivation:
"As director of Genomic Medicine Sweden (GMS), Richard Rosenquist Brandell has built a team that, since 2018, has worked purposefully to establish a national infrastructure for improved diagnostics, personalized treatment choices, and research in the field of precision medicine. This development is carried out in collaboration with healthcare, authorities, patient organizations, industry, and academia."

“The strength of GMS lies in the very close collaboration between all stakeholders, which has made it possible for us to offer precision diagnostics nationwide. I feel deeply honored as a clinical geneticist to receive this award, it truly came as a surprise,” says Richard Rosenquist Brandell, director of GMS.

The award was presented on December 4, 2025.

The text is based on an article from the Karolinska Institutet News site.

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Gene linked to rheumatic disease controls cell movement

In a recent study, researchers from CMM revealed how the gene DIORA1, associated with several rheumatic diseases, affects how cells move. The findings provide new insights into disease mechanisms and potential future therapies. The study was published in the scientific journal *PNAS*.

“This publication shows how incredibly long time it can take to answer a research question,” says Marie Wahren-Herlenius with a smile.

We meet in her office on the third floor of the CMM L8 building, where plastic 3D models of DIORA1 and MRCK kinases are hanging as decorations in the window next to her desk.

Marie Wahren-Herlenius explaining how DIORA1 binds to MRCK kinases. Photo: Magdalena Lindén.

“The people in my group kept asking me to buy a 3D printer for the lab. In the end, I gave in, but only on condition that they promised to print DIORA1 models for me, so here I have them.”

“We have long known that DIORA1 is linked to autoimmune diseases, without understanding its function. Now we show that the gene regulates the cell’s ability to move by interacting with a group of proteins known as MRCK kinases.”

The seeds for the now published DIORA1 story were sown around 2013, shortly after the first genome-wide association study (GWAS) for Sjögren's syndrome came out. “We began to combine DNA and gene expression data from peripheral blood mononuclear cells from Sjögren's patients to analyze how different variants of the same genetic site affect the amount of RNA expressed from a nearby or sometimes more distant site. These so-called expression quantitative trait locus (eQTL) analyses were something new at the time, and we threw ourselves into it.

The most prominent eQTL association for Sjögren's syndrome that they found , was a region on chromosome 8 corresponding to a group of genes named FAM167-BLK. In this region, the eQTL signal for the gene FAM167A (member A of the Family with sequence similarity 167) was unexpectedly strong, several orders of magnitude .

DIORA1 3D model. Photo: Magdalena Lindén.

Susanna Brauner, who was then a doctoral student in Marie Wahren-Herlenius' research group, deepened the analyses by sorting peripheral blood cells and performing targeted expression analyses in human and mouse T cells, monocytes, and B cells. Susanna found that FAM167A was mainly expressed in B cells.

After Susanna defended her thesis, Gudny-Ella Thorlacius and Laura Mentlein continued the studies of FAM167A. They reported that the encoded protein, which is conserved in vertebrates, has an intracellular, cytoplasmic localization, and in mice it is mainly expressed in the lungs and spleen.

Tilen Tršelič. Photo: Miranda Stiernborg.

When they studied the protein in greater detail, they realised that it had a lot of "disorder" in its structure. In higher types of organisms, there appears to be more proteins with "disorder" compared to simpler organisms. Over the years, it has been found that genetic polymorphisms in FAM167A are also associated with other rheumatic diseases, such as SLE, systemic sclerosis and myositis. However, the disease in which the strongest association is with polymorphisms in the FAM167A locus is Kawasaki disease, an acute inflammation of blood vessels that mainly affects young children and, in the worst cases, can lead to coronary artery aneurysms. Based on these observations, the researchers chose to name the gene encoded by the FAM167A locus "DIsORdered Autoimmunity1 (DIORA1)".

The question now was: What does DIORA1 do? At this point, Tilen Tršelič, who defended his thesis December 16th, came in. Using proximity proteomics, which revealed all the proteins that DIORA1 come in contact with, he could identify MRCKA and MRCKB kinases as direct interaction partners of DIORA1.

MRCK kinases are multidomain proteins with a role in cytoskeletal organization and cell motility. Since the functional outcome of protein interactions often depends on the specific domains involved, Tilen set out to map the interaction sites between DIORA1 and MRCK kinases. The results demonstrated that DIORA1 binds to the kinase inhibitory motif (KIM) of MRCK kinases, suggesting a role in regulating their activity.

To figure out what DIORA1 does inside the cell, Tilen decided to create DIORA1 knock-down cell lines using CRISPR. Through a number of analyses and experiments, he showed that DIORA1 knock-down led to increased tissue invasiveness of the cells and that phosphorylation of MRCK substrates was reduced, leading to dysregulated cell motility. Finally, Tilen confirmed that blocking MRCK kinases in the cell restored DIORA1 knockdown cell motility to normal levels, confirming the functional link between DIORA1, MRCK kinases, and invasive behavior.

Further studies by Tilen revealed that several other proteins may be involved in the same signaling network as DIORA1. Together, these proteins form a previously unrecognized regulatory system that likely plays an important role in controlling cell motility and may hold potential as future drug targets. This work has now led to a publication in *PNAS*, but the story is only the beginning of a deeper understanding of DIORA1 and its role in rheumatic and autoinflammatory diseases. The next step is to investigate how DIORA1 affects the immune system throughout the body, including studies on genetically modified mice.

"When I came to CMM seven years ago, I was super excited to do basic research but also craved to have more context to it - this feeling that understanding something deeply at the molecular level should ultimately matter for people. Uncovering the signaling pathways of a protein that had essentially no known function has been an incredible journey. To finally put a finger on what DIORA1 does, and how it shapes cell motility, is both interesting and personally meaningful. It's a reminder that connecting the dots can take time, but when the pieces fall into place, there is nothing like it," says Tilen.

The study was a collaboration between researchers at Karolinska Institutet and Linköping University. The researchers from Linköping University contributed with structural modelling of the proteins. The study was funded by the Swedish Research Council, the Knut and Alice Wallenberg Foundation, the Swedish Rheumatism Association, the Swedish Heart-Lung Foundation, and the King Gustav V 80th year foundation.

See publication for any conflicts of interest.

Publication:
"Autoimmunity-associated DIORA1 binds the MRCK family of serine/threonine kinases and controls cell motility", T. Tršelič, N.Pelo, G.M. de Fremont, V. S. Iyer, E. Richardsdotter Andersson, V. Ottosson, D. A. Frei, E. Baas, W. A. Nyberg, G. E. Thorlacius, L. Mentlein, S. V. Boddul, I. Sandu, D. Velasquez Pulgarin, Á. Végvári, C. Gerlach, F. Wermeling, M. Sunnerhagen, B. Wallner, A. Espinosa, M. Wahren-Herlenius, *PNAS*, online 3 October 2025, doi: 10.1073/pnas.2426917122.

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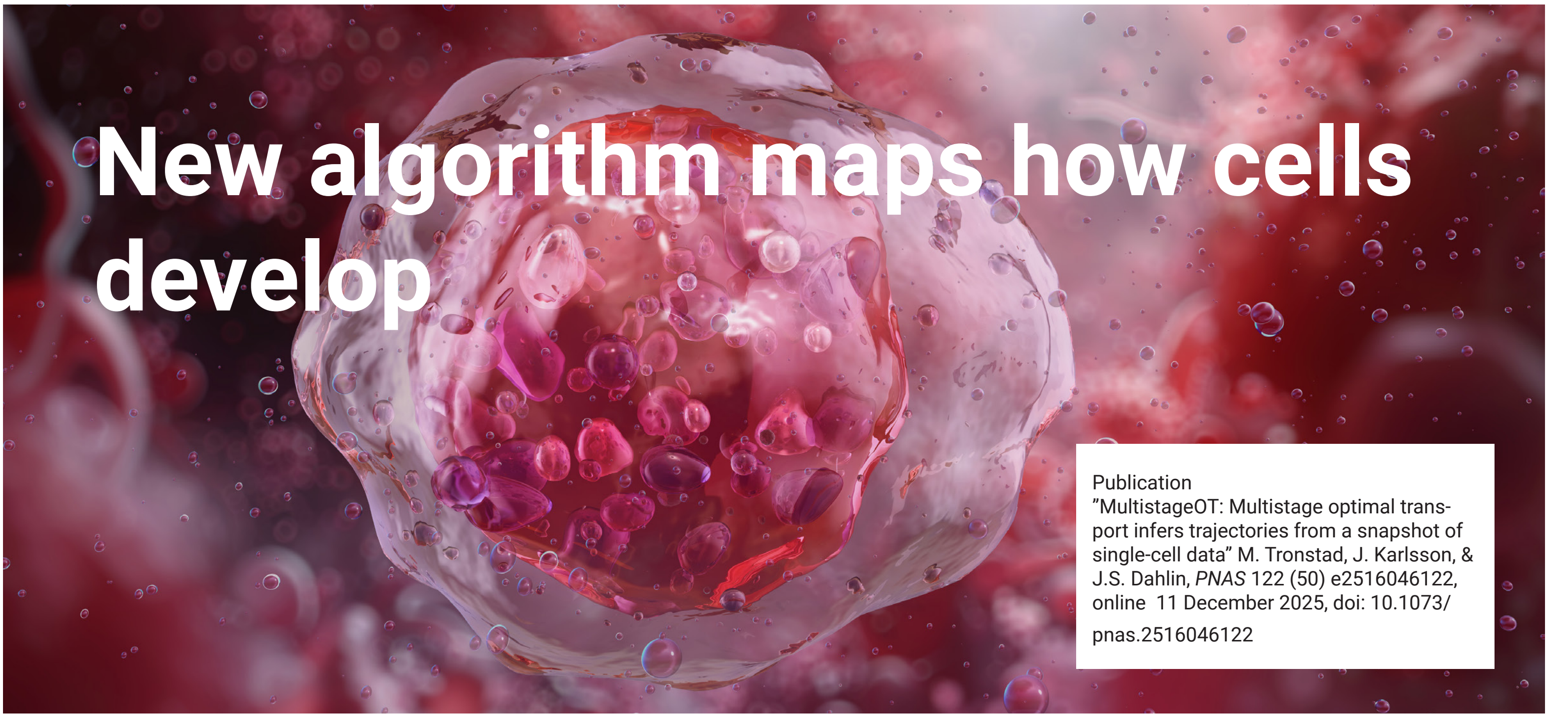


New algorithm maps how cells develop

Publication
"MultistageOT: Multistage optimal transport infers trajectories from a snapshot of single-cell data" M. Tronstad, J. Karlsson, & J.S. Dahlin, *PNAS* 122 (50) e2516046122, online 11 December 2025, doi: 10.1073/pnas.2516046122

Researchers at CMM, Karolinska Institutet and KTH have developed a computational method that can reveal how cells change and specialise in the body. The study, which has been published in the journal *PNAS*, can provide important knowledge about why this process sometimes goes wrong and leads to disease.

Cell differentiation is a fundamental process in the body. It enables stem cells to develop into different cell types, such as neurons in the brain or immune cells that guard against infection. When the process is disrupted it can lead to serious disease, but studying it is hard.

A fundamental challenge is that today's methods for analysing single cells destroy the cells when they are measured, which means that researchers only get a single snapshot in time. To address this problem, researchers from CMM and KTH have developed an algorithm called MultistageOT. It is based on mathematical principles known as optimal transport and can reconstruct the entire developmental process from a single snapshot of the cells' gene expression levels.

"When we sequence a cell, it is destroyed, and this means that we do not know what that cell would look like in the future. Our method makes it possible to model the entire developmental process, even if the cells are observed at a single time point," says Magnus Tronstad, PhD student in Joakim Dahlin's Team at CMM.

The algorithm learns to fill out the missing intermediate stages of the development and can therefore predict how cells mature and what function they will have. In the study, the method was tested on data from blood cell development, a complex system where stem cells give rise to many different types of blood cells.

The results demonstrate that MultistageOT is capable not only of reconstructing developmental trajectories, but also of identifying cells that deviate from the expected process–an essential mechanism for avoiding spurious conclusions.

"This gives us a powerful tool to understand how cells make "decisions" about their future, which is central in understanding how diseases arise when differentiation goes wrong," says Joakim Dahlin docent and Team Leader at CMM.

The researchers emphasize that the method is general and can be used in different biological systems, even outside the animal kingdom.

The study is a collaboration between researchers at Karolinska Institutet and Professor Johan Karlsson at KTH. The study was financed by Vetenskapsrådet, Cancerfonden and Karolinska Institutet. The researchers declare no conflict of interest.

Magnus Tronstad, Photo: Daryl Boey.

Joakim Dahlin. Photo: Karoline Kristo.

CMM Lucia Celebration and Photo Contest 2025

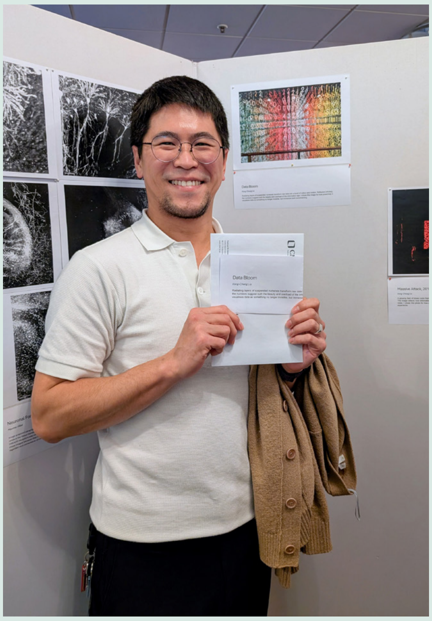
CMM EVENTS AND OUTREACH

The A Scalpella choir performing for CMM. Photo: Magdalena Lindén.

On December 12th all researchers affiliated with CMM were invited to a joint Lucia celebration in and outside the CMM Lecture Hall. As previous years, *A Scalpella*, the chamber choir at Medicinska Föreningen Karolinska Institutet, made a beautiful preformance of the traditional Swedish Lucia songs, perhaps surprising some of the new international CMM researchers who were not familiar with this tradition.

Before and after the performances, while enjoying glögg, lussekatter and pepparkakor, CMMers had a nice time socializing and watching the exhibiton of Photos submitted to the CMM Photo Contest 2025.

At the end of the event, the CMM Director Michael Sundström announced the winners and presented the awards. See the winning contributions on pages .



Kang-Cheng Liu, the First Prize Winner of CMM Photo Contest. Photo: Magdalena Lindén.

Winners of the CMM Photo Contest 2025: Data as Art

1st Prize

Data Bloom

by Kang-Cheng Liu

Radiating layers of suspended numerals transform raw data into a burst of colour and motion. Reflected infinitely, the numbers suggest both the beauty and overload of the information age. I chose this image for how powerfully it visualises data as something no longer invisible, but immersive and overwhelming.

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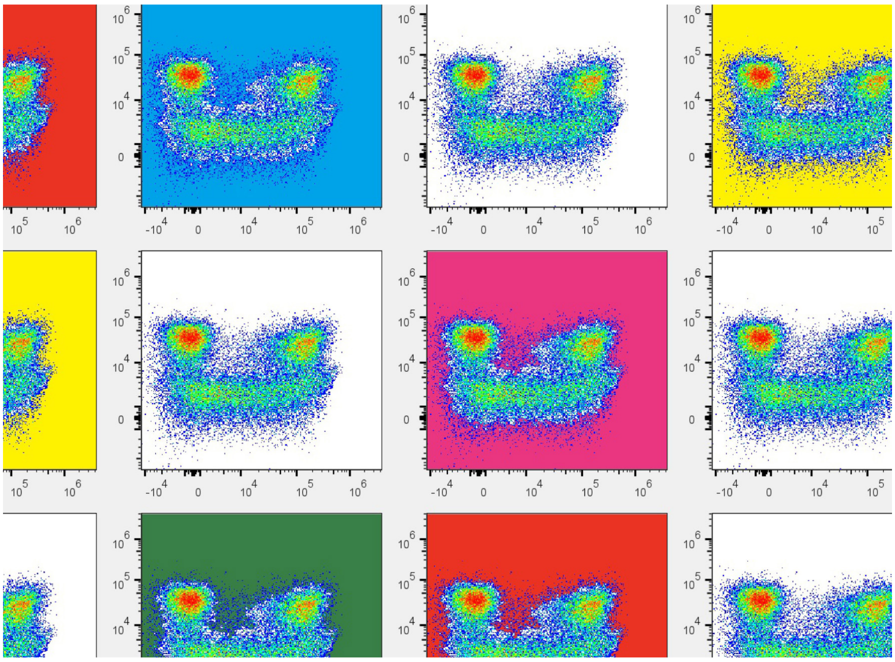
Winners of the CMM Photo Contest 2025: Data as Art



2nd Prize

Flow Smilometry

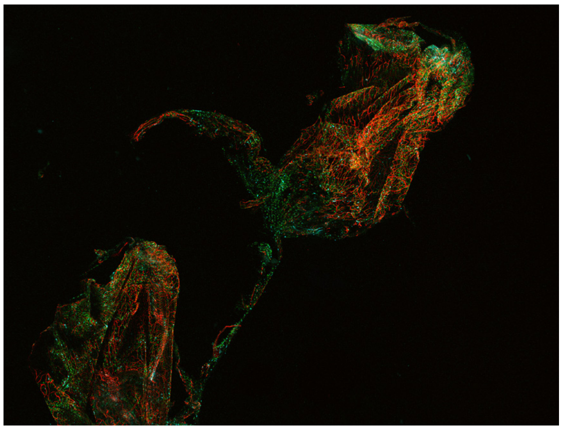
by Nicolas Ruffin

Science often rewards the researcher with joy.

3rd Prize

Square Root of Power

by Olivia Thomas



Honorary mention

The Brain's Silent Guardian: A Spider's Embrace

by Stefan Bencina

This image of the brain meninges was captured during an isolation exercise in a neuroimmunology course in Bordeaux I have recently attended. The structure's fibrous network resembles a spider that has found something trapped on its web. This parallels the meninges' function of acting as a spider-like shield to protect the brain from circulating pathogens and harmful substances.

The Annual Cardiovascular Research Retreat

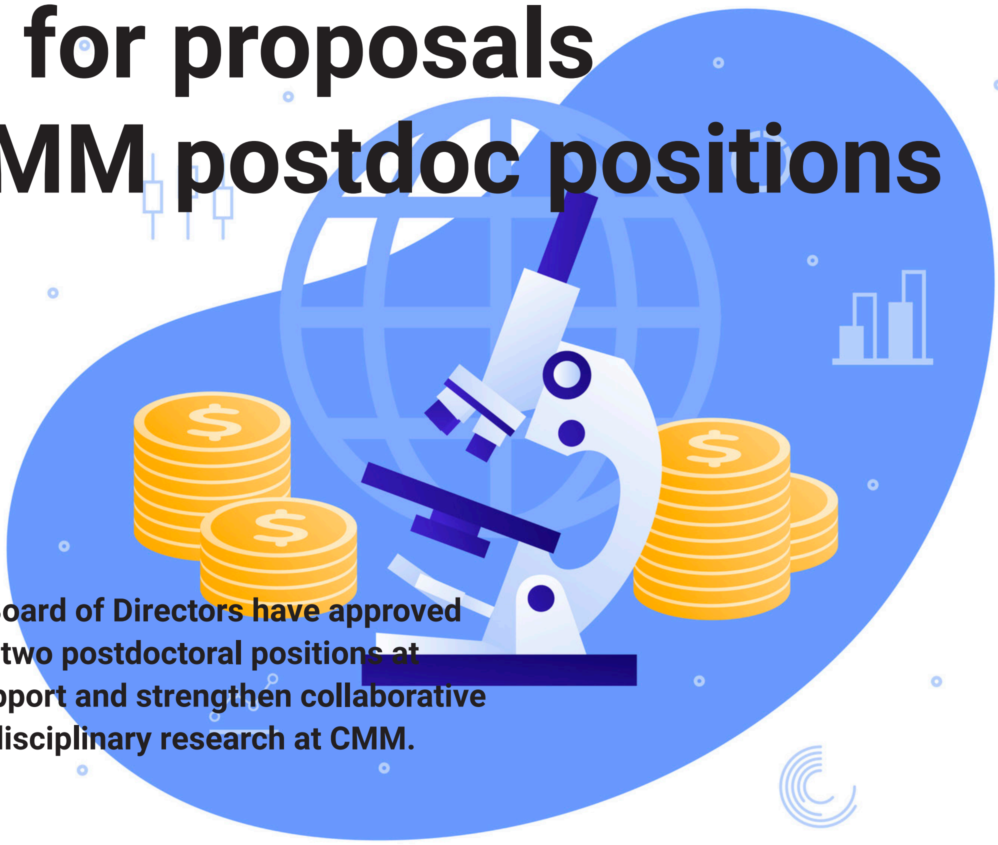
On November 27–28, 2025, the annual Cardiovascular Research Retreat was held at Sånga Säby. The retreat brought together distinguished international researchers who engaged closely with national and local speakers, including junior scientists.

Highlights included the presentation of awards: one for Best Oral Presentation and three for Best Poster Presentations, recognizing young scientists—a postdoctoral researcher, two doctoral students, and one master's student, all affiliated with CMM. The program was further enriched by interactive quiz activities and the traditional CVP run, fostering both scientific exchange and community spirit.

The retreat was organised by, among others, several CMM:ers, and was supported by Karolinska Institute, KIRCNET, and CVR.

Text by Hanna Björck.

Call for proposals – CMM postdoc positions



The CMM Board of Directors have approved funding for two postdoctoral positions at CMM to support and strengthen collaborative and cross-disciplinary research at CMM.

These general provisions apply:

- Eligible applicants are CMM Group and Team leaders based at CMM, Bioclinicum or Biomedicum, except for the CMM Steering Group members.
- The proposed projects must be aligned with CMMs mission and goals, with translational outputs and goals.
- One project should be aligned with the CMM Dark Immunome project, and the other having a clear clinical research focus.
- Cross-disciplinary proposals involving collaborations between several groups at CMM will be prioritized.
- The proposed project should be carried out over a two-year period, and the Group or Team Leader applicant must serve as the main supervisor for the postdoc.
- Supervisor and postdoc of successful proposals must report progress two times/year to the CMM Steering Group, and funding could be terminated if progress is clearly below expectations.
- The maximum financial contribution from CMM is 1,72 MSEK for each two-year postdoc position and can be used for salary and project-related running costs.
- The postdoc should be employed on a fixed-term project basis, limited to a maximum of two years. Employment can be at Karolinska Institutet, Karolinska University Hospital or CMM.
- The funding cannot be used for stipend(s).

Application:

To submit an application please send the following documents in English in a single pdf file to Kristina.edfeldt@cmm.se latest on 31 January 2026.
Research proposal of maximum three A4 pages in Arial font size 11, with single line spacing and 2,5 cm margins, references (font size 9) and any illustrations included. The application should be structured in the following sections with at least two pages on sections 4 & 5:

1. Purpose and aims
2. Current state-of-the-art
3. Significance and scientific novelty
4. Project description including theory and methodology
5. Cross-disciplinarity and collaborations
6. References

Main applicant CV of maximum one A4 page incl. 5 selected publications.

If applicable, postdoc candidate CV of maximum one A4 page incl. 5 selected publications.

Proposals will be reviewed and evaluated by the CMM Steering Group.

Note that this call for proposal is a one-off opportunity and the duration of the postdoc positions cannot be extended beyond the two-year duration.

Center for Molecular Medicine Foundation
L8:05 | Karolinska University Hospital
SE-171 76 Stockholm, Sweden
E-mail: communication@cmm.se

Editor: Magdalena Lindén
Layout: Edna Fagerstedt

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