2023

Annual Report

Department of Biomedical Sciences of Cells and Systems (BSCS)

UMCG

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Content
Annual Report 2023

1. Foreword - 2023

Hereby we present to you our fourth Annual Report of the Department of Biomedical Sciences of Cells and Systems (BSCS) (as of 2024 Department of Biomedical Sciences (BMS)). As with our previous reports, this edition aims to provide you with a quantitative overview of all our activities and achievements in the year 2023, including our scientific research, educational programs, business development, and outreach initiatives.

We consider the quantitative data in this report as our “medals”, often awarded to individuals, but mostly the result of fantastic collaborative efforts which laid the ground for these successes. We highly value that team spirit and are proud on those that made that shine.

In 2023, the Department became part of a new cluster, Biomedical Science & Technology, a rather natural merge with the Departments of Biomedical Engineering (now Biomaterials & Biomedical Technology (BBT)) and ERIBA. Within this cluster, we will even further foster collaborations to allow talent to develop and to provide opportunities for people to be or become inspiring teachers and innovative scientist.

To get funding for (especially basic) medical science is nowadays challenging, because of the (often unrealistic) desire of translation or valorization. To teach at the border of the unknowns is not always easy, as the urge to provide diplomas often prevails over challenging student curiosity and imagination. However, with tour great team spirit, I am convinced we will continue curiosity driven studies to uncover molecular principles driving of ageing and age-related disease at the best possible quality, knowing that this always has been the road driving new applications to diagnose or treat diseases. Similarly, with the dedication and skills to provide advanced teaching of our expertise, we are committed to contributing to educate the next generation of biomedical professionals.

I am thankful to all outside our departments who have supported our work and who inspired us to show our best.

I am proud of and indebted to all within the Department for all their contributions in 2023.

Harrie Kampinga
Head of the department
March 2024

2. Research at BSCS

Our mission is to contribute significant advancements to the understanding of the fundamentals of functional and dysfunctional human biology at the molecular, cellular and systems level that ultimately will be applicable to combat diseases and increase human health span.

In BSCS, research and education are intertwined.

- With our research, we aim to discover and transfer knowledge to medical applications.
- With our education, we teach cutting-edge biology to the doctors and scientist of the future.

This way, we strive to advance the cycle of bench-to-bed-to-bench for human well-being.

The societal relevance of this mission is considered to be comprised of the following 3 main items:

1. **Understanding basic mechanism of the function of cells & systems drive advances in Medicare**

   Nearly all current medical treatments are based on discoveries, often done long before the related application, on detailed insights in how molecules, cells and systems function and how they are derailed in disease.

* Our early analysis on how precision radiotherapy can be targeted to avoid radiation side effects has been the basis for proton therapy.
* Our screens in Drosophila melanogaster have led to the discovery of therapeutic compounds now explored for the treatment of PKAN.

2. **We connect state-of-the-art Research with Innovative Education**

   Academic education requires role models and modern teaching.

* BSCS takes pride in intense training and careful supervision of its PhD students.
* We support problem-based, curiosity-driven learning programs (such as in flipped classrooms), provide basic and advanced courses in science technologies and strategies, and practical courses.
* We develop novel digital education tools (e-learning).

3. **Collaborations drive discoveries**

   The progress of science is based on specialized expertise for discoveries, but requires intense collaborations amongst experts for driving such discoveries all the way to utilization.

* BSCS strives for a great team spirit not only to nurture internal collaboration but also strongly supports collaborations with external partners in and outside the UMCG.

3. Research groups at BSCS

Research in the Department of Biomedical Sciences of Cells and Systems is divided into the following four sections:

3.1 Section Anatomy and Medical Physiology

The section Anatomy and Medical Physiology perform basic research on human motivational processes using different motivational contexts and research techniques. Human motivational process in biomedical education and training also underly the development of several digital applications by our group that support undergraduate and postgraduate anatomy and physiology teaching. These applications can also be implemented in applied research on teaching efficacy. The two facilities of the Section – Dissection Room and Medical Physiology Lab –offer possibilities to collaborate in external research programs.

Groups:

The research group of **Janniko Georgiadis** mainly focuses on human motivational processes in i) biomedical education and training, integrating educational science with gaming-psychology, and ii) sexual behavior, focusing on predictive coding theory.

3.2 Section Cognitive Neuroscience

Section Cognitive Neuroscience does research into symptoms and treatment of different psychiatric disorders and of age-related cognitive impairment.

Groups:

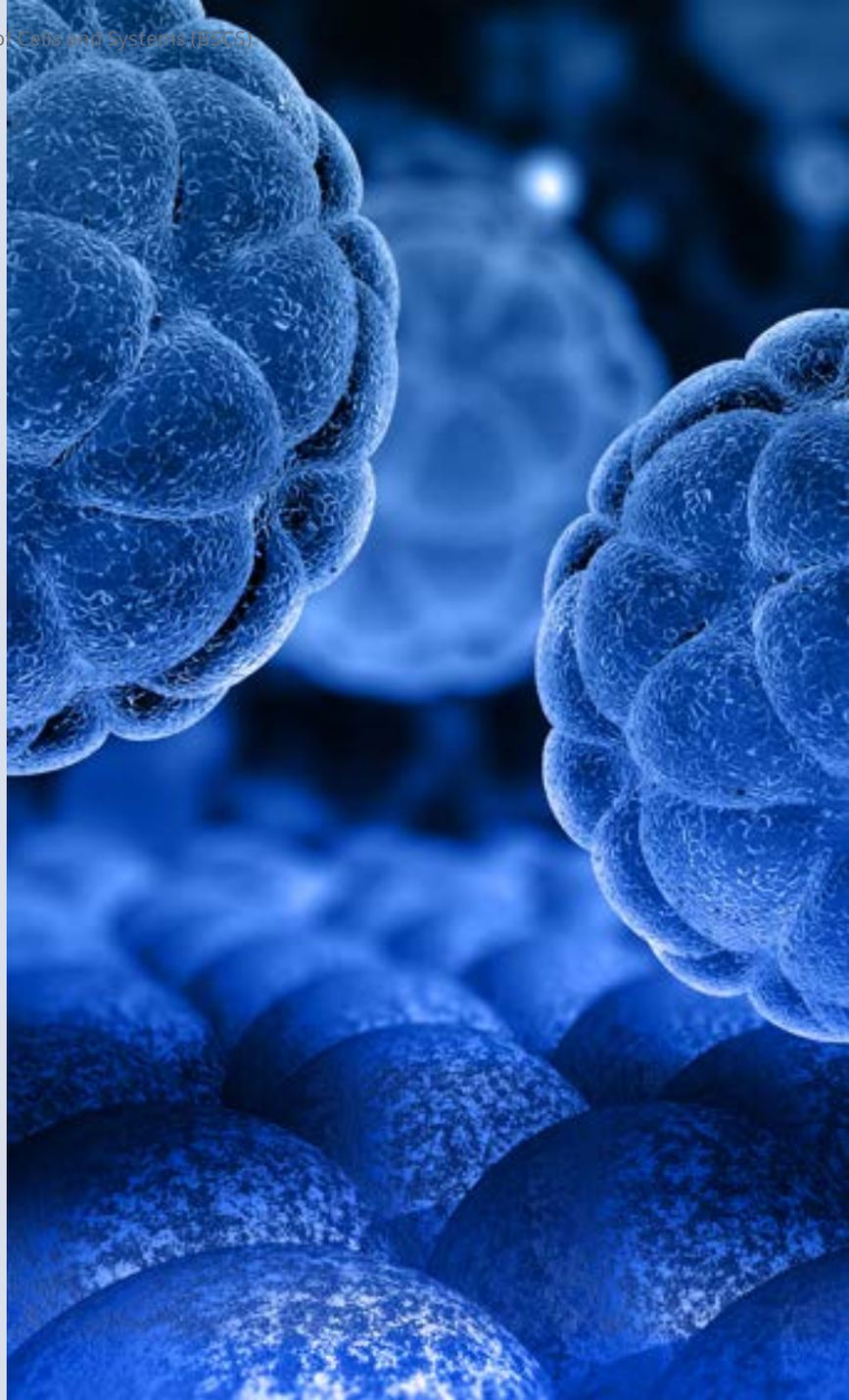
André Aleman focuses on three lines of investigation: i) Psychiatric symptoms and vulnerability, with a focus on cognitive-emotional interactions, ii) Cognitive aging, with a focus on mild cognitive impairment and iii) Treatment and prevention, with a focus on non-invasive neurostimulation.

Branislava Ćurčić-Blake focuses on brain connectivity analysis and improving cognitive functioning in patients with multiple sclerosis and elderly people with mild cognitive impairment (MCI), as well as auditory verbal hallucinations.

Sander Martens focuses on individual differences in temporal attention within and across sensory modalities.

Iris Sommer aims to improve future perspectives for patients with schizophrenia and other complex brain disorders. Special emphasis is put on biomarkers and personalized medicine. Her group has a broad interest in methods such as imaging, post-mortem analysis, epidemiology and treatment studies.

Marie-José van Tol focuses on the interaction between mood and cognition in major depressive disorders, and especially factors that promote a prolonged course of these disorders and prevent relapse.



3.3 Section Molecular Cell Biology

The research mission of this section is to study basic processes in molecular cell biology to generate novel, fundamental insights related to cellular and organismal fitness. Through high-quality research, we aim at identifying and, where possible, at exploiting cellular targets to promote healthy aging and/or treat human disease.

Groups:

Lara Barazzuol (Seconded from the department of Radiation Oncology) focuses on assessing the effect of DNA damage (as caused by radiation and chemotherapy) on the brain and aims to achieve an improved biological and molecular understanding of cancer treatment-induced neurocognitive dysfunction.

Rob Coppes (Seconded from the department of Radiation Oncology) focuses on the role, mechanism and regenerative potential of normal tissue stem cells in the response of tissues to different radiation qualities, such as photons and protons.

Ben Giepmans aims to better visualize how molecules, organelles and cells act in concert to organize life, and how this may be affected in diseases. Focus is on developing and improving large-scale multimodal microscopy approaches that allow better identification of targets with new probes. Special interest is in uncovering the trigger that leads to, Type 1 diabetes.

Mark Hipp studies the cellular quality control machinery to identify the mechanisms that healthy cells use to prevent toxic protein aggregation, and to help cells to use these mechanisms to prevent diseases associated with protein aggregation.

Harrie Kampinga studies how cells maintain a healthy proteome, which is not only crucial for protein function and hence functionality of cells, but also essential to prevent accumulation of protein damage (protein aggregates) that can lead to a cascade of toxic events that threaten cellular health span. To ensure a proper protein homeostasis, an intricate protein quality control (PQC) network exists in cells in which Heat Shock Proteins (HSP), the central research topic in his group, play a central role.

Ody Sibon aims to understand molecular mechanisms behind neurodegenerative diseases presenting with movement disorders. Obtained fundamental insights are used to design treatment strategies which are currently tested in clinical settings.

Sven van Ijzendoorn aims to understand the molecular mechanisms that control the intracellular dynamics of proteins, lipids and membranes in the context of the functional organization of cells, and to understand how these mechanisms contribute to health or, when disrupted, to human disease. In this context our focus is also on rare congenital disorders caused by disrupted intracellular protein dynamics and cellular organization, which includes elucidating their pathogenesis, development of patient-specific iPSC-based cell models and lead identification for novel therapeutic strategies.

3.4 Section Molecular Neurobiology

The mission of the Section Molecular Neurobiology is to study the central nervous system (CNS) during healthy ageing and neurodegenerative diseases using state of the art techniques.

Groups:

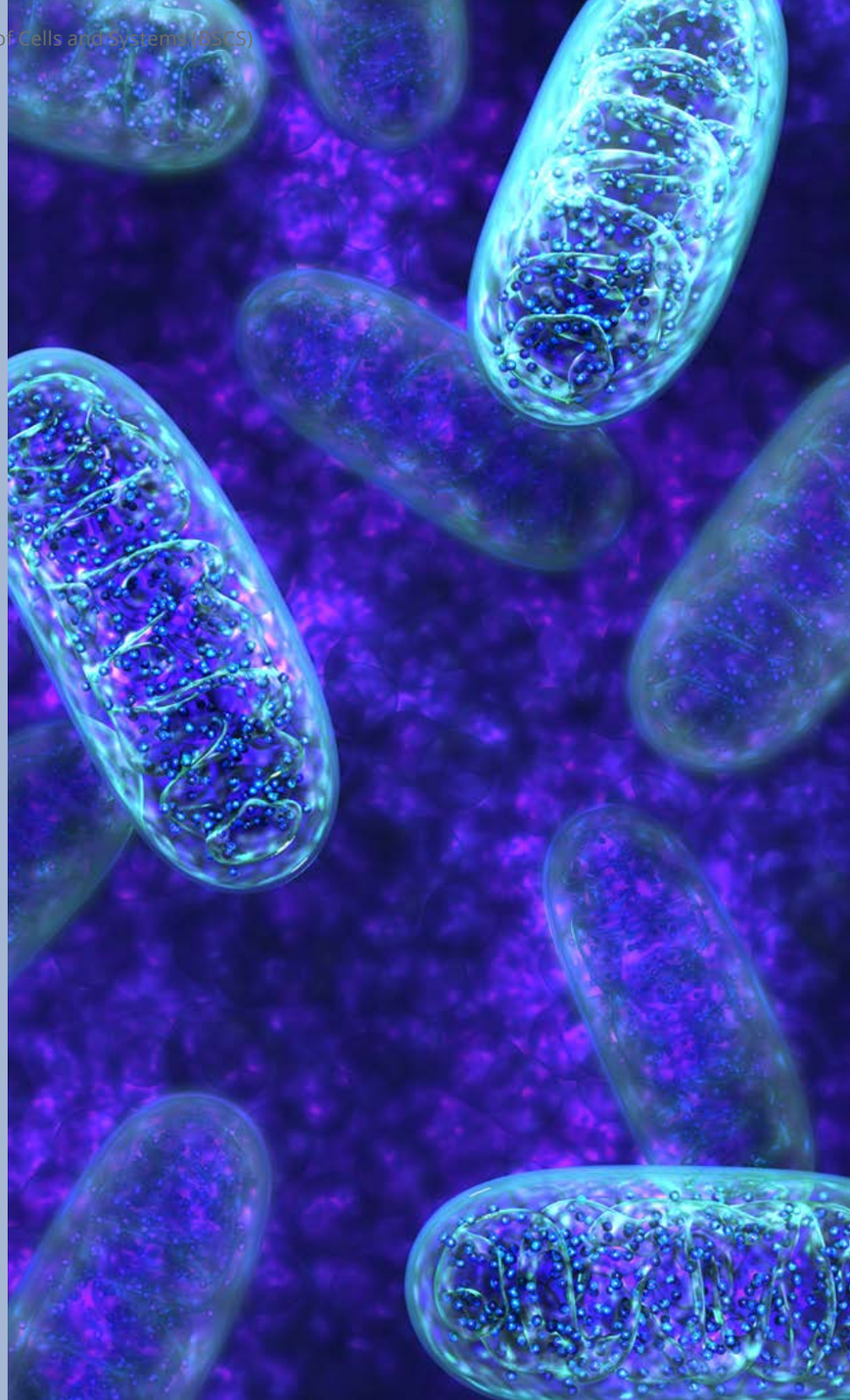
Wia Baron's research interests lie in the area of myelin biogenesis and myelin repair with emphasis on the disease multiple sclerosis (MS). Currently, her research aims at revealing and overcoming environmental restrictions in MS lesions that underlie remyelination failure.

Bart Eggen focuses on neuron-glia signaling and on the epigenetic regulation of different glial cell phenotypes and associated functionalities. This research is focused on brain development, ageing and perturbed functions of cells of the central nervous system cell in neurodegenerative conditions.

Inge Holtman focuses on the effect of natural genetic variation on susceptibility to brain diseases using state-of-the-art computational and machine learning approaches.

Susanne Kooistra focuses on how the epigenome regulates glial cell identity and function under neuroinflammatory conditions like multiple sclerosis, using single cell-omics approaches.

Inge Zijdewind investigates mechanisms – at the level of muscles, spinal cord, and cortex – responsible for increased levels of fatigue and fatigability in different groups of subjects (including multiple sclerosis). Additionally, associated effects of fatigue and fatigability on physical and cognitive performance, and quality of life are studied.



4. Awarded Research Proposals

Projects awarded to the Group Leaders in 2023:

#	Group Leader	Funding Body	Project Title	Funding Awarded
1	Aleman, A.	ZonMw	TAP-DEMENTIA: Timely, Accurate and Personalized Diagnosis of Dementia	€ 323,293.00
2	Baron, W.	Stichting MS Research	Unravelling differences in blood-brain barrier function between different clinical forms of MS	€ 70,000.00
3	Baron, W.	Stichting MS Research	Looking beyond white matter MS lesions: Exploring pathology in subpial cortical lesions and normal appearing white matter	€ 175,000.00
4	Boddeke, H.W.G.M.	ZonMw	How LRRK2 affect neuron-microglia communication in Parkinson‘s disease	€ 771,595.00
5	Eggen, B.J.L.	St. Zeldzame Zekten Fonds	NeuroMyelitis Optica Spectrum Disorder (NMOSD)	€ 175,000.00
6	Eggen, B.J.L.	ZonMw	Mechanisms of dementia – MODEM	€ 339,793.00
7	Georgiadis, J.R.	NRO	Exercise = Medicine: Interdisciplinaire learning communities voor toegepaste inspanningsfysiologie	€ 107,720.00
8	Giepmans, B.N.G.	NWO	3DNI – Data solutions for large-scale 3D multi-modal imaging with multi-beam FAST-EM	€ 309,737.00
9	Giepmans, B.N.G.	NWO	NL-Biolmaging-AM: An advanced multi-center microscopy infrastructure for the Netherlands	€ 1,194,197.00
10	Holtman, I.R.	Brain & Behavior Research Foundation	Identify The Moleculat And Cellular Mechanisma That Mediate Major Oepression Disorder, Bipolar Disorder And Schizophrenia	€ 62,520.00
11	Holtman, I.R.	St. Alzheimer Nederland	Aged brain organoids to study the role of microglia in pathogenesis of AD	€ 150,000.00
12	Holtman, I.R.	ERC	Transcriptional Regulation Assessed in Neuronal Subtypes in three major interrelated Psychiatric disorders	€ 1,499,999.00
13	Kampinga, H.H.	NWO	CureQ - Predict, Delay & Cure polyglutamine(Q) caused neurodegeneration	€ 439,761.25
14	Kooistra, S.M.	St. Alzheimer Nederland	The epigenetic landscape of cellular subtypes in AD	€ 150,000.00
15	Kooistra, S.M.	Stichting MS Research	Do transcriptional changes matter in MS? - Assigning function to targets identified through transcriptomic analysis	€ 330,000.00
16	Sibon, O.C.M.	ZonMw	Camelot: Coenzyme A & MEmbrane Lipids: an Opportunity for Treatment	€ 399,222.01
17	Sibon, O.C.M.	NWO	Role of the MiCrobiOta in Coenzyme-A homeostasiS in the guT (COAST)	€ 347,565.00

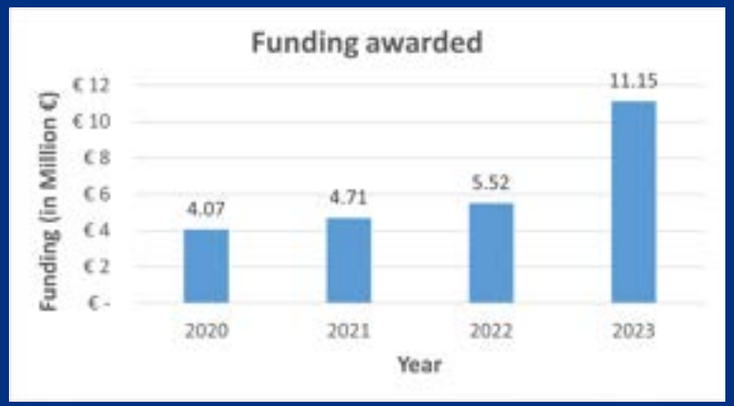
#	Group Leader	Funding Body	Project Title	Funding Awarded
18	Sommer, I.E.C.	Wellcome Trust	Language in Psychosis	€ 1,001,862.00
19	Sommer, I.E.C.	EU - HaDEA	TRUSTING: A TRUSTworthy speech-based AI monitorING system for the prediction of relapse in individuals with schizophrenia	€ 1,563,741.25
20	Tol, van M.J.	NWO-Vidi	Take it personally: A cognitive neuroscience approach to getting a grip on depression	€ 1,092,481.00
21	Zijdewind, C.A.T.	ZonMw	Post exertional malaise, a starting point to investigate and understand ME/CFS.	€ 499,129.00

Projects awarded to the PhDs/ Postdocs/ Technicians in 2023:

#	PhD/ Postdoc	Group Leader	Funding Body	Project Title	Funding Awarded
1	Palacios, E	Baron, W.	Cock J.K. de Stichting	Linking Heliobacter pylori outer membrane vesicle mediated activation of astrocytes to demyelination in multiple sclerosis	€ 4,500.00
2	Medeiros F. T.	Eggen, B.J.L.	Cock J.K. de Stichting	Developing a human organoid in vitro MS model	€ 4,500.00
3	Koster, M	Eggen, B.J.L.	Stichting MS Research	Visualising cellular heterogeneity and interactions in MS lesion progression in situ with RNAscope	€ 18,450.00
4	Kotah, J	Eggen, B.J.L.	Stichting MS Research	Alterations in microglial states in MS lesions using imaging mass cytometry	€ 20,000.00
5	Duinkerken, B.H.P	Giepmans, B.N.G.	Cock J.K. de Stichting	Expanding the toolbox for biomedical imaging at biomolecular resolution	€ 4,600.00
6	Vonk, D	Hipp, M.S.	Cock J.K. de Stichting	Differences between PRG3 and PRG5 folding and transportation	€ 4,500.00
7	Xu, M	IJzendoorn, van S.C.D.	Cock J.K. de Stichting	Role of MYO5B and related genes in the pathogenesis of rare diseases	€ 4,500.00
8	Hosseini, M	IJzendoorn, van S.C.D.	Cock J.K. de Stichting	The role of the gut microbiome in Parkinson's disease	€ 4,468.00
9	Kolbe M. M.	Kampinga, H.H.	Cock J.K. de Stichting	BSCS-MCB De Cock 2023-41 Musskopf	€ 4,500.00
10	Jager de, J.E.	Sommer, I.E.C.	Cock J.K. de Stichting	De Cock De Jager	€ 4,500.00
11	Begemann, M.J.H.	Sommer, I.E.C.	Brain & Behavior Research Foundation	To Continue Or Not To Continue? Investigating The Effect Of Antipsychotic Maintenance Therapy On Brain Volume In First Episode Psychosis Using A Randomized Design	€ 70,000.00

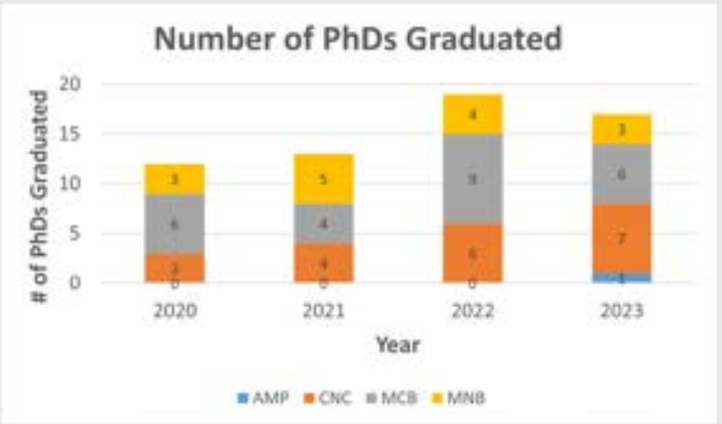
5. Facts and Figures

5.1 Funding/Grants awarded



*See the previous section for a list of awarded projects.

5.2 PhD Graduations



*See the Appendix-1 for a list of all PhD theses defended per section at the end of the report.

5.3 Scientific Publications

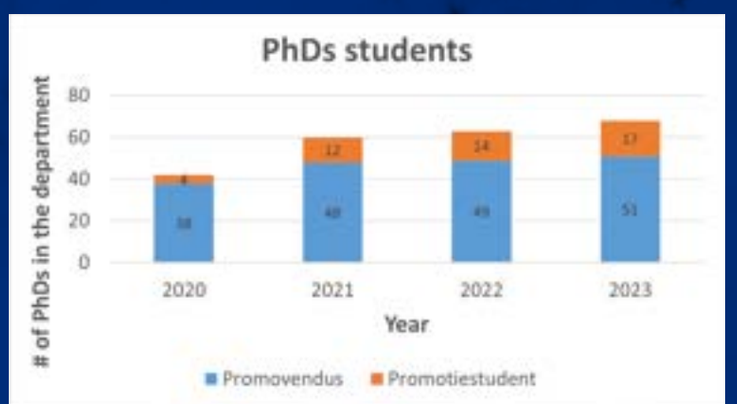
*See the Appendix-2 for a list of all publications published per section at the end of the report.

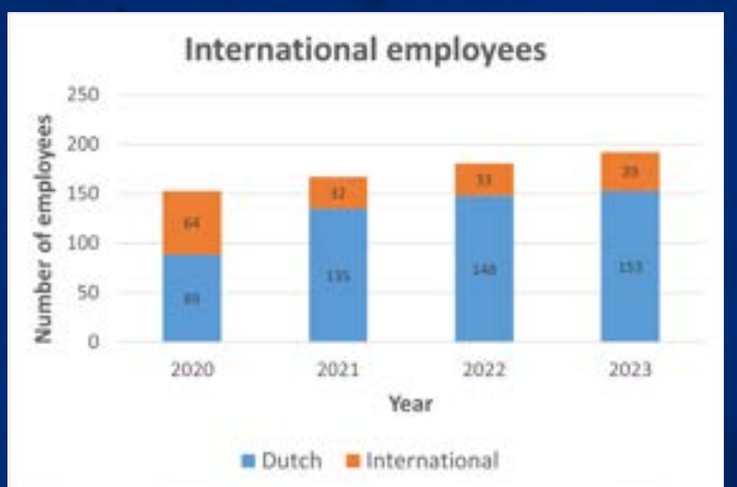
5.4 People


Employees
# of employees
250
200
150
100
50
0
91
62
84
83
90
91
92
100
2021
2021
2022
2023
Year
Men
Women


FTE
FTE
130
125
120
115
110
105
100
113.15
122.85
125.62
124.48
2020
2021
2022
2023
Year

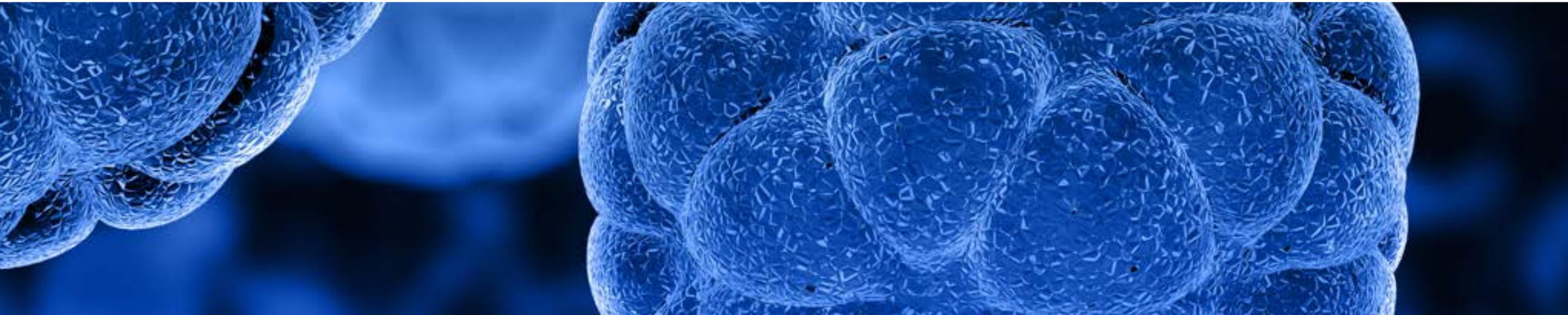

Gender
Percentage
100%
80%
60%
40%
20%
0%
59%
41%
50%
50%
50%
50%
48%
52%
2021
2021
2022
2023
Year
Men
Women


PhDs students
# of PhDs in the department
80
60
40
20
0
8
38
12
48
14
49
17
51
2020
2021
2022
2023
Year
Promovendus
Promotiestudent


International employees
Number of employees
250
200
150
100
50
0
64
89
67
135
33
148
39
153
2020
2021
2022
2023
Year
Dutch
International

Nationalities			
Brazil	2	Austria	1
Canada	1	Pakistan	1
Cyprus	1	Romania	1
Duitsland	9	Russia	4
Filipino	1	Slovakia	1
Hungary	1	Spain	2
Iran	1	Syria	1
Italy	4	Ukraine	2
Yugoslavia	1	USA	1
Iraq	1	South Africa	1
Mexico	1	Switzerland	1
Netherlands	153		

Management team BSCS	
Harrie Kampinga	Head of the Department
Janniko Georgiadis	Head of the Section Anatomy and Medical Physiology
André Aleman	Head of the Section Cognitive Neuroscience
Sven van IJzendoorn	Head of the Section Molecular Cellbiology
Bart Eggen	Head of the Section Molecular Neurobiology
Henk Heidekamp	Managing Director
Guus Achterweust	Financial Controller and Staff Advisor
Ria Ubels	Quality Assurance Manager and Staff Advisor
Mallikarjuna Gurram	Project Manager and Grant support
Wytse Hogewerf	Staff Assistent
Fokje Boomsma-van der Weg	Secretary Anatomy & Medical Physiology
Greetje Noppert	Secretary Molecular Cellbiology
Trix van der Sluis-Rozema	Secretary Molecular Neurobiology



6. Facilities

6.1 Dissection Room facility

The Dissection Room facility is a modern facility where real human anatomy can be studied extensively and in considerable detail. The facility strongly supports life-long learning, offering both basic undergraduate courses and specialistic post-graduate trainings across a great variety of teaching and training programs, locally, regionally, nationally and internationally. This irreplaceable form of learning is afforded by human body donors, who generously give their body to the University of Groningen to stimulate, support and improve biomedical education and research. The facility has a close collaboration with the Wenckebach Skills Center for the optimization of resident training and surgical approaches, for simulating skills needed in the operation room, and for research on clinically relevant anatomy.

Specific services:

- 3 different embalming methods to optimally cater to a range of education or research requests.
- partnership with Wenckebach Skills Center enables very wide range of education, training, and research activities with donated bodies.

Great expertise in organizing international specialistic surgical courses.

People involved in the facility and their roles:
Janniko R. Georgiadis – Head of the facility
Steve Oosterhoff – Manager of the facility
Peter Veldman – Prosector
Ronald Meijer - Prosector

Contact:
Department of Biomedical Sciences of Cells and Systems
University Medical Center Groningen
Antonius Deusinglaan, 1
Section Anatomy and Medical Physiology
Internal Zipcode FB42
9700 AD Groningen
The Netherlands
https://bscs.umcg.nl/en/facilities/dissection-room

6.2 Medical Physiology Lab facility

The Medical Physiology Lab is used to teach the basic concepts of physiology to 700-1000 students per year of medicine, human movement sciences, dentistry, pharmacy, biomedical sciences and the University College Groningen. Via experiential learning, these students master the concepts in respiratory physiology, cardiovascular physiology, exercise physiology and neurophysiology: the students experience the tests themselves and they perform those tests on fellow students, and learn to interpret the results. For medical students, this is also their first experience in physical examination and additional measurements, such as electrocardiography, blood pressure measurements, and lung function tests.

In 2020, we received a financial investment from the UMCG to update, upgrade, and increase the numbers of our equipment, to be able to match the practice in the clinic, to deal with larger numbers of students per practical, and to be able to offer high-end courses in physiology for medical residents and specialists. The first investments were used to update (and upgrade) one of the set-ups of exercise physiology, to renew the set-up for continuous blood pressure measurements, and to replace the stethoscopes for the cardiovascular function tests.

People involved in the facility and their roles:
Janniko R. Georgiadis – Head of the facility
Ruby Otter-Drost – Manager of the facility
Annelies van der Molen – Coordinator of the facility

Contact:
Department of Biomedical Sciences of Cells and Systems
University Medical Center Groningen
Antonius Deusinglaan, 1
Section Anatomy and Medical Physiology
Internal Zipcode FB42
9700 AD Groningen
The Netherlands
https://bscs.umcg.nl/en/facilities/medphyslab

6.3 Cognitive Neuroscience Center (CNC) facility

We provide high-quality measurements and analyses of brain structure and activity using a diversity of cutting-edge technologies. Founded in 2002, the CNC is a research facility where people from the UMCG, the RUG, and external users collaborate, combining a variety of disciplines including medicine, psychology, linguistics, biology, and artificial intelligence.

The main aim of our center is to understand the neural basis of cognitive and emotional functioning during development and ageing using different modalities including fMRI, EEG, NIRS, and neurostimulation.

We focus on different research topics:

- Diverse psychiatric disorders including depression and schizophrenia
- Cognitive Aging
- Attentional and emotional control
- Visual perception
- Food perception
- Language acquisition
- Neurofeedback
- Motor control
- Drug development

We are uniquely placed for a wide variety of (brain) studies. We collaborate with the Department of Nuclear Medicine and Radiology to support integration of PET and MR studies. Besides data acquisition, the CNC supports researchers with analyses and statistics and can provide a workplace environment with its own servers for (guest) researchers. Furthermore, the CNC offers commercial partners a complete brain research 'package' encompassing acquisition, analysis and reporting.

People involved in the facility and their roles:
Prof. André Aleman – Head of the facility

Contact:
Cognitive Neuroscience Center
Internal Zipcode FA32,
Antonius Deusinglaan 2,
9713 AW Groningen

Hedwig van Oosten at h.w.p.m.van.oosten@umcg.nl,
Telephone +31 50 361 64 44.
https://bscs.umcg.nl/en/facilities/cognitive-neuroscience-center/
https://umcgresearch.org/w/cognitive-neuroscience-center

6.4 Drosophila melanogaster facility

Drosophila melanogaster (fruit fly) is one of the most well studied animals to answer biological research questions in various fields, including ecology, evolution, behaviour, genetics, biomedical research, development and more.

The Drosophila facility at the UMCG is using a wealth of advanced genetic tools to design fly models to understand biological processes underlying age-related diseases. These models are used to investigate novel treatments for human diseases.

In collaboration with interested parties (researchers, educational organisations) we can design, and assist in generating and providing the requested Drosophila models.

We provide the following services:

1. Assist in the design of a suitable Drosophila model for research questions
2. Infrastructure for interested parties to generate the Drosophila model
3. Deliver fruit flies for small scale (genetic) teaching courses

People involved in the facility and their roles:

Prof. Ody Sibon -- Head of the facility
Ellie Eggens-Meijer --Technician: logistics Drosophila service unit
Bart Kanon -- Technician: Drosophila handling
Erika Geubel -- Technician: Drosophila handling

Contact:

Drosophila melanogaster – facility
Department of Biomedical Sciences of Cells and Systems
University Medical Center Groningen
Antonius Deusinglaan, 1
Section Molecular Cellbiology Internal Zipcode FB32
9700 AD Groningen
The Netherlands
https://umcgresearch.org/w/drosophila-melanogaster

6.5 UMCG Microscopy & Imaging Center (UMIC) facility

Microscopy is a longstanding great enabling technology to help to understand how molecules regulate, or affect, live. UMIC offers training and access to advanced microscopes and image processing aimed at cellular imaging.

UMIC staff is highly enthusiastic because it is again a fantastic time to be a microscopist! Recent developments that already routinely can be used at UMIC include:

(I) intravital microscopy to study molecules and cells in living organism using
   a. single-photon confocal laser scanning microscopy (CLSM)
   b. two-photon CLSM
   c. light sheet microscopy

(II) Robotics allow live-cell imaging plates at high throughput

Special niches at UMIC, including custom-built microscopes and expert assistance that attract international researchers include

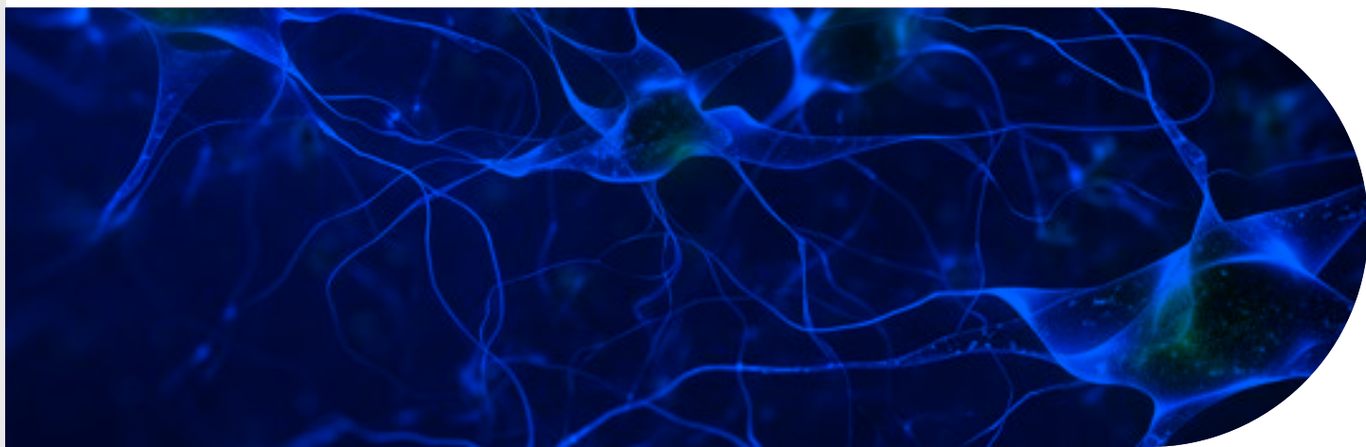
(i) correlated light and electron microscopy (CLEM);

(ii) 'nanotomy' to analyze molecules and organelles in tissues in a Google earth-like manner with nanometer range resolution

(iii) Identification using 'Color' electron microscopy

In 2021 several new techniques are available by a major upgrade of the instruments. UMIC is very dynamic and has many more approaches for cellular imaging, with several new investments planned. Do you want to apply seemingly impossible microscopic approaches in your research, feel free to contact us (www.umic.info).

Fig. 6.5a: Multimodal microscopy: Different signals are obtained from the electron microscope that allows 'nanotomy'and 'ColorEM'. Samples are sent from other regions in the Netherlands/ world to use these niche techniques in biomedical research.



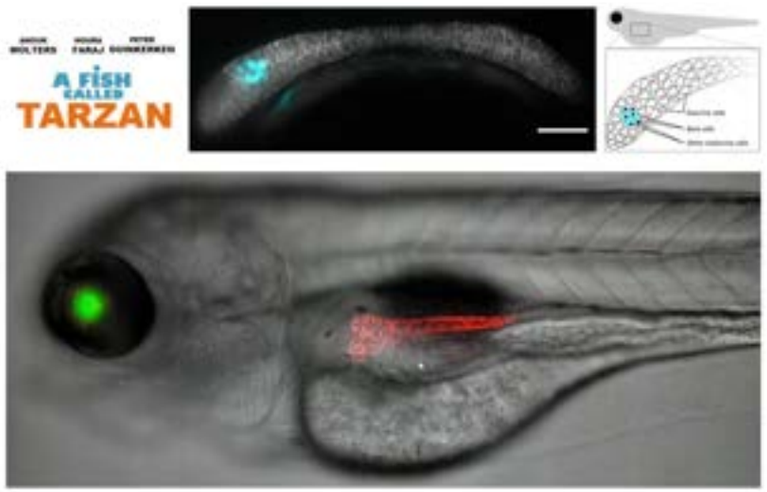


Fig 6.5b: Tarzan (top) and Jane (bottom), zebrafish larvae to study the pancreas in context of Type 1 diabetes. UMIC optogenetics and imaging of living larvae, including using multi-photon , single plane illumination microscopy and FAST-EM.

People involved in the facility and their roles:

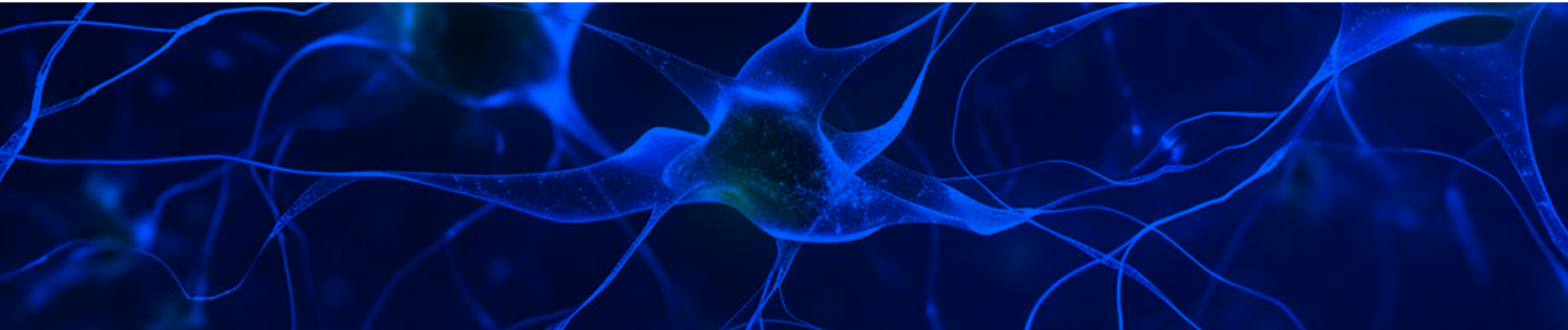
Ben Giepmans – Director
Klaas Sjollema – Managing Director Light Microscopy
Jeroen Kuipers – Managing Director Electron Microscopy

UMIC participates in the NVvM, NL-BioImaging, NEMI,
is a DTL-hotel and nPOD core facility

Contact:

UMCG Microscopy & Imaging Center (UMIC)
Antonius Deusinglaan 1 (FB32)
9700 AD Groningen
The Netherlands

EM-dbase: nanotomy.org
UMIC core: umic.info
https://umcgresearch.org/w/umic



6.6 Cesium-137 y-ray facility

The Cesium-137y-ray machine is to be used by authorized researchers to irradiate cells, Drosophila larvae, mice and rats and other samples.

People involved in the facility and their roles:

RPO (Radiation Protection Officer): Rob Coppes
RPE (Radiation Protection Expert): Rick Havinga
Contact person radiation worker (level 5): Uilke Brouwer

Contact:

https://bscs.umcg.nl/en/facilities/cesium-137%CE%B3-ray-facility/
Email: u.brouwer@umcg.nl
Department of Biomedical Sciences of Cells and Systems
University Medical Center Groningen
Antonius Deusinglaan, 1
Section Molecular Cellbiology Internal Zipcode FB32
9700 AD Groningen
The Netherlands

6.7 PARTREC facility

PARTREC is a dedicated research facility functioning in synergy with the UMCG Groningen Proton Therapy Center (GPTC). We uniquely combine technological development, preclinical studies, and patient studies with a Research and Development (R&D) programme to continuously improve proton therapy technology and treatment, while assessing the feasibility of other particles for high-precision radiotherapy.

The facility operates a large superconducting cyclotron for experimental research, mainly in the fields of radiation physics and biology. We support the further development of ion beam radiotherapy and the use of cyclotrons and accelerators.

Specific services:

- The cyclotron delivers beams of various ions ranging from protons to oxygen, with energies up to 190 MeV (for protons) and 90 MeV per amu (for ions of helium to oxygen).
- The accelerator is also used by the University of Groningen for nuclear physics research and commercial radiation-hardness testing, with the possibility of using a heavy cocktail of ions as massive as Xe, with an energy of 30 MeV per amu.

Our technical staff operates the accelerator facility and provides support for designing, building, and operating experimental apparatus.

People involved in the facility and their roles:
Alexander Gerbershagen - Team Leader for Accelerator and Radiation Physics.
Marc-Jan van Goethem - Contact liaison for beam time request/booking.

Contact:
Department of Biomedical Sciences of Cells and Systems
University Medical Center Groningen
Particle Therapy Research Center (PARTREC)
Zernikelaan 25
9747 AA Groningen
The Netherlands
https://umcgresearch.org/w/partrec

7. Education

Teaching and training is also a core activity within the BSCS department. The research staff from BSCS is involved in a wide range of educational activities spanning across multiple faculties and institutions. Below we provide a list of courses that are being coordinated by the research staff from the BSCS. This list does not include the activities where the BSCS members were not the coordinators.

Faculty/ Institute	Course	Coordinator
Medicine	G2020 Semester 1.1 (course director)	Anne-Marijke Kosta
	G2020 Semester 1.2 (course director)	Hiske van Duinen
	G2020 Semester 2.1 (course director)	Hiske van Duinen
	G2020 Premaster (course director)	Rob Bakels
	Test assessment panel (TBP, chair)	Rob Bakels
	European Medical School Oldenburg-Groningen	Janniko Georgiadis
	Psychiatry and Neuroscience (2nd year)	Branislava Ćurčić-Blake
	Commissie Profileringsonderwijs (member)	Bart Eggen
	MMIT neuroscience track & MMIT neuroscience week	Susanne Kooistra & Bart Eggen
	MMIT- Scientific integrity	Sven van IJzendoorn
	MMIT- Mechanisms of disease and innovative treatment.	Sven van IJzendoorn
	MMIT-CPE Exam committee (chair)	Bart Eggen
	Educational Committee Medicine (OCG, member)	Hiske van Duinen, Carola Haven
	Exam Committee Medicine & dentistry (ECTG, member)	Pepijn Schoonen
Dentistry	Medische lijn (coordinator)	Inge Zijdewind
Science and Engineering (FSE)	BCN research master: Human neuroanatomy	Janniko Georgiadis
	Bachelor Life Sciences & Technology / Biology: Medical Physiology	Hiske van Duinen
	BCN research master: Membrane Biology and Disease	Wia Baron
	Medical Cell Biology	Muriel Mari
	BCN research master: Functional Neuroscience	Susanne Kooistra
	Glia and Stem Cell Biology	Bart Eggen
	BCN research master: Clinical neuropsychiatry	Marie-José van Tol
	BCN research master: Mathematics for neuroscientists	Branislava Ćurčić-Blake

Faculty/ Institute	Course	Coordinator
Human Movement Science	Bachelor BW: Neuroanatomie 1	Janniko Georgiadis
	Bachelor BW: Algemene fysiologie	Ruby Otter-Drost
	Bachelor BW: Neurofysiologie	Hiske van Duinen
	Bachelor BW: Inspanningsfysiologie	Ruby Otter-Drost
University College Groningen	Anatomy & Histology	Cyril Luman
	Human Physiology	Pepijn Schoonen
	Clinical Psychology: mental health and illness	André Aleman
Hanze	Anatomie van de mens (Master Physician Assistant)	Carola Haven
Post-graduate teaching and training	Common Trunk surgery residency training program	Carola Haven
BSCS/UMIC, UMCG	Cellular Imaging Light	Ben Giepmans
GSMS	Ethics in science and Scientific Integrity	Sven van IJzendoorn
UMCG	UMCG committee for language and culture (chair)	Rob Bakels
UMCG	Body donation programme	Janniko Georgiadis

8. Scientific dissemination & Business Development

At BSCS, we encourage and support researchers to share our know-how, drive discoveries towards applications and (in doing so) collaborate with industries. We welcome collaborations to generate access to our scientific ideas and state-of-the-art facilities. Below we list out results from our recent efforts to connect science with business.

8.1 PKAN

The Sibon group discovered and developed a potential treatment for the neurodegenerative disease Pantothenate Kinase-Associated Neurodegeneration (PKAN) (Srinivasan et al., Nat. Chem Biol 2015; Jeong et al., EMBO MOL. MED 2019).

Currently, financed by the Stichting Zeldzame Ziekte Fonds, Stichting Kans voor PKAN kinderen, de Stichting Lepelaar, ZonMW and the Hersenstichting, an investigator driven clinical trial started (September 2021) for PKAN patients in close collaboration with the Expertise Centre for Movement Disorders, at the UMCG. The product under investigation was designed, developed and produced (clinical usage grade) by prof. Sibon and her collaborators. The product is proven to be effective in Drosophila and mouse models for PKAN and the aim of the clinical study is to test our developed product in the clinic.

8.2 Enatom

Enatom is a joint initiative by the Section Anatomy & Medical Physiology and the 360 degree visualization company VIEMR (https://viemr.com/zorg/) to visualize in exquisite detail human anatomical specimens for use in distance learning applications and solutions. Thanks to considerable investments over the past few years, Enatom has made substantial progress in anatomic content and image quality.

8.3 Anatomy Gym

Anatomy Gym is a game-like App for smartphone and tablet to learn anatomical facts. It was launched in 2020. Anatomy Gym has seen considerable interest from users as well as from teaching parties that want to include specific modules. Anatomy Gym is scalable to a very large and diverse audience, and progress has been made to stimulate its further development and sustainability.

8.4 Stem cell therapy

Radiotherapy of head and neck cancer is often accompanied with dysfunction of the salivary glands leading to xerostomia (dry mouth syndrome). Basic science by the Coppes' lab linked this to identification of a salivary gland cell stem compartment that is depleted by radiation. This has now developed into a stem cell therapy in which stem cells from the patient are collected before and give back after radiation for the treatment of this side effect. After pre-clinical testing and development of a protocol for safe clinical use (https://ascopubs.org/doi/full/10.1200/JCO.21.01208), a first-in-man Phase I/II trial will start this summer at the UMCG.

9. Outreach & Dissemination

Besides research and education, all scientific staff members from BSCS, including PhD students, postdocs, and group leaders, have been actively involved in the scientific outreach and dissemination activities. Below we list out the notable activities by BSCS during the year 2021.

Outreach activities by the PIs, PhDs, Postdocs, and Technicians:

Section Anatomy and Medical Physiology	
1	From the group of Janniko Georgiadis: Commemorial service for body donors and their bereaved
2	Ruby Otter-Drost (teacher) from the group of Janniko Georgiadis: NRO Comenius Senior Fellowship - Exercise = Medicine: Interdisciplinary learning communities for applied exercise physiology https://www.rug.nl/about-ug/organization/service-departments/teaching-academy-groningen/news/2023/comenius-2023-winners?lang=en
3	Hiske van Duinen (lecturer) from the group of Janniko Georgiadis: Medische Jeugd Academie over Longen (in UMCG voor lagere schoolkinderen)

Section Cognitive Neuroscience	
1	Iris Sommer: 18 January 2023/Hoorn: lecture at symposium about ongelijkheid medische onderzoeken man-vrouw. Eva = geen Adam.
2	Iris Sommer: 18 January 2023 / DNLF Talk Amsterdam. Lecture about kunstmatige intelligentie medicijn voor de zorg. https://spui25.nl/programma/kunstmatige-intelligentie-medicijn-voor-de-zorg
3	Iris Sommer: 3 februari 2023 / Tjaarda in Oranjewoud: lecture at immunologiecongres about Voeding en immuunactivatie.
4	Iris Sommer: March 2023 / Nieuwsbrief Geestelijke Gezondheid March 2023, ZonMw interview February 2023: Inhaalslag rond man-vrouwverschillen in de psychiatrie.
5	Iris Sommer: 4 March 2023: dr Kelder en Co/ NPO radio 1: Interview about toenemende wetenschappelijke kennis over de connectie tussen darmen en brein.
6	Iris Sommer: 9 March 2023. / Barcelona: IV European Meeting on Women's Mental Health- Psychosis and Gender. Keynote speaker: sex- and gender-differences in the treatment of psychosis
7	Iris Sommer: April 2023 / Horizon2020 grant for a project (chair Iris Sommer) that will use automatic speech analysis to predict psychiatric events.
8	Iris Sommer: 14 April 2023 / Haarlem: lecture at KHMW award ceremony of the annual profile paper prizes to secondary school students from Haarlem and the surrounding area.
9	Iris Sommer: 15 April 2023 / Papendal: lecture at Symposium World Parkinson Day 2023 about de invloed van voeding op de ziekte van Parkinson.
10	Iris Sommer: 22 April 2023 Giessen / Keynote speaker International Schizophrenia Symposium. Nutritional Psychiatry
11	Iris Sommer: 17 May 2023 / VU Amsterdam: lecture about vrouw-specifieke behandeling
12	Iris Sommer: 23 May 2023 / Rotterdam: lecture at WORLD TRADE CENTRE
13	Iris Sommer: 25 May 2023 / University Museum Groningen: opening exhibition: PHALLUS. Norm & Form

14 Iris Sommer: Wellcome podcast episode - Psychosis

15 Iris Sommer: Spring 2023 /Libelle gezond: interview / artikel: ons brein wil ook wat.

16 Iris Sommer: 2023 / Apotheke für mich: Lebenskunst: interview: Das weibliche Gehirn verstehen

17 Iris Sommer: 18 – 20 August Lowland 2023, shitty science

18 Iris Sommer: Video Lowlands 2023

19 Iris Sommer: 1 September 2023 – lunch with extraordinarily talented people at Noordeinde Palace / The Hague with King Willem-Alexander

20 Iris Sommer: Podcast: Baan door het Brein

21 Iris Sommer: Interview Meer Gezonde Jaren Magazine - ‚brain food' en ‚ongelijke medische behandeling van vrouwen en mannen'

22 Iris Sommer: Interview Psychologie Magazine about book De bacterie en het brein

23 Iris Sommer: NTR Focus podcast – menopause

24 Iris Sommer: NPO/KRONCRV - TV consumer program about nutrition

25 Iris Sommer: Hersenstichting - video Hello Fresh

26 Iris Sommer: Hersenstichting - video voeding en hersengezondheid webpagina over voeding en de hersenen

27 Iris Sommer: 19 October 2023 - Congres Eva is geen Adam / UMCG

28 Iris Sommer: 21 October 2023 – Trouw: Interview book: De bacterie en het brein

29 Iris Sommer: 25 October 2023 – lecture at Mullerfonds

30 Iris Sommer: 26 October 2023 – Villa VdB, NPO Radio 1: Luister naar Darmen: Het tweede brein van de mens. https://www.nporadio1.nl/fragmenten/villa-vdb/a4c9dce6-d8f9-45b6-afec-9f844c353759/2023-10-26-darmen-het-tweede-brein-van-de-mens

31 Iris Sommer: 26 October 2023 – TV interview new book: Tijd voor MAX: Het schaatsseizoen gaat beginnen https://www.npostart.nl/POW_05546136

32 Iris Sommer: 30 October 2023 – NRC interview https://www.nrc.nl/nieuws/2023/10/30/met-online-memes-mentaal-welzijn-bespreekbaar-maken-a4179080

33 Andre Aleman: -10 maart, Akademy lezing "Het seniorenbrein", 's ochtends in Leeuwarden, 's middags in Joure. Organisatie: Fryske Academy.

34 Andre Aleman: -18 augustus: Theatercollege "Verward door je brein", Noorderzon, performing arts festival (i.s.m. Studium Generale RuG), Noorderplantsoen Groningen.

35 Andre Aleman: - 15 nov: interview over cognitive aging, The Daily Telegraph (UK Newspaper), https://www.telegraph.co.uk/christmas/2023/11/15/lockdown-effect-age-brains-cognitive-function-covid/

36 Andre Aleman: - Ons onderzoek naar neurale correlaten van waardering van planten (samen met Wageningen University en Beekenkamp BV) werd besproken in een artikel in Focus: vakblad voor de bloemisterij, 2023; 26: 40-41.

37 Marie-José van Tol: 20-Nov-23 Perestrojka 20 nov 2023; radio-interview van een uur: https://www.glasnostici.nl/2023/11/21/perestrojka-94-marie-jose-van-tol/

38 Marie-José van Tol: 23-Oct-23 UK interview: use of twitter 23 oktober 2023: https://ukrant.nl/magazine/twitter-loopt-leeg-wat-doen-de-rug-wetenschappers/

39 Marie-José van Tol: 09-Oct-23 Algemeen Dagblad - interview 9 oktober 2023 https://www.ad.nl/kaag-en-braassem/ondanks-tegenslagen-een-rijk-leven-hoe-doe-je-dat-die-vraag-houdt-hoogleraar-marie-jose-van-tol-bezig~a3a452cb/?

40 Marie-José van Tol: 22-Sep-23 Oratie recordings (22 september 2023): https://www.youtube.com/watch?v=pqTmx8PR9X8&feature=youtu.be

41 Marie-José van Tol: 01-Sep-23 Oratie minute UMCG / oratiovideo: https://www.linkedin.com/posts/umcg-research_stemming-gestut-marie-jos%C3%A9-van-tol-oratio-activity-7109589404309942272-qE4U?

42 Marie-José van Tol: 29-Sep-23 European Research Night (29 september 2023) https://zpannendzernike.nl/activiteit/care-meets-music-interprofessional-collaboration-of-nurses-and-musicians-in-hospital-care/

43 Marie-José van Tol: 01-Nov-23 GUF symposium on academic freedom (talk on positive academic freedom): https://www.rug.nl/about-ug/latest-news/news/archief2023/nieuwsberichten/1010-guf-lustrum-symposium

44 Marie-José van Tol: 08-Oct-23 Bijdrage AD over grensoverschrijdend gedrag in de NL academie: https://www.ad.nl/binnenland/machtspiramide-werkt-grensoverschrijdend-gedrag-universiteiten-in-de-hand-is-er-een-oplossing~ac4dd2a1/

45 Marie-José van Tol: 01-Oct-23 TjongeJonge Podcast serie - co-host https://open.spotify.com/show/5Fh12KJO7FXJbUaEUs1Knf

46 Marie-José van Tol: 08-Oct-23 Grensoverschrijdend gedrag / Iedereen Professor AD, bijdrage MJ van Tol; 8 oktober 2023: https://www.ad.nl/binnenland/machtspiramide-werkt-grensoverschrijdend-gedrag-universiteiten-in-de-hand-is-er-een-oplossing~ac4dd2a1/

47 Marie-José van Tol: 04-Sep-24 Alternatieve Opening Academisch Jaar 2023-2024 - organisatie en praatje over Iedereen Professor: https://www.aob.nl/actueel/artikelen/kom-4-september-naar-de-alternatieve-opening-van-het-academisch-jaar/

48 Marie-José van Tol: 01-Sep-23 Organisatie Opening Academisch Jaar RUG 2023 - 2024: https://www.rug.nl/about-ug/latest-news/events/aca-cer/opening-academic-year/

49 Marie-José van Tol: 30-Aug-23 Groene Amsterdammer - commercialisering in het onderwijs, bijdrage nav Denkruimte rapport: https://www.groene.nl/artikel/slim-verdienen?

50 Marie-José van Tol: 01-Aug-23 Over de Kop podcast serie - redactie https://open.spotify.com/show/03X8BkBasUOqzP44UzkOgS

51 Marie-José van Tol: 20-Jun-23 Radio 1, Nieuws & Co, nav Rapport Denkruimte: https://www.nporadio1.nl/fragmenten/nieuws-en-co/029381f7-7b62-4f0f-b0df-16428c879f7c/2023-06-20-wat-zijn-de-gevolgen-voor-de-wetenschap-van-wetenschapsfinanciering-door-externe-partijenv

52 Marie-José van Tol: 19-Jun-23 LNVH symposium - talk on Iedereen Professor / The ideal academy: https://www.lnvh.nl/a-3862/lnvh-spring-symposium-the-ideal-academy

53 Marie-José van Tol: 24-Apr-23 New Scientist / Parool (24 april 2023): https://www.newscientist.nl/blogs/met-mri-speuren-naar-sporen-van-psychische-stoornissen-en-de-werking-van-therapie/

54 Marie-José van Tol: 23-Mar-23 Slimmer academisch jaar - kick off: 23 maart 2023: https://www.utoday.nl/news/72708/opluchting-over-komst-slimmer-collegejaar?

55 Marie-José van Tol: 23-Feb-23 23 feb 2023: Studium Generale Kenniscafé - Ongelukkig: https://sggroningen.nl/evenement/ongelukkig

56 Marie-José van Tol: 10-Feb-23 RTL 4 - Koffietijd: over vrouwen in de wetenschap https://www.koffietijd.nl/videos/57342/fragmenten/vrouwen-in-de-wetenschap

57 Marie-José van Tol: 23-Jan-23 NOS / Nieuws & Co nav rapport at risk scholars: https://nos.nl/artikel/2460956-opvang-gevluchte-wetenschappers-gaat-moeizaam-aan-nederlandse-universiteiten

58 Marie-José van Tol: 23-Jan-23 RTV- Noord Eva Zoekt Uit: waarom moet je huilen als je verdrietig bent: https://www.rtvnoord.nl/tv/aflevering/eva-zoekt-uit/985817

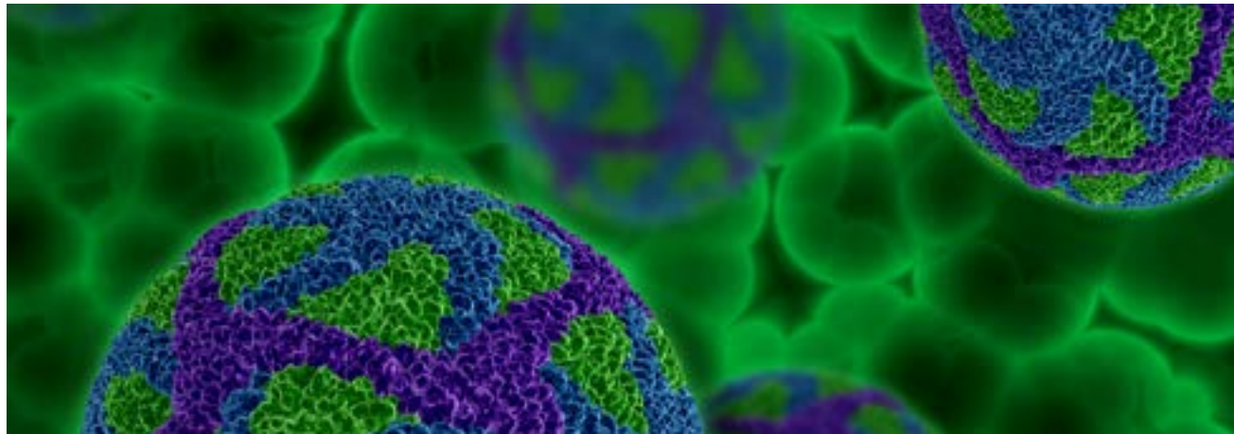
Section Molecular Cellbiology

1	Mario Mauthe from the group of Reggiori FM/Kampinga HH: NBIA Stichting Ijzersterk patient/contact day - Participated in the NBIA Stichting Ijzersterk patient/contact day, Amsterdam, Netherlands https://stichtingijzersterk.nl/nbiacontact-informatiemiddag/
2	Mario Mauthe from the group of Reggiori FM/Kampinga HH: NBIA patient conference - Participated in the NBIA patient conference in Polan, Warsaw https://stichtingijzersterk.nl/actueel-nieuws/
3	Mario Mauthe from the group of Reggiori FM/Kampinga HH: grat Eur Joint Program Rare Diseases - Received a grant from the European Joint Program on Rare Diseases (EJP-RD) Networking Support Scheme (eur 30000) https://www.ejprarediseases.org/our-actions-and-services/funding-opportunities/calls/networking-support/
4	Mario Mauthe from the group of Reggiori FM/Kampinga HH: First Int BPAN workshop - Organized the first international BPAN workshop helt in Warsaw, Poland.
5	Ody Sibon from the group of Ody Sibon: Podcast UMCG Research talk - Met Larissa van der Wall, Laura Damiano, Hans Hektor en Ody Sibon. The UMCG Research Talk is a podcast where we talk about research news and important themes in the research landscape. In the March 2023 episode we talk about bringing research from bench to bedside.
6	Ody Sibon from the group of Ody Sibon: NBIA informatie- en contactdag - Speaker NBIA/IJzersterk patient and family day, October 2023, Amsterdam https://stichtingijzersterk.nl/nbiacontact-informatiemiddag/
7	Ody Sibon from the group of Ody Sibon: Frits Zernike 790 year - Open dag celebration Frits Zernike 70 year. November 2023. At 70 locations in Groningen, the public is invited to visit and look through microscopes. Ben Giepmans was the main organizer for the UMIC and I organized the possibility for the public to observe living fluitflies with bright red fluorescent eyes. https://www.rug.nl/fse/meet-the-faculty/70zernike/publieksdag-microscopie
8	Ben Giepmans from the group of Ben Giepmans: Frits Zernike 790 year - Open dag celebration Frits Zernike 70 year. November 2023. At 70 locations in Groningen, the public is invited to visit and look through microscopes. Ben Giepmans was the main organizer for the UMIC and I organized the possibility for the public to observe living fluitflies with bright red fluorescent eyes. https://www.rug.nl/fse/meet-the-faculty/70zernike/publieksdag-microscopie
9	Luc Sondorp from the group of Rob Coppes: 21- 2023 Kolff Paper of the year - Societal Impact Award 2022 - Luc Sondorp (Rob Coppes group) and co authors recieved 2023 Kolff Paper of the year - Societal Impact Award 2022 – for: Noltes ME, Sondorp LHJ, Kracht L, Antunes IF, Wardenaar R, Kelder W, Kemper A, Szymanski W, Zandee WT, Jansen L, Brouwers AH, Coppes RP* and Kruijff S*. Patient-derived parathyroid organoids as a tracer and drug-screening application model. Stem Cell Reports 2022, 17, 2518–2530.
10	Abel Soto Gamez from the group of Rob Coppes: Presentation - Presentation at Cellular Senescence Network – April 13, 2023. Groningen
11	Abel Soto Gamez from the group of Rob Coppes: Presentation - Presentation at Dutch Society for Research on Aging (DUSRA) - June 15-16, 2023. Groningen
12	Abel Soto Gamez from the group of Rob Coppes: Poster presentation - Poster presentation at - Salivary Glands and Exocrine Biology, Gordon Research Conference (GRC) - Jan 28-Feb 3, 2023
13	Abel Soto Gamez from the group of Rob Coppes: Poster presentation - Poster presentation at - International Cell Senescence Association (yICSA) - Cambridge Symposium March 30, 2023
14	Abel Soto Gamez from the group of Rob Coppes: Poster presentation - Poster presentation at - International Wolfsberg Meeting on Molecular Radiation Biology/Oncology - June 17-19, 2023. Oslo, Norway
15	Abel Soto Gamez from the group of Rob Coppes: Poster presentation - Poster presentation at -International Congress for Radiation Research (ICRR) - August 27-30, 2023. Montréal, Canada.

16	Davide Cinat from the group of Rob Coppes: Presentation - Presentation at GRS and GRC meetings: Salivary glands and exocrine biology, Ventura, California (US).
17	Davide Cinat from the group of Rob Coppes: Presentation - Presentation at NVRB meeting, Utrecht (NL). Accepted for oral presentation. November 2023
18	Danielle Voshart from the group of Lara Barazzuol: Presentation / Poster presentation. Travel grant awart. Invite Co -chair - Presentation at 16th International Wolfsberg meeting, Oslo (NO). Poster presentation awarded with travel grant and invited co-chair. June 2023
19	Danielle Voshart from the group of Lara Barazzuol: Presentation / poster presentation. - Presentation at International Congress for Radiation Research (ICRR) 2023, Montrèal, Quebec (CA). Poster presentation. August 2023
20	Mark Hipp from the group of Mark Hipp: Charity4Brains - Q&A at Charity Event about Ataxia
21	Ben Giepmans from the group of Ben Giepmans: nPOD innovation award for Islet nanotomy - The network for pancreatic organ donors with diabetes (nPOD) innovation award for 'Islet nanotomy' was handed to Ben Giepmans at the 15th nPOD meeting . An open access EM data repository of nPOD biobanked tissue was created, analysed and published. This is possibly the largest dbase of its kind and is still expanding. Islet nanotomy is shared open access in a FAIR way (link), being mined by several other scientists. https://npod.org/grants-to-npod-investigators/
22	Harrie Kampinga from the group of Harrie Kampinga: Organisation JDP workshop in Gdansk - Meeting chair/organiser, speaker, March 2023
23	Harrie Kampinga from the group of Harrie Kampinga: EMBO meeting chaperone, Croatia - Invited speaker, May 2023
24	Harrie Kampinga from the group of Harrie Kampinga: GRC meeting, Italy - Meeting co-chair/organiser, July 2023
25	Harrie Kampinga from the group of Harrie Kampinga: Key note lecture - keynote speaker 1st dutch protein aggregation meeting 30-11-2023

Section Molecular Neurobiology

1	Inge Holtman from the group of Inge Holtman: Podcast UMCG - Podcast participation: https://umcgresearch.org/w/the-netherlands-neurogenomics-database-project-a-holistic-research-aproach.
2	Inge Holtman from the group of Inge Holtman: Interview research celebrities - Interview „Researcher celebrities" https://www.youtube.com/watch?v=CQnXjTzTZLg&t=141s.
3	Inge Holtman from the group of Inge Holtman: Lecture - Noorderzon .
4	Inge Zijdewind from the group of Inge Zijdewind: UMCG Open Day - UMCG Open Day participation.
5	Nikki Dreijer from the group of Inge Zijdewind: UMCG Open Day - UMCG Open Day participation.
6	Leda Maffei from the group of Inge Zijdewind: UMCG Open Day - UMCG Open Day participation.
7	Nikki Dreijer from the group of Inge Zijdewind: interview TENS – MS regional news - Interview In the regional newspaper .
8	Inge Zijdewind from the group of Inge Zijdewind: TENS: Topic MS/Medisch Contact - interview in Medical Contact.
9	Nieske Brouwer from the group of Bart Eggen: Podcast - Podcast serie on Spotify ; researchers, PhD students (section MNB) and MS patients talking about MS.

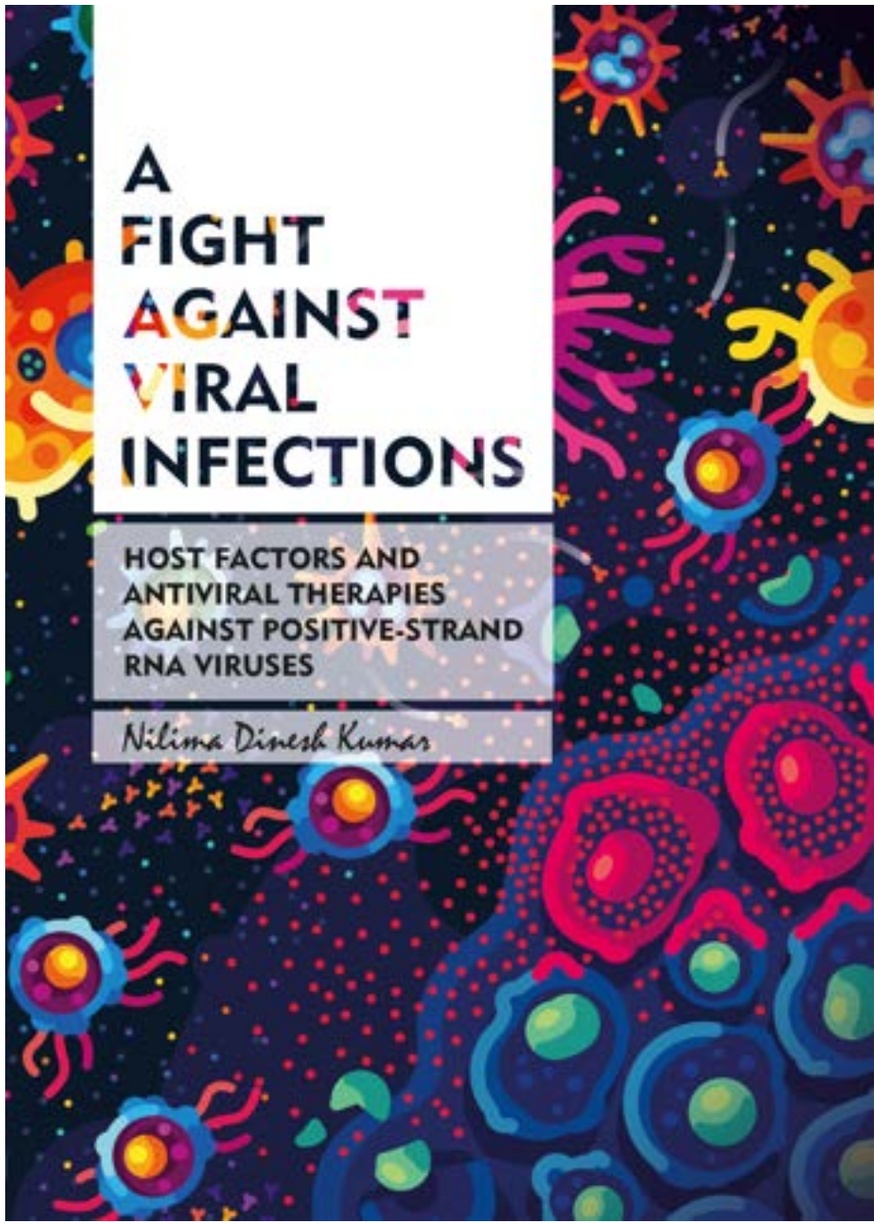


10. Appendix 1: PhD graduations

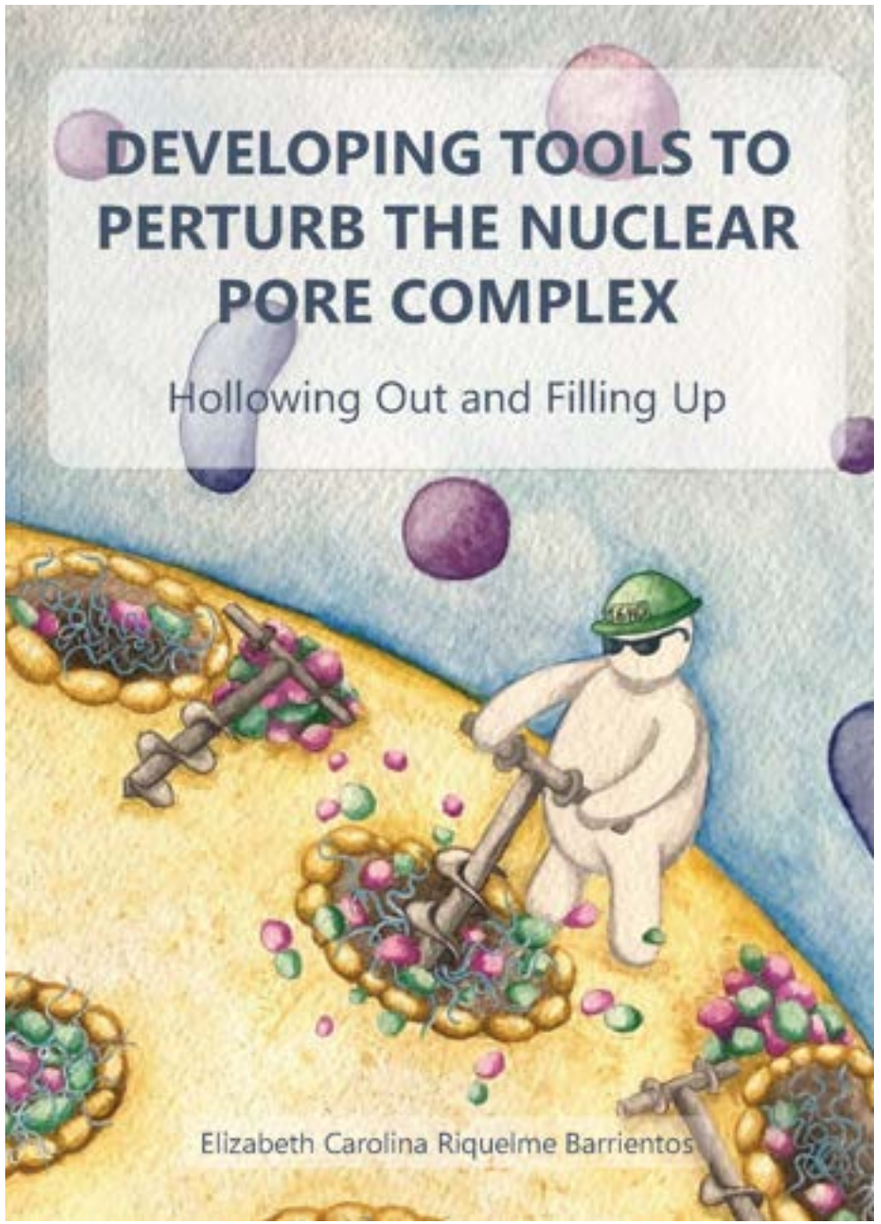
More details about the PhD graduations can be found on the university research portal.

#	Section Anatomy and Medical Physiology	
1	PhD Student:	Debbie Jaarsma
	Promotor(s):	Janniko Georgiadis
	Co-promoter(s):	-
	Thesis title:	Why so serious? State of the art and future directions for game-based learning in health professions education
	URL:	https://research.rug.nl/en/publications/why-so-serious-game-based-learning-in-health-profession-education

#	Section Cognitive Neuroscience	
1	PhD Student:	Janna de Boer
	Promotor(s):	Iris Sommer
	Co-promoter(s):	Frank Wijnen
	Thesis title:	Voices: a clinical computational psycholinguistic approach to language and hallucinations in schizophrenia spectrum disorders
	URL:	https://research.rug.nl/nl/publications/voices-a-clinical-computational-psycholinguistic-approach-to-lang
2	PhD Student:	Cyprien Guerrin
	Promotor(s):	Iris Sommer, Erik de Vries
	Co-promoter(s):	Doorduin, Janine
	Thesis title:	The dual hit hypothesis of schizophrenia
	URL:	https://www.rug.nl/about-ug/latest-news/events/promoties/?hfId=123791

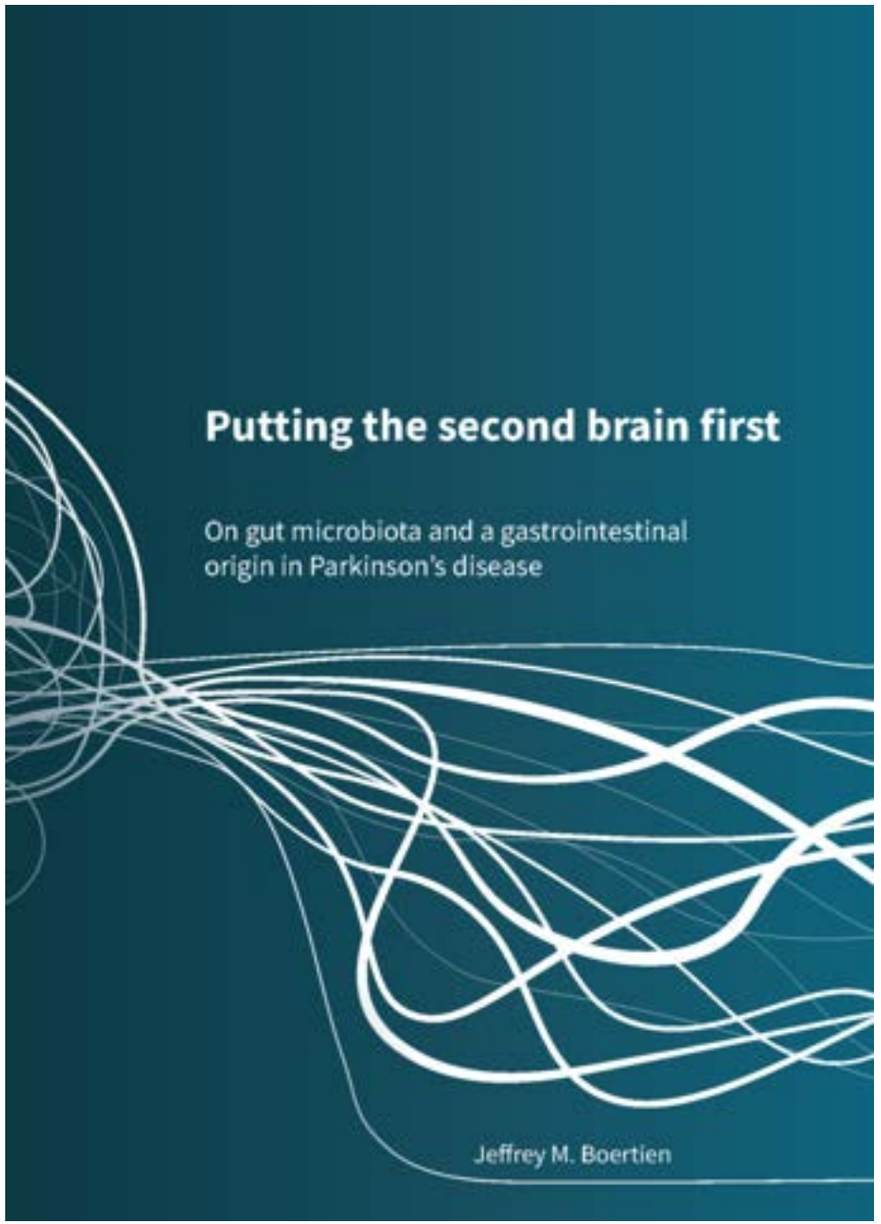


3	PhD Student:	Theresa Marschall
	Promotor(s):	Iris Sommer, Brani Curcic-Blake
	Co-promoter(s):	Schuite-Koops, Sanne; Brederoo, Sanne,
	Thesis title:	Off the beaten path: hallucinations beyond psychosis
	URL:	https://research.rug.nl/en/publications/off-the-beaten-path-hallucinations-beyond-psychosis
4	PhD Student:	Sofia Puvogel
	Promotor(s):	Iris Sommer, Bart Eggen
	Co-promoter(s):	Palma Alvarado, V.A.
	Thesis title:	Neurodevelopment, Brain Vasculature and schizophrenia
	URL:	https://research.rug.nl/nl/publications/neurodevelopment-brain-vasculature-and-schizophrenia
5	PhD Student:	Anne-Sophie Enthoven
	Promotor(s):	Iris Sommer, Erik de Vries
	Co-promoter(s):	Doorduin, Janine
	Thesis title:	Immune dysfunction and childhood trauma in schizophrenia spectrum disorders
	URL:	https://research.rug.nl/en/publications/immune-dysfunction-and-childhood-trauma-in-schizophrenia-spectrum
6	PhD Student:	Saskia Nijmeijer
	Promotor(s):	Marie-José van Tol
	Co-promoter(s):	Merel Keijzer (Letteren)
	Thesis title:	Flexible aging: A multidisciplinary approach to learning to preserve
	URL:	https://research.rug.nl/en/publications/flexible-aging-a-multidisciplinary-approach-to-learning-to-preser
7	PhD Student:	Juan Francisco Flores-Vazquez
	Promotor(s):	Aleman, Andre; Enriquez Geppert, Stefanie
	Co-promoter(s):	Sosa- Ortiz, Ana Luisa,
	Thesis title:	Disturbances of behavioural control and associative memory as early markers of Alzheimer's disease: on impulsivity, self-awareness, faces and names
	URL:	https://research.rug.nl/en/publications/disturbances-of-behavioural-control-and-associative-memory-as-ear

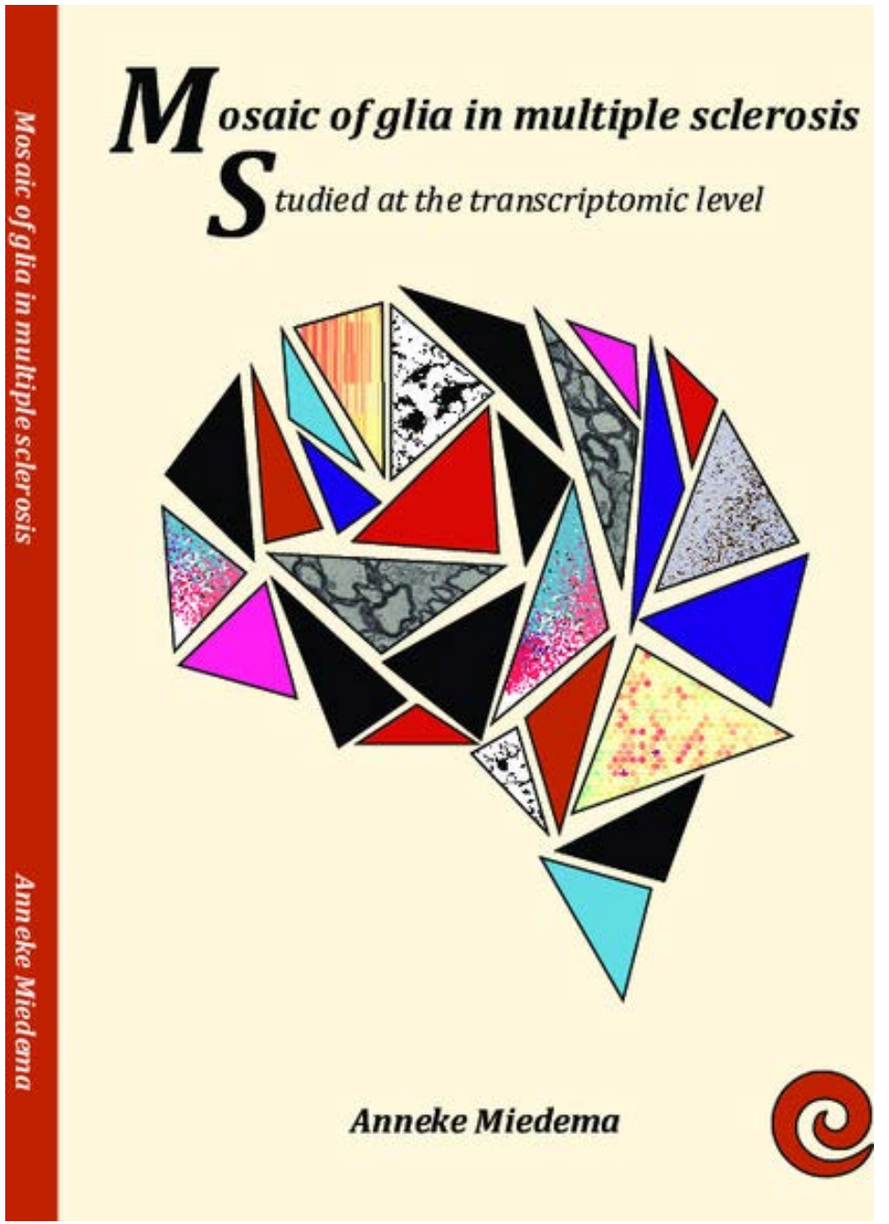


Section Molecular Cellbiology

1	PhD Student:	Li, Q.
	Promotor(s):	IJzendoorn van, S.C.D.; Horvatovich, P.; Guryev, V.
	Co-promoter(s):	-
	Thesis title:	MYO5B in health and disease.
	URL:	https://research.rug.nl/en/publications/myo5b-in-health-and-disease
2	PhD Student:	Schaik van, P.
	Promotor(s):	Baron, W.; Zuhorn, I.S.; IJzendoorn van, S.C.D.
	Co-promoter(s):	-
	Thesis title:	Breaking Barriers: delivery of a novel therapeutic drug to promote remyelination in multiple sclerosis
	URL:	https://research.rug.nl/en/publications/breaking-barriers-delivery-of-a-novel-therapeutic-drug-to-promote
3	PhD Student:	Boertien, J.M.
	Promotor(s):	Laar van, T; IJzendoorn van, S.C.D.
	Co-promoter(s):	Scheperjans, Filip, Co-supervisor, External person; Auvinen, Petri, Co-supervisor, External person
	Thesis title:	Boertien, J.M. (2023) Putting the second brain first: on gut microbiota and a gastrointestinal origin in Parkinson's disease
	URL:	https://research.rug.nl/en/publications/putting-the-second-brain-first-on-gut-microbiota-and-a-gastrointe
4	PhD Student:	Sun, Y.
	Promotor(s):	IJzendoorn van, S.C.D.; Giepmans, B.N.G.
	Co-promoter(s):	-
	Thesis title:	Sun, Y. (2023) Genotypes and phenotypes in rare congenital diarrheal diseases: focus on microvillus inclusion disease and MEDNIK syndrome
	URL:	https://research.rug.nl/en/publications/genotypes-and-phenotypes-in-rare-congenital-diarrheal-diseases-fo



5	PhD Student:	Dinesh Kumar, N.
	Promotor(s):	Reggiori, F.
	Co-promoter(s):	Smit, J.
	Thesis title:	Dinesh Kumar, Nl. (2023) A FIGHT AGAINST VIRAL INFECTIONS: host factors and antiviral therapies against positive-strand RNA viruses.
	URL:	https://research.rug.nl/en/publications/a-fight-against-viral-infections-host-factors-and-antiviral-thera
6	PhD Student:	Barrientos, Riquelme
	Promotor(s):	Veenhof, L.; Sibon, O.C.M.
	Co-promoter(s):	-
	Thesis title:	Barrientos, E.C.R. (2023) Developing tools to perturb the nuclear pore complex. Hollowing out and filling up.
	URL:	https://research.rug.nl/en/publications/developing-tools-to-perturb-the-nuclear-pore-complex-hollowing-ou
	Section Molecular Neurobiology	
1	PhD Student:	Anneke Miedema
	Promotor(s):	Eggen/Boddeke
	Co-promoter(s):	S.M. Kooistra
	Thesis title:	Mosaic of Glia in MS
	URL:	https://research.rug.nl/en/publications/mosaic-of-glia-in-multiple-sclerosis-studied-at-the-transcriptomi
2	PhD Student:	Pauline van Schaik
	Promotor(s):	Baron/Zuhorn/v.Ijzendoorn
	Co-promoter(s):	-
	Thesis title:	Breaking Barriers
	URL:	https://research.rug.nl/en/publications/breaking-barriers-delivery-of-a-novel-therapeutic-drug-to-promote
3	PhD Student:	Takuya Oshima
	Promotor(s):	Eggen/Boddeke
	Co-promoter(s):	-
	Thesis title:	Microglia shapes and states
	URL:	https://research.rug.nl/en/publications/microglia-shapes-and-states-exploring-microglias-path-from-homeos



11. Appendix 2: Publications

More details about these publications can be found on the university research portal.

Section Anatomy and Medical Physiology

1. Decreased Muscle Strength in Children With Repaired Tetralogy of Fallot: Relation With Exercise Capacity. Eshuis G, van Duinen H, Lelieveld OTHM, Hegeman AK, Nijenhuis H, Willems TP, Hepping AM, Maurits N, du Marchie Sarvaas GJ, Berger RMF. J Am Heart Assoc. 2023 Jun 6;12(11):e027937. doi: 10.1161/JAHA.122.027937.
2. Capturing the Complex Relationship Between Internal and External Training Load: A Data-Driven Approach. van der Zwaard S, Otter TA, Kempe M, Knobbe A, Stoter IK. International Journal of Sports Physiology and Performance 18, no. 6 2023): 634-642. doi: 10.1123/ijspp.2022-0493
3. The sexual response. Georgiadis JR. In: Reference Module in Neuroscience and Biobehavioral Psychology, Encyclopedia of the Human Brain. 2023. Elsevier doi: 10.1016/B978-0-12-820480-1.00024-3

Section Cognitive Neuroscience

1. A century of research on neuromodulation interventions: A scientometric analysis of trends and knowledge maps
   Sabé, M., Sulstarova, A., Chen, C., Hyde, J., Poulet, E., Aleman, A., Downar, J., Brandt, V., Mallet, L., Sentissi, O., Nitsche, M. A., Bikson, M., Brunoni, A. R., Cortese, S. & Solmi, M., Sept-2023, In: Neuroscience and Biobehavioral Reviews. 152, 12 p., 105300.
2. Are Brain Responses to Emotion a Reliable Endophenotype of Schizophrenia? An Image-Based Functional Magnetic Resonance Imaging Meta-analysis
   Fiorito, A. M., Aleman, A., Blasi, G., Bourque, J., Cao, H., Chan, R. C. K., Chowdury, A., Conrod, P., Diwadkar, V. A., Goghari, V. M., Guinjoan, S., Gur, R. E., Gur, R. C., Kwon, J. S., Lieslehto, J., Lukow, P. B., Meyer-Lindenberg, A., Modinos, G., Quarto, T., Spilka, M. J., & 8 others, 15-Jan-2023, In: Biological Psychiatry. 93, 2, p. 167-177 11 p.
3. Dissociated deficits of anticipated and experienced regret in at-risk suicidal individuals
   Ai, H., Duan, L., Huang, L., Luo, Y., Aleman, A. & Xu, P., 9-Mar-2023, In: Frontiers in Psychiatry. 14, 11 p., 1121194.
4. Neurocomputational mechanisms underlying fear-biased adaptation learning in changing environments
   Wang, Z., Nan, T., Goerlich, K. S., Li, Y., Aleman, A., Luo, Y. & Xu, P., May-2023, In: PLOS BIOLOGY. 21, 5, 26 p., e3001724.
5. Paracingulate Sulcus Length and Cortical Thickness in Schizophrenia Patients With and Without a Lifetime History of Auditory Hallucinations
   Ćurčić-Blake, B., de Vries, A., Renken, R. J., Marsman, J. B. C., Garrison, J., Hugdahl, K. & Aleman, A., 25-Feb-2023, In: Schizophrenia Bulletin. 49, Supplement_1, p. S48-S57 10 p.
6. Role of the amygdala in disrupted integration and effective connectivity of cortico-subcortical networks in apathy
   Zeng, N., Aleman, A., Liao, C., Fang, H., Xu, P. & Luo, Y., Mar-2023, In: Cerebral Cortex. 33, 6, p. 3171–3180 10 p.
7. Supported Education and Supported Employment for Individuals at Clinical-High Risk of Psychosis: A Pilot Study
   Malda, A., Kuis, D. J., Nieboer, R., van der Pol, B., Aleman, A., Korevaar, L., Sportel, B. E., Hofstra, J., Pijnenborg, G. H. M. & Boonstra, N., Sept-2023, In: Journal of Psychosocial Rehabilitation and Mental Health. 10, 3, p. 331-343 13 p.

8 The dynamics of social activation and suspiciousness in individuals at ultra-high risk for psychosis
Steenhuis, L. A., Harms, T., Nauta, M. H., Bartels-Velthuis, A. A., Albers, C. J., Aleman, A., Vos, M., Pijnenborg, G. H. M., van den Berg, D., Palstra, E. C., Wigman, J. T. W. & Booij, S. H., Dec-2023, In: Schizophrenia Research. 262, p. 67-75 9 p.

9 The temporal dynamics of attention: Thinking about oneself comes at a cost in sub-clinical depression but not in healthy participants
Wang-Li, J., Hoekstra, C., Enriquez Geppert, S., Luo, Y., Aleman, A. & Martens, S., Aug-2023, In: Current Psychology. 42, p. 19561–19572 12 p.

10 Variability and magnitude of brain glutamate levels in schizophrenia: a meta and mega-analysis the 1H-MRS in Schizophrenia Investigators, Merritt, K., McCutcheon, R. A., Aleman, A., Ashley, S., Beck, K., Block, W., Bloemen, O. J. N., Borgan, F., Boules, C., Bustillo, J. R., Capizzano, A. A., Coughlin, J. M., David, A., de la Fuente-Sandoval, C., Demjaha, A., Dempster, K., Do, K. Q., Du, F., Falkai, P., & 5 others, May-2023, In: Molecular Psychiatry. 28, p. 2039–2048 10 p.

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23 Luykx JJ, Gonzalez-Diaz JM, Guu TW, van der Horst MZ, van Dellen E, Boks MP, Guloksuz S, DeLisi LE, Sommer IE, Cummins R, Shiers D, Lee J, Every-Palmer S, Mhalla A, Chadly Z, Chan SKW, Cotes RO, Takahashi S, Benros ME, Wagner E, Correll CU, Hasan A, Siskind D, Endres D, MacCabe J, Tiihonen J. An international research agenda for clozapine-resistant schizophrenia. Lancet Psychiatry. 2023 Aug;10(8):644-652. doi: 10.1016/S2215-0366(23)00109-8. Epub 2023 Jun 14. PMID: 37329895.

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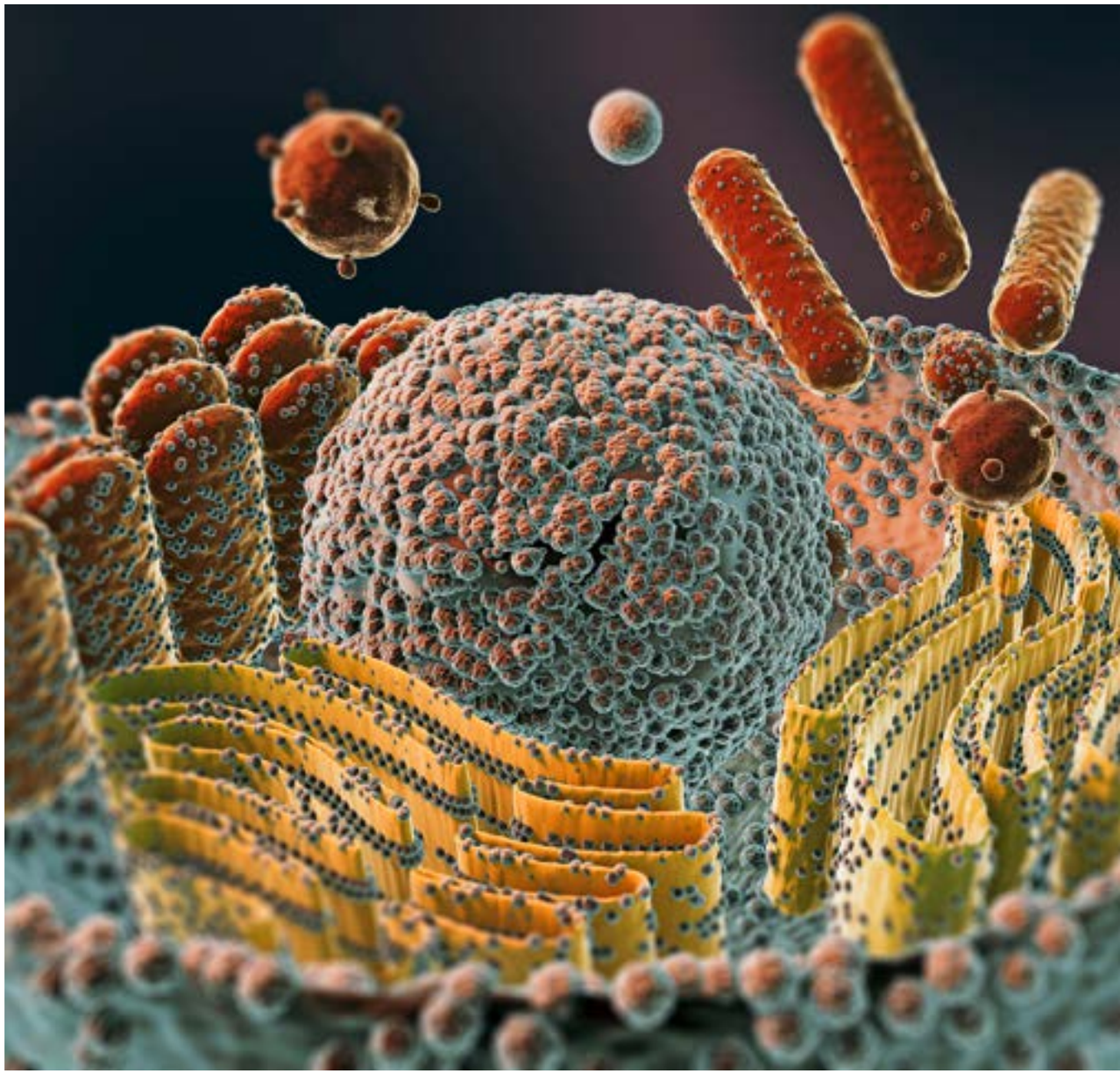

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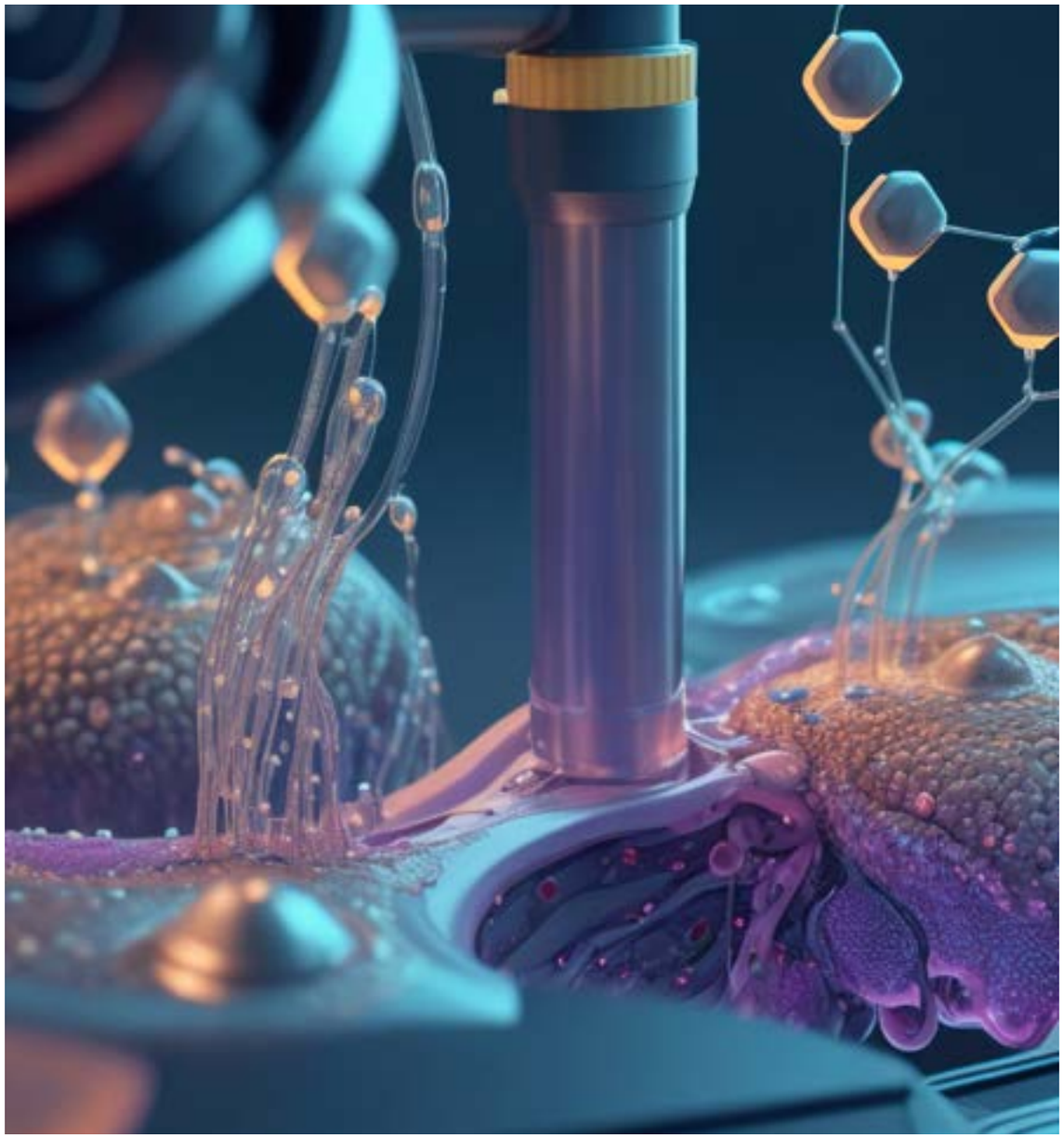

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