



Annual Report 2020

Department of Biomedical Sciences
of Cells and Systems (BSCS)



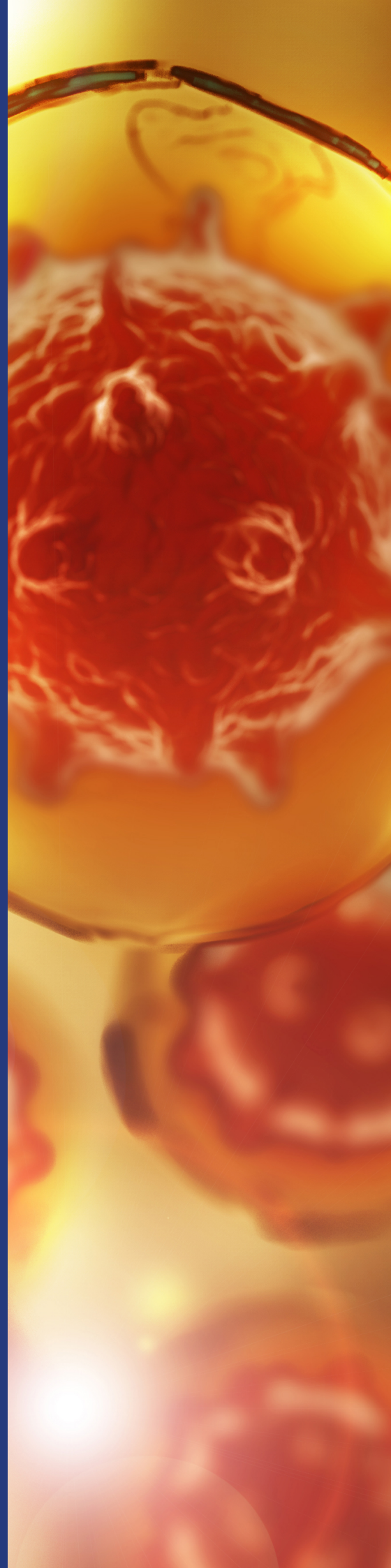
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Annual Report 2020

Department of
Biomedical Sciences
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(BSCS)



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1. Foreword

It is a pleasure to present to you the first Annual Report of the Department of Biomedical Sciences of Cells and Systems (BSCS) for the year 2020. This report provides you with a quantitative overview of all our activities and achievements, in science, education, business development and outreach.

Whereas important to have such an overview, we believe that also qualitative treasures are truly relevant for the success of a department: how people collaborate to reach synergy (e.g. a large majority of our paper published were the result of collaborations within or outside our department) or how we allow talent to grow and develop (in research and teaching) and how we value those that make this possible.

In 2020 the Covid-19 pandemic had a major impact on all our activities. Our researchers had to work under unpleasant conditions in shifts and with various safety protocols with minimal opportunities for (informal) contacts and brainstorming. Our Educating staff were forced to spend many extra hours to design novel on-line teaching modules and had the difficult tasks to inspire students from behind a screen. Despite these hurdles, 2020 was a successful year with multiple grants and wonderful publications and an impressive list of courses, lectures and practical rotations, all of which you will find in this Annual Report.

Also in 2021, we are still fighting the Covid-19 pandemic. With the advent of Covid vaccines and proper (rapid) testing, we hope to go back to our (close to) normal lives soon, such that we can again share the excitement of research successes in person and inspire students face-to-face.

Harrie Kampinga
Head of the department, BSCS
April 2021



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 class rooms), 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 The 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 The Section Cognitive Neurosciences

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

Groups:



- **Andre 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 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 prevention 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 major depressive disorders, and especially factors that promote a prolonged course of these disorders.

3.3 The 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** (appointed by the Dept of Radiotherapy) 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.



- **Steven Bergink** aims to understand how damage to the DNA in our cells can have detrimental consequences.



- **Rob Coppes** (appointed by the Dept of Radiotherapy) focuses on the role, mechanism and regenerative potential of normal tissue stem cells in the response of tissues to different radiation qualities, such as photon and protons.



- **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.



- **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.



- **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.

- **Muriel Mari** focuses on i) Investigation of the membrane rearrangements underlying the biogenesis of the autophagosomes, the vesicular carriers that are the hallmark of autophagy, and ii) Improvement and development of new electron microscopy approaches to increase the number of biological questions that can be addressed with these techniques.



- **Catherine Rabouille** focuses on i) how cellular stress remodels the secretory pathway into a phase separated stress assembly in cell culture and ii) how cells initiate unconventional secretion through the Golgi protein GRASP in organoids.

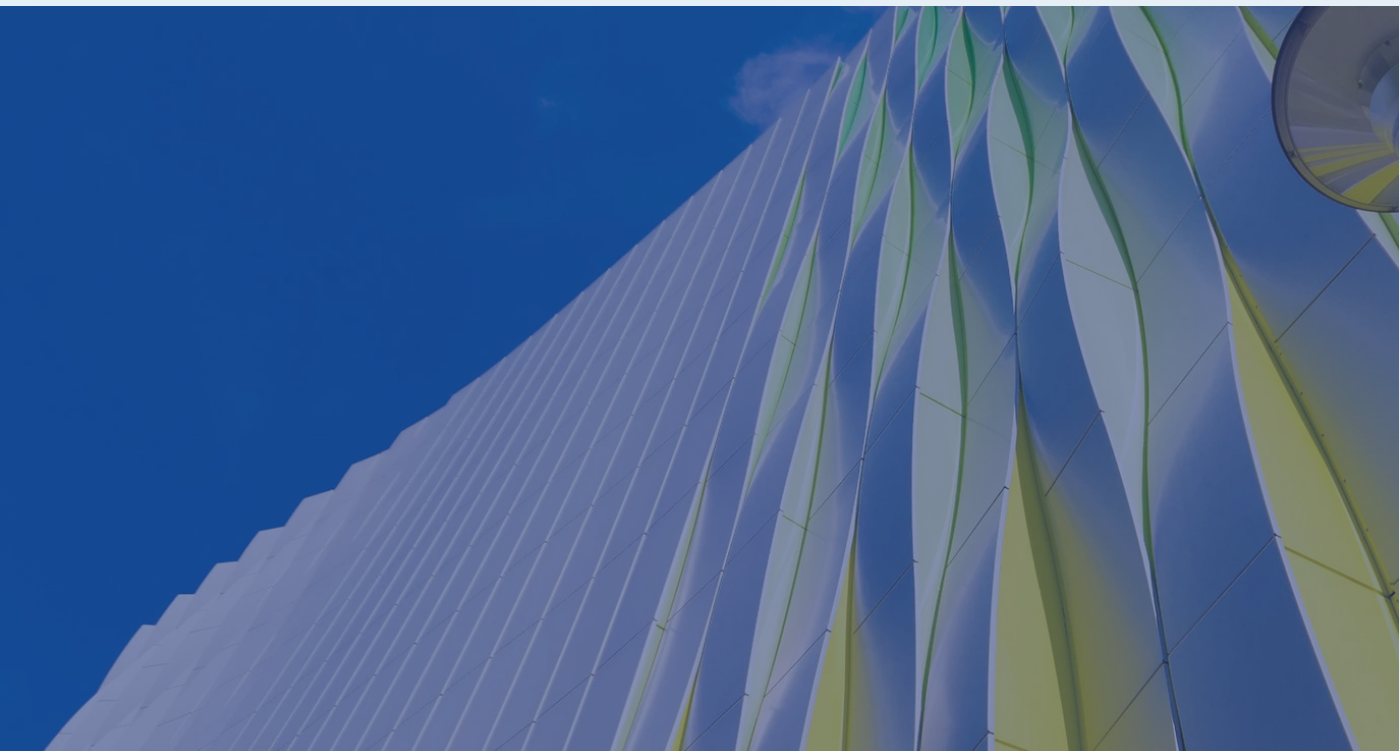
- **Fulvio Reggiori** aims at unveiling the regulation and molecular mechanism of autophagy using yeast as the model system. As the long-term objective is to understand the exact contribution of autophagy in specific physiological and pathological contexts, the group is also investigating the interaction between autophagy-related proteins and pathogens, in particular viruses, and the role of autophagy in preventing neurodegeneration.





- **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 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 The 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.



- **Jon Laman** studies a selection of interrelated topics: i) Roles of costimulatory/coinhibitory receptors such as CD40 and VISTA, notably on microglia, in MS progression and remyelination, ii) Contribution of infectious pathogens and gut microbiota in MS progression and remyelination and iii) Stress granules in microglia related to MS lesion activity and repair.



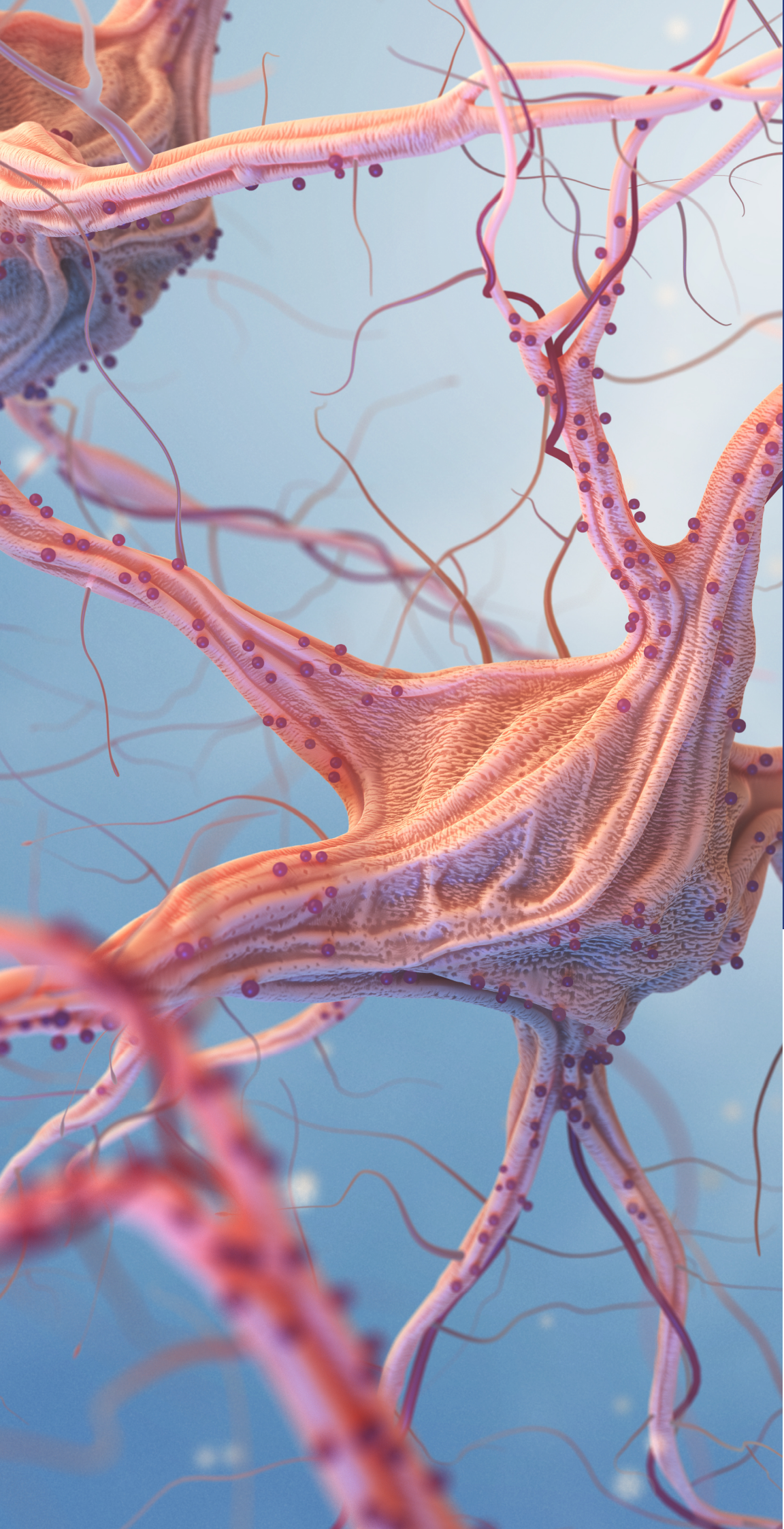
- **Susanne Kooistra** focuses on how the epigenome regulates glial cell identity and function under neuroinflammatory conditions like multiple sclerosis, using single cell-omics approaches.

- **Inge Zijdewind** investigates mechanisms – at the level of muscles, spinal cord, and cortex – which could be 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

Researcher	Funding Body	Project Title	Budget
Astrid Alsema	De Cock-Hadders	Single-cell transcriptome analysis of cortical microglia derived from post-mortem Alzheimer's Disease patient brain tissue	€ 3.500,00
Bart Eggen	Alzheimer NL	Integrative single nuclear and spatial transcriptomics to delineate AD aetiology	€ 100.000,00
Bart Eggen	MS 20-1085 Mutations Assoc.	Are somatic mutations associated with MS lesions and do they drive MS pathophysiology?	€ 65.000,00
Bart Eggen	KNAW NL Hersenbank	The Netherlands Neurogenetics Database	€ 85.000,00
Ben Giepmans	ZonMw DTL Hotel via Delft	Workflow optimization for 100x faster biomedical electron microscopy image acquisition	€ 30.000,00
Ben Giepmans	NWO Biomolecular Google Maps -LIFT	Building biomolecular 'Google Maps'	€ 285.000,00
Fulvio M.Reggiore	NWO Corona Fast Track	Identification of pan-anti-beta coronavirus compounds using a simple and rapid high-throughput screening approach	€ 50.000,00
Fulvio M.Reggiore	Mercatus Center Fast grant COVID-19	Research on coronaviruses	€ 165.000,00
Fulvio M.Reggiore	NWO Klein Autophagosomes	Inflating autophagosomes with lipids	€ 358.470,00
Fulvio M.Reggiore	Swiss Grant Reprogram. By select. Autophagy	Metabolic reprogramming by selective autophagy	€ 594.420,00
Harm H. Kampinga	NWO Science Dip.fund	BRIdging Astrocytic - NEurons Interactions in Neuronal Degeneration (BRA-NED)	€ 20.000,00
Harm H. Kampinga	NWO Groot Guardians	Guardians of protein disorder	€ 650.307,00
Iris E.C. Sommer	ZonMw Ophelia	Outcome of Psychosis: Heterogeneity Explained by Longlasting Individual Attributes (OPHELIA)	€ 1.498.601,00
Jacomien Jongma	Stg. De 3 Lichten	Het falen van myelineherstel bij multiple sclerose: een ontregeld samenspel tussen neuronen en oligodendrocyten?	€ 6.000,00
Malte Borggrewe	De Cock-Hadders	Expression of VISTA in distinct types of multiple sclerosis lesions	€ 3.500,00
Marie-Jose van Tol	NWO How to put a break / Mind-Cog	How to put a break on rumination: tracking effects of fantasizing - and mindfulness - based interventions on depressive vulnerability in the wild	€ 50.000,00
Marion Wijering	De Cock-Hadders	Spatial transcriptomics for the analysis of lesion heterogeneity in MS	€ 4.000,00
Nynke Talma	De Cock-Hadders	Single-cell transcriptome analysis of senescent cells from the aged mouse brain	€ 4.000,00
Ody Sibon	Lepelaar PKAN Vitamin	Vitamin derivative for PKAN patients	€ 6.080,00
Qinghong Li	De Cock-Hadders	The pathogenesis of osteo-oto-hepato-enteric syndrome	€ 4.000,00
Rianne Gorter	De Cock-Hadders	MMP-7: an (essential) player in the formation of remyelination inhibiting fibronectin aggregates in multiple sclerosis?	€ 4.000,00
Sven van Ijzendoorn	Daniel Courtney Trust	Repurposing of N-acetylcysteine for the treatment of microvillus inclusion disease	€ 20.000,00
Wia Baron	MS 19-1067 Out of the Box	Is een sluimerende virusinfectie de oorzaak van myeline afbraak bij MS?	€ 61.542,00
Budget awarded projects 2020			€ 4.068.420,00
Number of projects awarded in 2020			23



5. Facts and Figures

5.1 Funding received/ Projects awarded

Budget awarded projects 2020	€ 4.068.420,00
Number of projects awarded in 2020	23*
Total number of running projects	123

*See the previous section for a list of projects awarded during 2020.

5.2 PhD Graduations

Number of PhDs Graduated per section	
Cognitive Neurosciences	3
Molecular Cellbiology	6
Molecular Neurobiology	3
Total	12*

*See the Appendix-1 for a list of all PhD theses defended in 2020 per section at the end of the report.

5.3 Scientific Publications

Number of publications per section	
Anatomy and Medical Physiology	3
Cognitive Neurosciences	63
Molecular Cellbiology	43
Molecular Neurobiology	25
Total	134*

*See the Appendix-2 for a list of all publications published during 2020 per section at the end of the report.



5.4 People

Formation FTE in BSCS as per 2020-12

Section	FTE	Headcount
Anatomy and Medical Physiology	14.68	34
Cognitive Neurosciences	27.21	39
Molecular Cellbiology	37.11	41
Molecular Neurobiology	25.15	30
BSCS Management	9.00	9
Total	113.15	153

Gender: Men & Women

Count	Percentage(%)
Men	41
Women	59
Total	100

Total number of Phds	42
Staff under age 44	73%
Total number of employees	153
No. of employees moved out	7
No. of employees joined	23

No. of International employees	64
% international employees	25%
No. of nationalities	22
\$Belgium 1	France 3
Sri Lanka 1	USA 2
Germany 22	Ireland 1
China 10	Turkey 1
Portugal 1	Slovenia 1
Japan 1	Iraq 1
Spain 5	Greece 1
India 3	Syria 1
Italy 1	Switzerland 1
Cyprus 1	Mexico 4
	Brazil 2

Management team BSCS

Henk Heidekamp	Managing Director
Arnoud Rozema	Financial Controller and Staff Advisor
Mallikarjuna Gurram	Research Coordinator
Wytse Hogewerf	Staff Assistant
Harry Moes	Housing, HRM, Finance and Quality Assurance
Greetje Hollander	Secretary Anatomy & Medical Physiology
Hedwig van Oosten	Secretary Cognitive Neuroscience Center
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

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

Janniko R. Georgiadis – Head of the facility
Ruby Otter-Drost – Manager of the facility
Annelies van der Molen – Coordinator of the facility

Contact:

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University Medical Center Groningen
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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

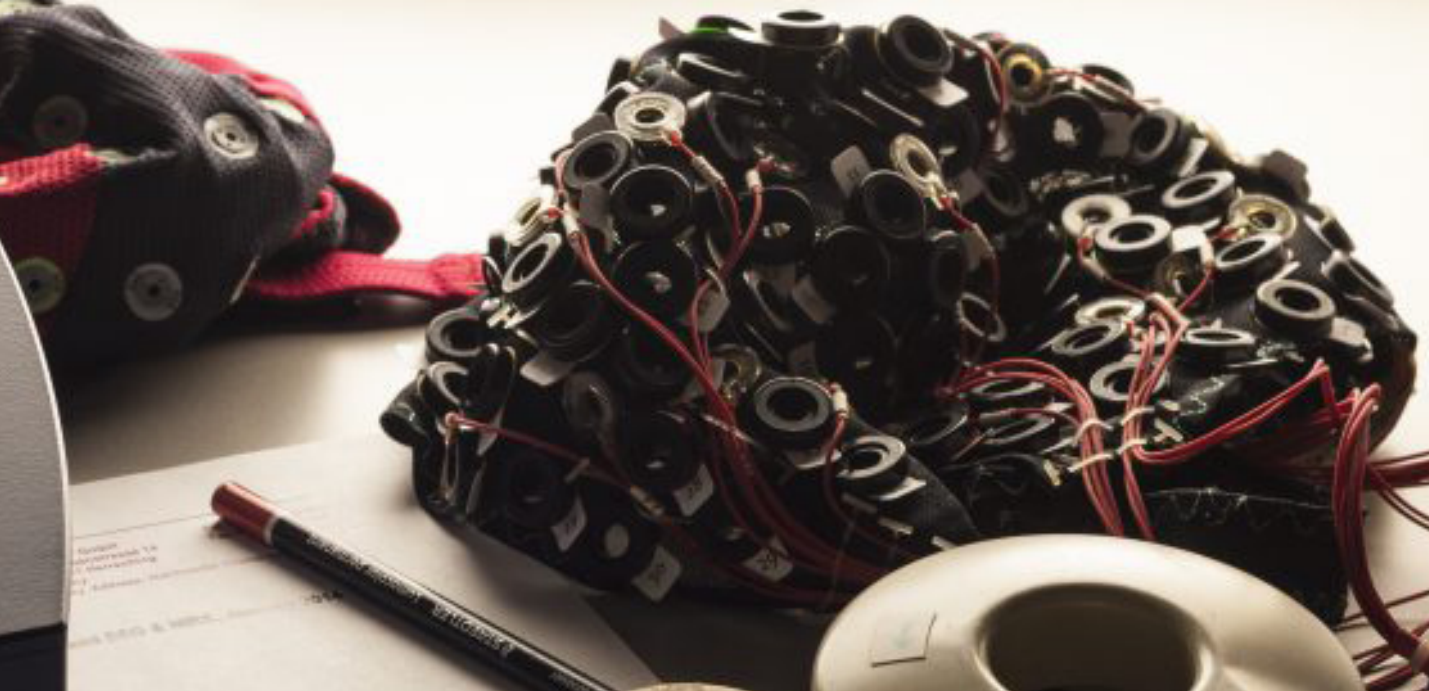
Prof. Andre Aleman – Head of the facility

Contact:

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

For information, you can contact
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

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

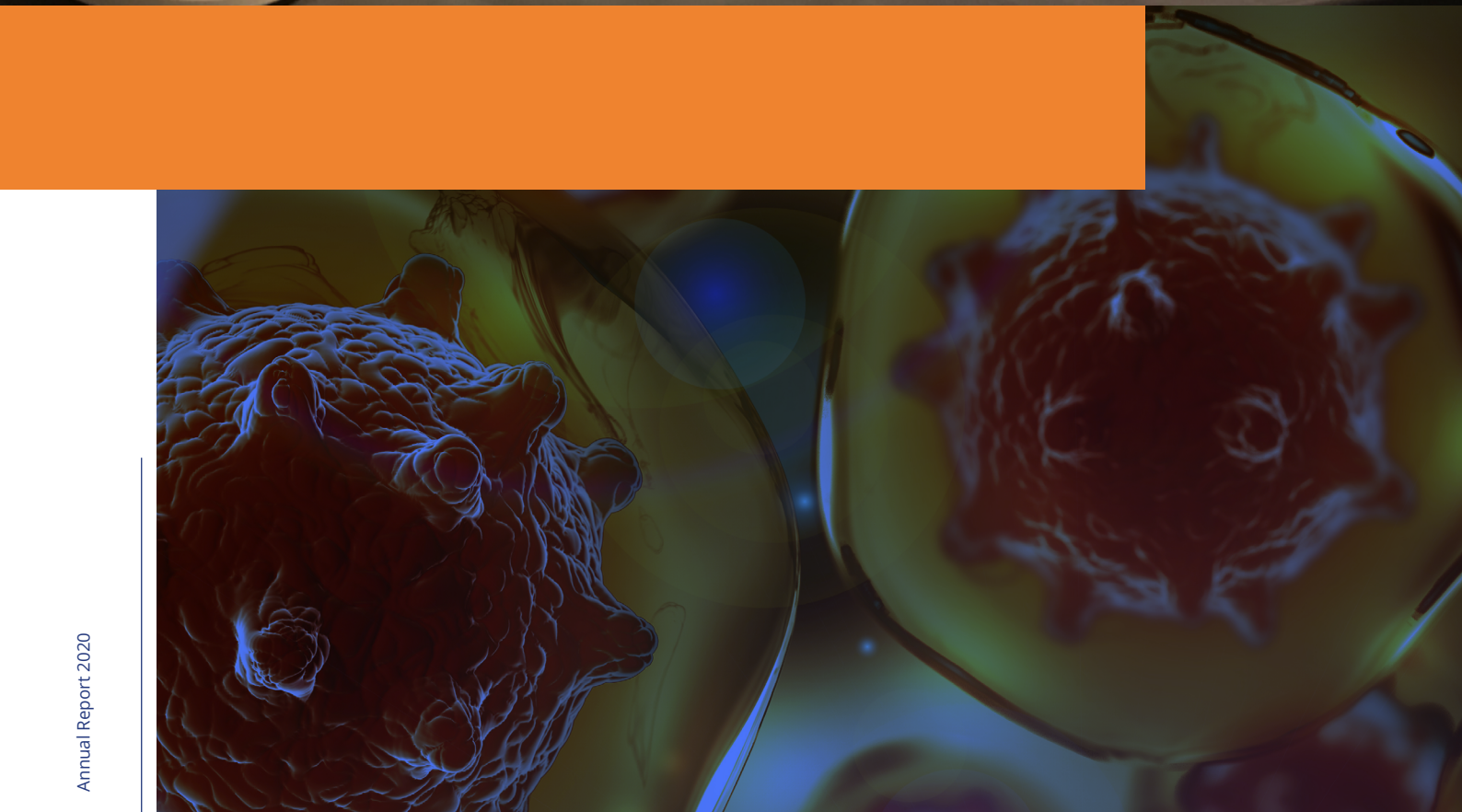
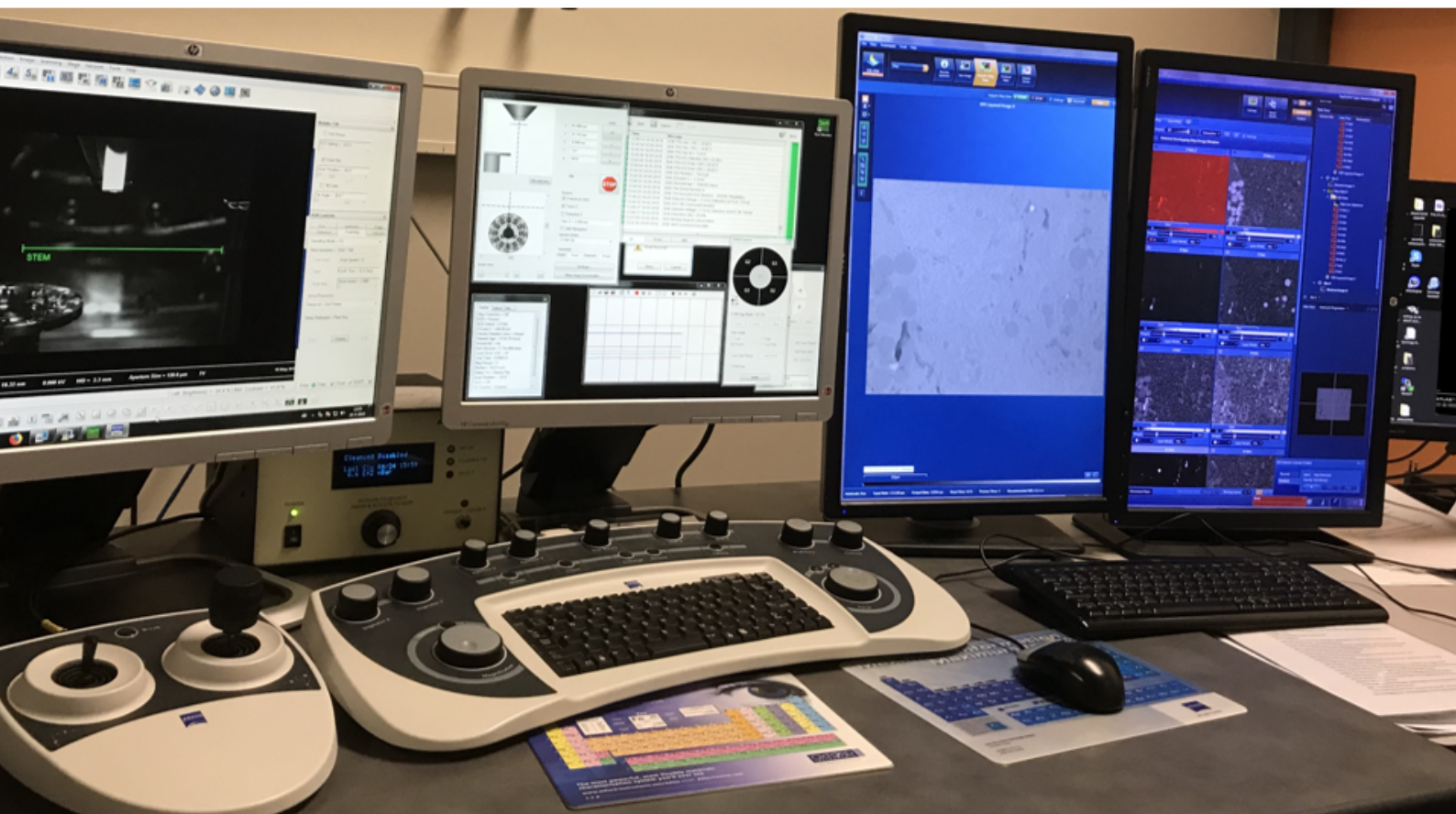
Antonius Deusinglaan, 1

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.

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).

People

Ben Giepmans – Scientific Director

Klaas Sjollema – Managing Director Light Microscopy

Jeroen Kuipers – Managing Director Electron Microscopy

UMIC participates in the [NVvM](#), [NL-Biolmaging](#), [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 γ -ray facility

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

People

RPO (Radiation Protection Officer): Rob Coppes

RPE (Radiation Protection Expert): Rick Havinga

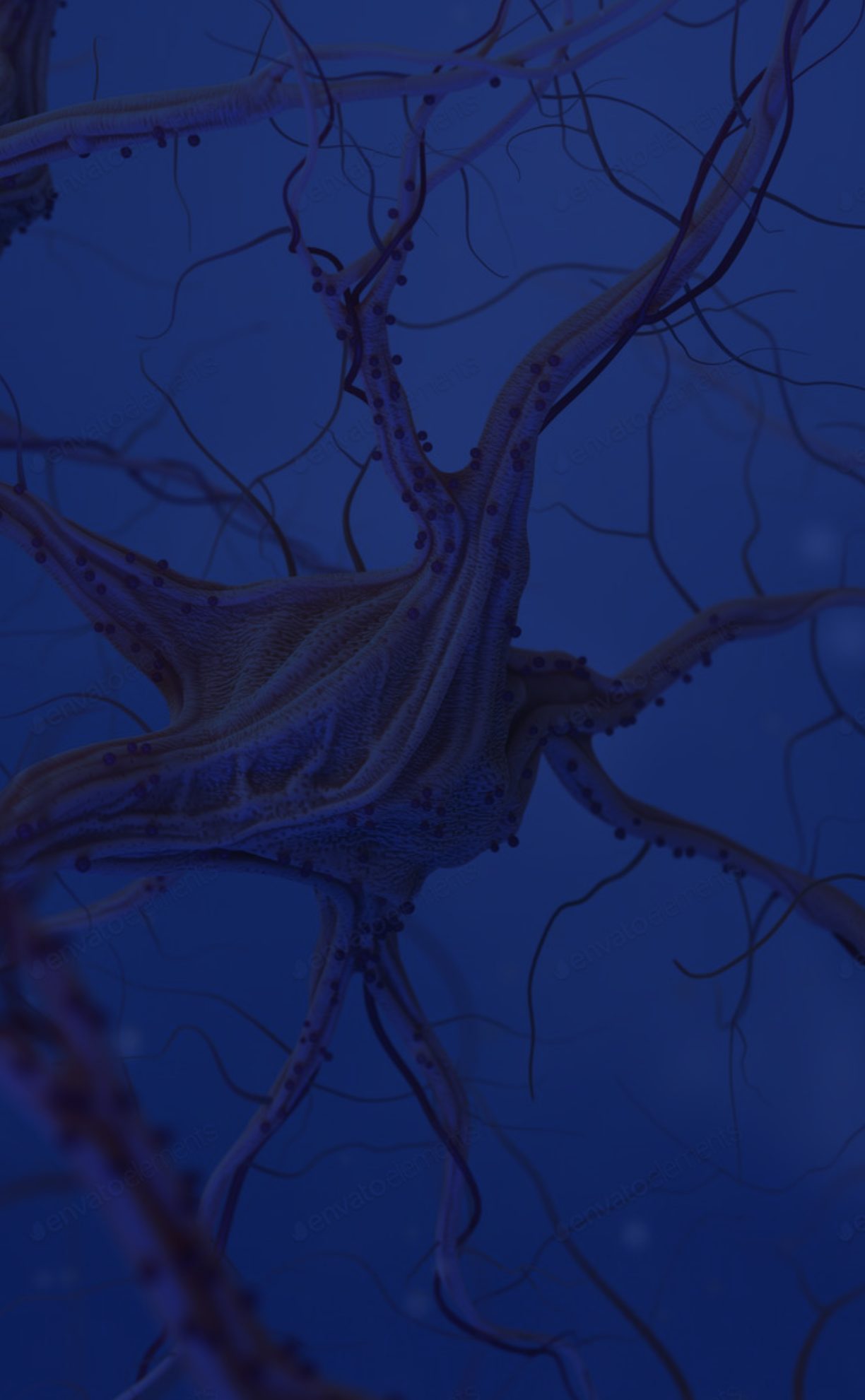
Contact person radiation worker (level 5): Uilke Brouwer

Contact:

<https://bscs.umcg.nl/en/facilities/cesium-137%CE%B3-ray-facility/u.brouwer@umcg.nl>

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Section Molecular Cellbiology Internal Zipcode FB32
9700 AD Groningen
The Netherlands





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 Course Semester 1.2	Hiske van Duinen
	G2020 Course Semester 2.1	Hiske van Duinen
	G2020 Course Semester 2.2	Janniko Georgiadis
	G2020 Premaster	Rob Bakels
	G2020 chair TBP (toetsbeoordelingspanel)	Rob Bakels
	European Medical School Oldenburg-Groningen	Janniko Georgiadis
	Psychiatry and Neuro-science (2nd year)	Branislava Ćurčić-Blake
Dentistry	Bachelor, year 1	Anne-Marijke Kosta
Science and Engineering (FSE)	Master BCN: Human neuroanatomy	Janniko Georgiadis
	Bachelor Life Sciences & Technology / Biology: Medical Physiology	Hiske van Duinen
	Membrane Biology and Disease	Wia Baron
	Cell Biology	Muriel Mari
Human Movement Science	Bachelor BW: Neuroanatomie 1	Janniko Georgiadis
	Bachelor BW: Algemene fysiologie	Ruby Otter-Drost
	Bachelor BW: Neurofysiologie	Rob Bakels
	Bachelor BW: Inspanningsfysiologie	Hiske van Duinen
University College Groningen	Anatomy & Histology	Cyril Luman
	Human Physiology	Pepijn Schoonen
	Clinical Psychology: mental health and illness	Andre Aleman
Hanze	Anatomie van de mens(Master Physician Assistant)	Carola Haven
Post-graduate teaching and training	Common Trunk surgery residency training program	Janniko Georgiadis
BSCS/UMIC, UMCG	Cellular Imaging Light	Ben Giepmans
BCN, UMCG	Cognitive Neuro-psychiatry, Research Masters	Marie-José van Tol



8. Scientific Dissemination and 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).

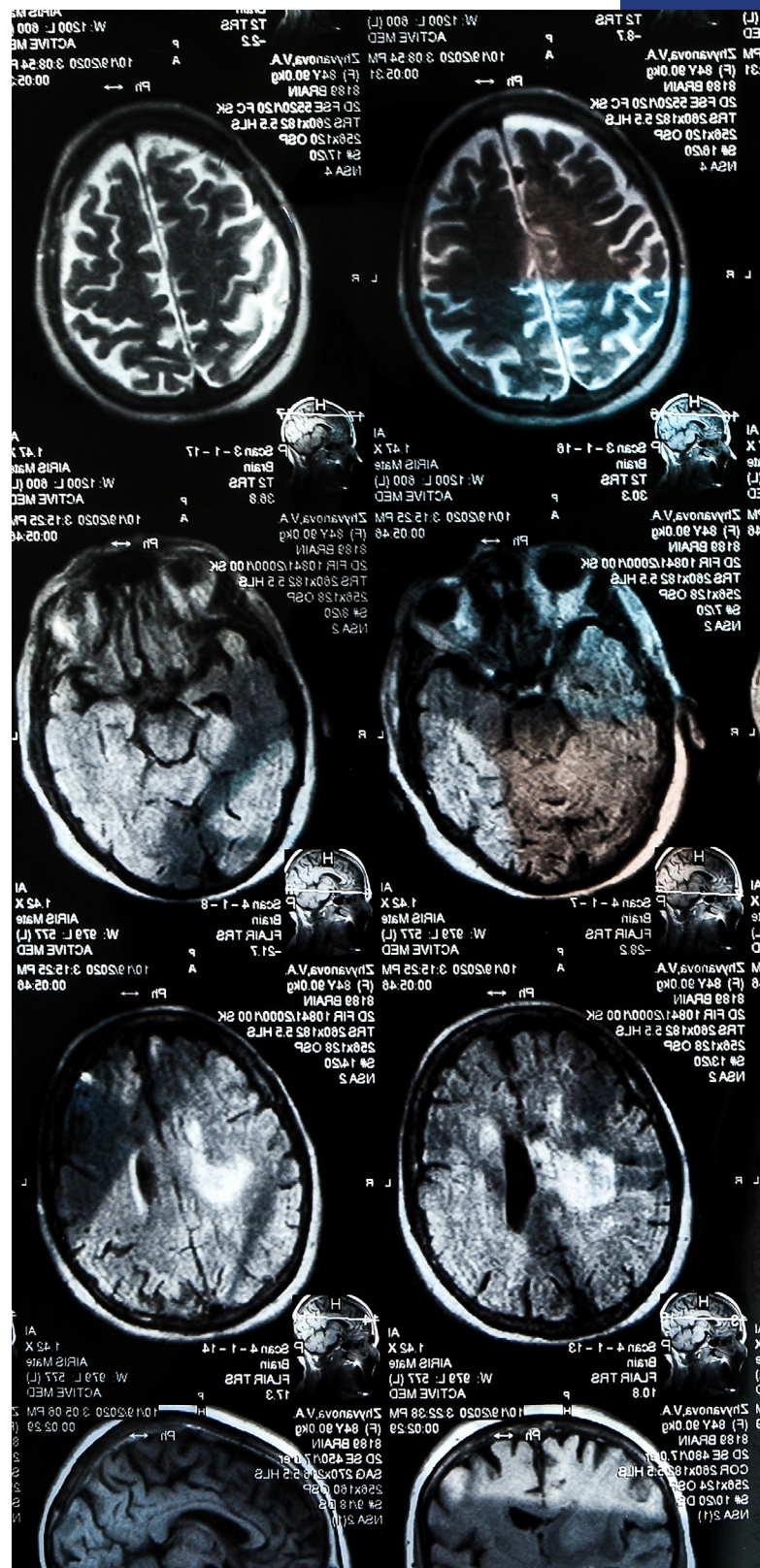
Currently, financed by the Stichting Zeldzame Ziekte Fonds, Stichting Kans voor PKAN kinderen, de Stichting Lepelaar, ZonMW and the Hersenstichting, an investigator driven clinical trial is being prepared for PKAN patients in close collaboration with the Expertise Centre for Movement Disorders, at the UMCG. The product under investigation was proven to be effective in *Drosophila* and mouse models for PKAN and the aim of the 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](#) 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 DiapoCare cream with AVEBE

Development and market introduction of protease inhibitors for topical cream application against skin inflammation. Clinical indications include: diaper dermatitis in babies, stoma patients, incontinence, congenital defects of the colon, Crohn's disease, and cancer treatment side effects. Original scientific concept developed by Dr. J.G. van Embden, L. van Lieshout (Bsc) and J.D. Laman. Longstanding collaboration with the cooperation AVEBE (Veendam, Groningen) providing protease inhibitors from protein fraction of starch potatoes. The launching company is Eurodrug B.V. (Den Haag) with a cream for diaper dermatitis in healthy infants. This product called Diapocare is now marketed in the entire European Community, and 13 other countries including Thailand, Singapore and Hong Kong <https://diapo-care.com/product/diapo-care-cream/>

8.5 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](#), a first in man Phase I/II trial will start this summer at the UMCG.

9. Outreach and Communication

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 2020.

1. Rob Coppes received a cheque from the zwem en poloclub "Steenwijk 34" which had been swimming 200 km to sponsor the KWF project, "Increasing therapeutic window of proton therapy in brain, head and neck cancer". ([Info](#))
2. Pascal de Boer (Giepmans group) published a blog post on the Open Science Blog as part of the Open Science Award and Event organized by the University of Groningen Library and the Open Science Community Groningen, highlighting the open access availability of large-scale electron microscopy (EM) data (nanotomey). ([Info](#))
3. A Fluorescence image picture from Malte Borggreve's review (Eggen/Laman's group) is published on the cover of Journal of Molecular Medicine. ([Info](#))
4. Jon Laman group contributed to an article published in EOS Wetenschap.eu, titled "Afweerstoffen uit darmen gelinkt aan multiple sclerose" ([Info](#))
5. Cognitive Neuroscience investigator Marie-José van Tol explains "What does the corona crisis to your brain?" in an article published by UMCG KennisInzicht. ([Info](#))
6. Marie-José van Tol was at RTV Noord talked about the effect of sitting indoors for five weeks on couples, singles and (adolescent) children. ([Info](#))
7. Harrie Kampinga was at RTV Noord and NOS Radio to talk about (his research on) Huntington's disease and support of a patient-initiated money-raising campaign ([Info](#))
8. Marie-José van Tol was on the Jelte Posthumus podcast and talked about the role of the brain in depression and anxiety. ([Info](#))
9. Iris Sommer and Sven van Ijzendoorn groups, along with Wageningen University and Research and Winlove Probiotics, received 1 million euro grant from The Brain Foundation (de Hersenstichting) for research on how the gut can be manipulated to fight brain diseases. ([Info](#), [Info+](#))
10. Iris Sommer shared the secrets of the brain in an article published in the Universiteitskrant(UK). ([Info](#))
11. Janniko Georgiadis published a short film on Commemoration human body donors. ([Info](#))
12. Janniko Georgiadis and his team created a software Enatom (lite version). ([Info](#))
13. Janniko Georgiadis and his team created a software UMCG Anatomy Gym. ([Info](#))
14. Hiske van Duinen was selected as a Docent van het jaar 2020 and Beste Online Docent. ([Info](#))



10. Appendix 1: PhD graduations

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

Section Cognitive Neurosciences

Larabi, D. (2020),
Supervisor: Andre Aleman,
Thesis title: Insight in the brain: a multimodal approach investigating insight in individuals with a psychotic disorder and healthy individuals.
<https://doi.org/10.33612/diss.118152005>

Geng, H. (2020),
Supervisor: Andre Aleman,
Thesis title: The Predictive Brain and Psychopathology: Searching for the hidden links across anxiety, hallucination and apathy.
<https://doi.org/10.33612/diss.131330743>

Xin, Y. (2020),
Supervisor: Andre Aleman,
Thesis title: Motivation, reward and stress: individual difference and neural basis.
<https://doi.org/10.33612/diss.143843592>

Section Molecular Cell biology

Werkman, I. (2020),
Supervisor: Baron, W; Hoekstra, D,
Thesis title: Macroglial diversity and its effect on myelination.
<https://doi.org/10.33612/diss.113508108>

de Jong, E. (2020),
Supervisor: Ijzendoorn van, SCD,
Thesis title: G23 peptide-mediated delivery of biodegradable nanocarriers across an in vitro blood-brain barrier model.
<https://doi.org/10.33612/diss.132284892>

Leng, C. (2020),
Supervisor: Ijzendoorn van, SCD; Giepmans BNG,
Thesis title: The roles of MYO5B in epithelial cells and the intestine: A focus on microvillus inclusion disease.
<https://doi.org/10.33612/diss.127906021>

Overeem, A. W. (2020) ,
Supervisor: Ijzendoorn van, SCD; Hoeksstra, D.,
Thesis title: Polarized protein trafficking and disease: Towards understanding the traffic jams in microvillus inclusion- and Wilson disease.
<https://doi.org/10.33612/diss.112660241>

Soto Padilla, A. (2020),
Supervisor: Sibon, OCM,
Thesis title: In the heat of the moment: How Drosophila melanogaster's response to temperature is modulated by sensory systems, social environment, development, and cognition.
<https://doi.org/10.33612/diss.109887653>

Beer de, M (2020),
Supervisor: Sibon, OCM; Giepmans, BNG,
Thesis title: Development and application of protein-based probes for correlated microscopy.
<https://doi.org/10.33612/diss.147586577>

Section Molecular Neurobiology

Angelica Sabogal Guaqueta (2020),
Supervisor: Erik Boddeke,
Thesis title: Unraveling molecular signaling in neurodegenerative diseases.
<https://doi.org/10.33612/diss.111514738>

Marissa Dubbelaar (2020),
Supervisor: Bart Eggen,
Thesis title: Aspects of the Microglia Transcriptome: Microglia in complex RNA-Seq output gives laborious integrative analyses.
<https://doi.org/10.33612/diss.134443852>



11. Appendix 2: Publications



More details about these publications can be found on the [university research portal](#).

Section Anatomy and Medical Physiology:

1. Borg C. et al. The Influence of Sexual Arousal on Self-Reported Sexual Willingness and Automatic Approach to Models of Low, Medium, and High Prior Attractiveness; doi: 10.1080/00224499.2019.1687641; Journal of Sex Research 57 7(2020), Article.
2. van Gaalen et al. Human prosections beyond the dissection room. Journal of anatomy, 236, 96-97. (2020). Article.
3. van Gaalen et al. Gamification of health professions education: a systematic review. Advances in Health Sciences Education. doi: 10.1007/s10459-020-10000-3; (2020). Review.
3. Pijnenborg G.H.M. et al. Brain areas associated with clinical and cognitive insight in psychotic disorders: A systematic review and meta-analysis; doi:10.1016/j.neubiorev.2020.06.022; Neuroscience and Biobehavioral Reviews 116 (2020), Review.
4. Xu P. et al. Amygdala-prefrontal connectivity modulates loss aversion bias in anxious individuals; doi:10.1016/j.neuroimage.2020.116957; NeuroImage 218 (2020), Article.
5. Stiekema A.P.M. et al. Facilitating recovery of daily functioning in people with a severe mental illness who need longer-term intensive psychiatric services: Results from a cluster randomized controlled trial on cognitive adaptation training delivered by nurses; doi:10.1093/schbul/sbz135; Schizophrenia Bulletin 46 5(2020), Article.

Section Cognitive Neurosciences:

1. Thompson P.M. et al. ENIGMA and global neuroscience: A decade of large-scale studies of the brain in health and disease across more than 40 countries; doi:10.1038/s41398-020-0705-1; Translational Psychiatry 10 1(2020), Review.
2. Humpston C. et al. Real-Time Functional Magnetic Resonance Imaging Neurofeedback for the Relief of Distressing Auditory-Verbal Hallucinations: Methodological and Empirical Advances; doi:10.1093/schbul/sbaa103; Schizophrenia Bulletin 46 6(2020), Article.
6. de Jong S. et al. A qualitative evaluation of the effects of Metacognitive Reflection and Insight Therapy: 'Living more consciously'; doi:10.1111/papt.12212; Psychology and Psychotherapy: Theory, Research and Practice 93 2(2020), Article.
7. Xin Y. et al. Recent life stress predicts blunted acute stress response and the role of executive control; doi:10.1080/10253890.2019.1687684; Stress 23 3(2020), Article.
8. Lefaucheur J.-P. et al. Corrigendum: "Evidence-based guidelines on the therapeutic use of repetitive transcranial magnetic stimulation (rTMS): An update

- (2014–2018)" (Clinical Neurophysiology (2020) 131(2) (474–528), (S1388245719312799), (10.1016/j.clinph.2019.11.002)); doi:10.1016/j.clinph.2020.02.003; Clinical Neurophysiology 131 5(2020), Erratum.
9. Tumati S. et al. Functional network topology associated with apathy in Alzheimer's disease; doi:10.1016/j.jad.2020.01.158; Journal of Affective Disorders 266 (2020), Article.
 10. Steenhuis L.A. et al. The Longitudinal Association Between Preadolescent Facial Emotion Identification and Family Factors, and Psychotic Experiences in Adolescence (The TRAILS Study); doi:10.1007/s10578-019-00922-4; Child Psychiatry and Human Development 51 2(2020), Article.
 11. Liemburg E.J. et al. Expressive deficits and amotivation as mediators of the associations between cognitive problems and functional outcomes: Results from two independent cohorts; doi:10.1016/j.schres.2019.12.018; Schizophrenia Research 218 (2020), Article.
 12. Xin Y. et al. Intrinsic prefrontal organization underlies associations between achievement motivation and delay discounting; doi:10.1007/s00429-019-01982-x; Brain Structure and Function 225 2(2020), Article.
 13. Lefaucheur J.-P. et al. Evidence-based guidelines on the therapeutic use of repetitive transcranial magnetic stimulation (rTMS): An update (2014–2018); doi:10.1016/j.clinph.2019.11.002; Clinical Neurophysiology 131 2(2020), Review.
 14. Chen J. et al. Pharmacotherapy Monitoring and Outcome Survey (PHAMOUS) Investigators; Neurobiological Divergence of the Positive and Negative Schizophrenia Subtypes Identified on a New Factor Structure of Psychopathology Using Non-negative Factorization: An International Machine Learning Study; doi:10.1016/j.biopsych.2019.08.031; Biological Psychiatry 87 3(2020), Article.
 15. Di Plinio S. et al. I am Me: Brain systems integrate and segregate to establish a multidimensional sense of self; doi:10.1016/j.neuroimage.2019.116284; NeuroImage 205 (2020), Article.
 16. Aleman A. et al. The Silent Danger of Social Distancing; doi:10.1017/S0033291720002597; Psychological Medicine (2020), Letter.
 17. Jutten R.J. et al. The Cognitive-Functional Composite is sensitive to clinical progression in early dementia: Longitudinal findings from the Catch-Cog study cohort; doi:10.1002/trc2.12020; Alzheimer's and Dementia: Translational Research and Clinical Interventions 6 1(2020), Article.
 18. Wagner E. et al. Repetitive transcranial magnetic stimulation (rTMS) for schizophrenia patients treated with clozapine; doi:10.1080/15622975.2020.1733080; World Journal of Biological Psychiatry (2020), Article.
 19. Ho T.C. et al. Subcortical shape alterations in major depressive disorder: Findings from the ENIGMA major depressive disorder working group; doi:10.1002/hbm.24988; Human Brain Mapping (2020), Article.
 20. Opel N. et al. Brain structural abnormalities in obesity: relation to age, genetic risk, and common psychiatric disorders: Evidence through univariate and multivariate mega-analysis including 6420 participants from the ENIGMA MDD working group; doi:10.1038/s41380-020-0774-9; Molecular Psychiatry (2020), Article.
 21. Begemann M. et al. Drugs with anti-inflammatory effects to improve outcome of traumatic brain injury: a meta-analysis; doi:10.1038/s41598-020-73227-5; Scientific Reports 10 1(2020), Article.
 22. de Boer J.N. et al. Language disturbances in schizophrenia: the relation with antipsychotic medication; doi:10.1038/s41537-020-00114-3; npj Schizophrenia 6 1(2020), Article.
 23. Sommer I.E. et al. The clinical course of schizophrenia in women and men—a nation-wide cohort study; doi:10.1038/s41537-020-0102-z; npj Schizophrenia 6 1(2020), Article.
 24. de Boer J.N. et al. Language in schizophrenia: relation with diagnosis, symptomatology and white matter tracts; doi:10.1038/s41537-020-0099-3; npj Schizophrenia 6 1(2020), Article.
 25. van Dellen E. et al. Functional brain networks in the schizophrenia spectrum and bipolar disorder with psychosis; doi:10.1038/s41537-020-00111-6; npj Schizophrenia 6 1(2020), Article.
 26. Jongs N. et al. A framework for assessing neuropsychiatric phenotypes by using smartphone-based location data; doi:10.1038/s41398-020-00893-4; Translational Psychiatry 10 1(2020), Article.
 27. Brand B.A. et al. Raloxifene augmentation in men and women with a schizophrenia spectrum disorder: A study protocol; doi:10.1016/j.conctc.2020.100681; Contemporary Clinical Trials Communications 20 (2020), Article.
 28. Hofer E. et al. Genetic correlations and genome-wide associations of cortical structure in general population samples of 22,824 adults; doi:10.1038/s41467-020-18367-y; Nature Communications 11 1(2020), Article.
 29. Begemann M.J. et al. Efficacy of non-invasive brain stimulation on cognitive functioning in brain disorders: A meta-Analysis; doi:10.1017/S0033291720003670; Psychological Medicine 50 15(2020), Review.
 30. Badcock J.C. et al. Hallucinations in Older Adults: A Practical Review; doi:10.1093/schbul/sbaa073; Schizophrenia Bulletin 46 6(2020), Review.
 31. Ormel P.R. et al. A characterization of the molecular phenotype and inflammatory response of schizophrenia patient-derived microglia-like cells; doi:10.1016/j.bbi.2020.08.012; Brain, Behavior, and Immunity 90 (2020), Article.
 32. Speyer H. et al. Discontinuation of antipsychotic medication—time to rethink trial design; doi:10.1016/S2215-0366(20)30340-0; The Lancet Psychiatry 7 10(2020), Letter.
 33. Schutte M.J.L. et al. Hallucinations and other psychotic experiences across diagnoses: A comparison of phenomenological features; doi:10.1016/j.psychres.2020.113314; Psychiatry Research 292 (2020), Article.

34. Liu X. et al. Joint Multi-modal Parcellation of the Human Striatum: Functions and Clinical Relevance; doi:10.1007/s12264-020-00543-1; Neuroscience Bulletin 36 10(2020), Article.
35. van der Horn H.J. et al. An integrated perspective linking physiological and psychological consequences of mild traumatic brain injury; doi:10.1007/s00415-019-09335-8; Journal of Neurology 267 9(2020), Review.
36. Faay M.D.M. et al. Hostility and aggressive behaviour in first episode psychosis: Results from the OPTiMiSE trial; doi:10.1016/j.schres.2020.08.021; Schizophrenia Research 223 (2020), Article.
37. Sommer I.E. et al. What can psychiatrists learn from SARS and MERS outbreaks?; doi:10.1016/S2215-0366(20)30219-4; The Lancet Psychiatry 7 7(2020), Note.
38. Eltokhi A. et al. Dysregulation of synaptic pruning as a possible link between intestinal microbiota dysbiosis and neuropsychiatric disorders; doi:10.1002/jnr.24616; Journal of Neuroscience Research 98 7(2020), Review.
39. van der Zalm Y.C. et al. CLOZ-NP Study Group; Delegating Clozapine Monitoring to Advanced Nurse Practitioners: An Exploratory, Randomized Study to Assess the Effect on Prescription and Its Safety; doi:10.1007/s10488-020-01031-4; Administration and Policy in Mental Health and Mental Health Services Research 47 4(2020), Article.
40. Nuninga J.O. et al. Vasogenic edema versus neuroplasticity as neural correlates of hippocampal volume increase following electroconvulsive therapy; doi:10.1016/j.brs.2020.04.017; Brain Stimulation 13 4(2020), Article.
41. Nuninga J.O. et al. Volume increase in the dentate gyrus after electroconvulsive therapy in depressed patients as measured with 7T; doi:10.1038/s41380-019-0392-6; Molecular Psychiatry 25 7(2020), Article.
42. Nasib L.G. et al. Prednisolone versus placebo addition in the treatment of patients with recent-onset psychotic disorder: A trial design; doi:10.1186/s13063-020-04365-4; Trials 21 1(2020), Article.
43. Thompson I.A. et al. Dopamine D2up-regulation in psychosis patients after antipsychotic drug treatment; doi:10.1097/YCO.0000000000000598; Current Opinion in Psychiatry 33 3(2020), Review.
44. Fernando P. et al. Do we need sex-oriented clinical practice guidelines for the treatment of schizophrenia?; doi:10.1097/YCO.0000000000000597; Current Opinion in Psychiatry 33 3(2020), Review.
45. De Boer J.N. et al. Anomalies in language as a biomarker for schizophrenia; doi:10.1097/YCO.0000000000000595; Current Opinion in Psychiatry 33 3(2020), Review.
46. Marschall T.M. et al. Deafferentation as a cause of hallucinations; doi:10.1097/YCO.0000000000000586; Current Opinion in Psychiatry 33 3(2020), Review.
47. Majier K. et al. Stronger than your voices: A cognitive behavioral therapy for youth suffering from auditory verbal hallucinations; doi:10.1177/1359104519888011; Clinical Child Psychology and Psychiatry 25 2(2020), Article.
48. Grasby K.L. et al. Enhancing NeuroImaging Genetics through Meta-Analysis Consortium (ENIGMA)-Genetics working group; The genetic architecture of the human cerebral cortex; doi:10.1126/science.aay6690; Science 367 6484(2020), Article.
49. Ottens T.H. et al. Hallucinations after cardiac surgery: A prospective observational study; doi:10.3390/medicina56030104; Medicina (Lithuania) 56 3(2020), Article.
50. Saris I.M.J. et al. Default Mode Network Connectivity and Social Dysfunction in Major Depressive Disorder; doi:10.1038/s41598-019-57033-2; Scientific Reports 10 1(2020), Article.
51. Schmaal L. et al. ENIGMA MDD: seven years of global neuroimaging studies of major depression through worldwide data sharing; doi:10.1038/s41398-020-0842-6; Translational Psychiatry 10 1(2020), Review.
52. van Velzen L.S. et al. White matter disturbances in major depressive disorder: a coordinated analysis across 20 international cohorts in the ENIGMA MDD working group; doi:10.1038/s41380-019-0477-2; Molecular Psychiatry 25 7(2020), Article.
53. Ai H. et al. Longitudinal brain changes in MDD during emotional encoding: Effects of presence and persistence of symptomatology; doi:10.1017/S0033291719001259; Psychological Medicine 50 8(2020), Article.
54. Tozzi L. et al. Interactive impact of childhood maltreatment, depression, and age on cortical brain structure: Mega-analytic findings from a large multi-site cohort; doi:10.1017/S003329171900093X; Psychological Medicine 50 6(2020), Article.
55. Zhang L. et al. Distinct temporal brain dynamics in bipolar disorder and schizophrenia during emotion regulation; doi:10.1017/S0033291719000217; Psychological Medicine 50 3(2020), Article.
56. Frässle S. et al. Predicting individual clinical trajectories of depression with generative embedding; doi:10.1016/j.nicl.2020.102213; NeuroImage: Clinical 26 (2020), Article.
57. Han L.K.M. et al. Brain aging in major depressive disorder: results from the ENIGMA major depressive disorder working group; doi:10.1038/s41380-020-0754-0; Molecular Psychiatry (2020), Article.
58. Hoekstra C. et al. A Skill-Based Approach to Modeling the Attentional Blink; doi:10.1111/tops.12514; Topics in Cognitive Science 12 3(2020), Article.
59. Hoekstra C. et al. A skill-based approach to modeling the attentional blink; doi:; Proceedings of ICCM 2019 - 17th International Conference on Cognitive Modeling (2020), Conference Paper.
60. Geng H. et al. Abnormal dynamic resting-state brain network organization in auditory verbal hallucination; doi:10.1007/s00429-020-02119-1; Brain Structure and Function 225 8(2020), Article.
61. Larabi D.I. et al. Trait self-reflectiveness relates to time-varying dynamics of resting state functional connectivity and underlying structural connectomes: Role of the default mode network; doi:10.1016/j.neuroimage.2020.116896; NeuroImage 219 (2020), Article.

62. Popov S. et al. The role of semantics and repair processes in article-noun gender disagreement in Italian: An ERP study; doi:10.1016/j.bandl.2020.104787; *Brain and Language* 206 (2020), Article.
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Section Cellbiology:

1. Villar-Vesga J. et al. Differential Profile of Systemic Extracellular Vesicles From Sporadic and Familial Alzheimer's Disease Leads to Neuroglial and Endothelial Cell Degeneration; doi:10.3389/fnagi.2020.587989; *Frontiers in Aging Neuroscience* 12 (2020), Article.
2. Henthorn N.T. et al. Mapping the Future of Particle Radiobiology in Europe: The INSPIRE Project; doi:10.3389/fphy.2020.565055; *Frontiers in Physics* 8 (2020), Review.
3. Barazzuol L. et al. Prevention and treatment of radiotherapy-induced side effects; doi:10.1002/1878-0261.12750; *Molecular Oncology* 14 7(2020), Review.
4. García-Huerta P. et al. Insulin-like growth factor 2 (IGF2) protects against Huntington's disease through the extracellular disposal of protein aggregates; doi:10.1007/s00401-020-02183-1; *Acta Neuropathologica* 140 5(2020), Article.
5. Serlidaki D. et al. Functional diversity between HSP70 paralogs caused by variable interactions with specific co-chaperones; doi:10.1074/jbc.RA119.012449; *Journal of Biological Chemistry* 295 21(2020), Article.
6. Coppes R.P.; Macrophages come to the rescue; doi:10.1158/0008-5472.CAN-20-3499; *Cancer Research* 80 24(2020) et al. Macrophages come to the rescue; doi:10.1158/0008-5472.CAN-20-3499; *Cancer Research* 80 24(2020), Short Survey.
7. Nagle P.W. et al. Current and Future Perspectives of the Use of Organoids in Radiobiology; doi:10.3390/cells9122649; *Cells* 9 12(2020), Review.
8. Sondorp L.H.J. et al. Patient-derived papillary thyroid cancer organoids for radioactive iodine refractory screening; doi:10.3390/cancers12113212; *Cancers* 12 11(2020), Article.
9. Peng X. et al. Cellular senescence contributes to radiation-induced hyposalivation by affecting the stem/progenitor cell niche; doi:10.1038/s41419-020-03074-9; *Cell Death and Disease* 11 10(2020), Article.
10. Beukinga R.J. et al. Addition of HER2 and CD44 to 18F-FDG PET-based clinico-radiomic models enhances prediction of neoadjuvant chemoradiotherapy response in esophageal cancer; doi:10.1007/s00330-020-07439-8; *European Radiology* (2020), Article.
11. Kuipers J. et al. Correction to: Neodymium as an alternative contrast for uranium in electron microscopy (*Histochemistry and Cell Biology*, (2020), 153, 4, (271-277), 10.1007/s00418-020-01846-0); doi:10.1007/s00418-020-01922-5; *Histochemistry and Cell Biology* 154 6(2020), Erratum.
12. de Boer P. et al. Large-scale electron microscopy database for human type 1 diabetes; doi:10.1038/s41467-020-16287-5; *Nature Communications* 11 1(2020), Article.
13. de Beer M.A. et al. Nanobody-Based Probes for Subcellular Protein Identification and Visualization; doi:10.3389/fncel.2020.573278; *Frontiers in Cellular Neuroscience* 14 (2020), Review.
14. Vishwanatha T.M. et al. Tubulysin Synthesis Featuring Stereoselective Catalysis and Highly Convergent Multicomponent Assembly; doi:10.1021/acs.orglett.0c01718; *Organic Letters* 22 14(2020), Article.
15. Joshi B.S. et al. Endocytosis of Extracellular Vesicles and Release of Their Cargo from Endosomes; doi:10.1021/acsnano.9b10033; *ACS nano* 14 4(2020), Article.
16. Kuipers J. et al. Neodymium as an alternative contrast for uranium in electron microscopy; doi:10.1007/s00418-020-01846-0; *Histochemistry and Cell Biology* 153 4(2020), Article.
17. Rempel I.L. et al. Flexible and Extended Linker Domains Support Efficient Targeting of Heh2 to the Inner Nuclear Membrane; doi:10.1016/j.str.2019.11.003; *Structure* 28 2(2020), Article.
18. Klaips C.L. et al. Sis1 potentiates the stress response to protein aggregation and elevated temperature; doi:10.1038/s41467-020-20000-x; *Nature Communications* 11 1(2020), Article.
19. Bie A.S. et al. An inventory of interactors of the human HSP60/HSP10 chaperonin in the mitochondrial matrix space; doi:10.1007/s12192-020-01080-6; *Cell Stress and Chaperones* 25 3(2020), Article.
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21. Trentini D.B. et al. Role for ribosome-associated quality control in sampling proteins for MHC class I-mediated antigen presentation; doi:10.1073/pnas.1914401117; *Proceedings of the National Academy of Sciences of the United States of America* 117 8(2020), Article.
22. Jayaraj G.G. et al. Functional modules of the proteostasis network; doi:10.1101/cshperspect.a033951; *Cold Spring Harbor Perspectives in Biology* 12 1(2020), Article.
23. Genzel L. et al. Erratum: How the COVID-19 pandemic highlights the necessity of animal research (*Current Biology* (2020) 30(18) (R1014-R1018), (S0960982220311842), (10.1016/j.cub.2020.08.030)); doi:10.1016/j.cub.2020.10.033; *Current Biology* 30 21(2020), Erratum.
24. Genzel L. et al. How the COVID-19 pandemic highlights the necessity of animal research; doi:10.1016/j.cub.2020.08.030; *Current Biology* 30 18(2020), Article.
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26. Thiruvalluvan A. et al. DNAJB6, a Key Factor in Neuronal Sensitivity to Amyloidogenesis; doi:10.1016/j.molcel.2020.02.022; Molecular Cell 78 2(2020), Article.
27. De Mattos E.P. et al. Protein Quality Control Pathways at the Crossroad of Synucleinopathies; doi:10.3233/JPD-191790; Journal of Parkinson's Disease 10 2(2020), Review.
28. Schoppe J. et al. AP-3 vesicle uncoating occurs after HOPS-dependent vacuole tethering; doi:10.15252/emboj.2020105117; EMBO Journal 39 20(2020), Article.
29. Gao J. et al. Function of the SNARE Ykt6 on autophagosomes requires the Dsl1 complex and the Atg1 kinase complex; doi:10.15252/embr.202050733; EMBO Reports 21 12(2020), Article.
30. Misrielal C. et al. Autophagy in Multiple Sclerosis: Two Sides of the Same Coin; doi:10.3389/fncel.2020.603710; Frontiers in Cellular Neuroscience 14 (2020), Review.
31. Nirk E.L. et al. Hydroxychloroquine in rheumatic autoimmune disorders and beyond; doi:10.15252/emmm.202012476; EMBO Molecular Medicine 12 8(2020), Review.
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