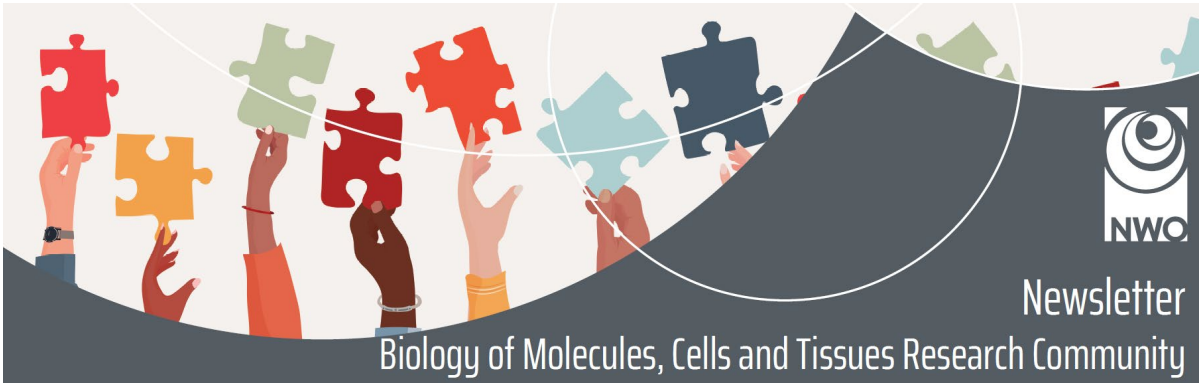


Newsletter Biology of Molecules, Cells and Tissues Research Community
25 April 2023

Please find below the newsletter of the Biology of Molecules, Cells and Tissues Research Community. This is the first edition of a quarterly newsletter, which contains information about new colleagues in the field, the advisory committee, relevant meetings, calls, and it lists granted projects related to our field. Are you a new member and do you want to introduce yourself or one of your colleagues in the upcoming newsletter or want to share your vacancies with the field? Submit your contribution by sending an email to j.wendrich@nwo.nl.

Best regards,
on behalf of the Biology of Molecules, Cells and Tissues Research Community advisory committee*,
Erik Danen (UL), Michiel Vermeulen (RU) and Jos Wendrich (NWO)

*NWO advisory committee of Biology of Molecules, Cells and Tissues Research Community:

Erik Danen (chair)	UL
Michiel Vermeulen (chair)	RU
Stanley Brul	UvA
Ingrid Dijkgraaf	UM
Amalia Dolga	RUG
Jacqueline Jacobs	NKI
Wouter Kohlen	WUR
Katharina Sonnen	Hubrecht
Robbert Rottier	ErasmusMC

Breaking news: Research community get together at NWO Life!

To facilitate networking within the research community, the Round Table of Life Sciences offers a networking get together with drinks for each of the research communities on the evening of NWO Life. Register, and join us in Egmond aan Zee on the 23rd and 24th of May!

New appointments, grants, prizes, and other news

Euro-Bioimaging, virtual Pub and newsletter
Euro-BioImaging is the European landmark research infrastructure for biological and biomedical imaging. Through Euro-BioImaging, life scientists, regardless of their affiliation, can access imaging instruments, expertise, training opportunities and data management services that they might not find at their home institutions or among their collaboration partners. **Read more >**

Every Friday at 13.00 CET, staff from the different imaging facilities Europe-wide join for a virtual meeting about myriad of topics regarding imaging. Ideal for PhDs and young Post-docs! **Read more >**

NL-BioImaging receives 15 million euros from the NWO National Roadmap programme
The Dutch Research Council (NWO) announced on 20 February that the NL-BioImaging consortium will receive major funding from the National Roadmap programme. The Leeuwenhoek Center for Advanced Microscopy (LCAM), a collaboration between the University of Amsterdam and the Netherlands Cancer Institute, plays a crucial role within this new national consortium. **Read more >** **Read more >**

The Physica Prize 2023 has been awarded to Nynke Dekker, professor single molecule nanoscale biophysics at the Kavli Institute of Nanoscience at Delft Technical University. She has invented and developed innovative physical methods within molecular biology, which she applies to current and relevant issues in biology and medicine. Her research takes place at the interfaces of physics, chemistry and biology. **Read more >**

New round of Open Competition Domain Science-XL opened
The Domain Science (ENW)-XL grants are intended for consortia in which research groups use collaboration to create added value compared to individual projects, such as for example ENW-M grants. The ENW-XL grant gives researchers the opportunity and freedom to start, strengthen, and/or expand world-class, groundbreaking, challenging and innovative lines of research **Read more >**

NWO launches call on early detection of osteoarthritis by KIC and Dutch Arthritis Society **Read more >**

NWO and The Young Academy (DJA) have joined forces to investigate the challenges researchers face in setting up and conducting inter- and transdisciplinary projects. To this end, we would like to invite you to share your experiences by filling out a questionnaire. **Read more >**

UvA biologists develop new record bright red fluorescent protein
Fluorescent proteins are widely used in biological research to make all kinds of cell types or structures visible. Think of, for example, stem cells or proteins related to cancer. A research team from the University of Amsterdam, led by Dorus Gadella, has developed a new bright red fluorescent protein: mScarlet3. They published the properties and the DNA code for this protein in the leading magazine Nature Methods. **Read more >**

NWO brings more focus to the NWA programme
The 'Research on Routes by Consortia' (ORC) programme line of the Dutch Research Agenda (NWA) will get more focus starting from the 2023 round. Each of the 25 routes will nominate a theme every two years. The adjustment comes from last year's NWA review. **Read more >**

Events, meetings, and workshops

What	When	Where
DSCB "Should I stay or should I go: cell adhesion and migration"	12 May 2023	Trippenhuis, Amsterdam
EMBL Conference Chromatin and epigenetics	15-18 May 2023	EMBL Heidelberg and Virtual
NWO Life	23-24 May 2023	Egmond aan Zee
The ageing genome	4-7 June 2023	EMBL Heidelberg and Virtual

22nd International European Light Microscopy Initiative Meeting	6-9 June 2023	Noordwijkerhout
ISSCR 2023	14-17 June 2023	Boston, USA, and virtual
Dutch Neuroscience Meeting	22-23 June 2023	Tiel
FEMS	9-13 July 2023	Hamburg, Germany
Dutch Medicine Days	20-21 September 2023	Oss
NWO Biophysics	9-10 October 2023	Veldhoven
DSSCR Meeting 2023	20 October 2023	Utrecht

Are you organising a meeting of interest for the Biology of Molecules, Cells and Tissues community and would you like to have it included in this list? Send us an email.

Meet us at NWO Life 2023

23-24 May 2023, Egmond aan Zee

NWO Life is an annual scientific conference covering all disciplines in the Dutch Life Sciences at all scales. It is meant to connect researchers, to explore and push boundaries, to discuss new or desirable developments in the field, to get inspired by each other's research and approaches and to start new interdisciplinary collaborations. **Read more >**

Research communities at NWO Life

For members of the five research communities within the life sciences, NWO Life is the hub to physically meet, connect and discuss major topics addressing the further development of the field. There will be dedicated moments to connect with the other members of your research community, as well as, moments to connect with potential new research community members.

Strategic evening

Prior to the NWO Life2023 conference, NWO and the Life Sciences Round Table organise a strategic interactive session on relevant developments and desirable directions in the Dutch Life Sciences. This session takes place during a 3-course (vegetarian/vegan) dinner and starts at 17:15 (dinner starts at 18:00). Titled "Towards an open and FAIR research culture", we will exchange views on building blocks for a transparent and healthy research culture in the life sciences, both in terms of data and people. We aim to gain inspiration on how we can contribute to this individually and as a community.

Representatives from the field are invited to participate (group leaders, members of the Biology Council, board members of disciplinary associations in the life sciences, deans, NWO board members and policymakers). A limited number of tickets is available.

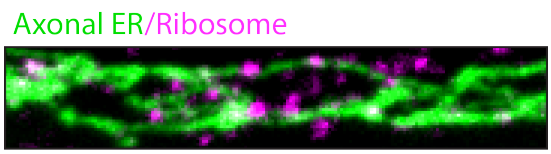
New colleagues

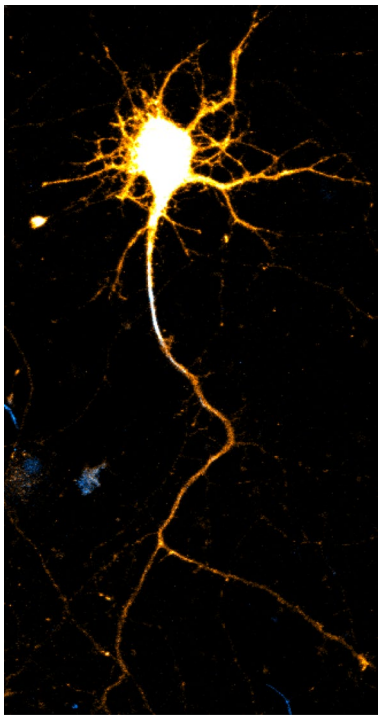
Every newsletter new colleagues in the field of Biology of Molecules, Cells and Tissues are invited to introduce themselves to the community.
Do you want to introduce yourself? Contact us via email!

Max Koppers, VU Amsterdam

I am fascinated by the ability of neurons, which are complex and highly polarized cells, to regulate, maintain and adapt their subcellular proteome. Neurons can achieve this through trafficking mRNA to subcellular sites and locally translating mRNAs. These processes are crucial for neuron function and health. The main goal of my lab is to acquire a better understanding of the molecular mechanisms and functional consequences of mRNA trafficking and local translation at specific subcellular sites in neurons in health and disease. We use live-cell and superresolution imaging combined with genetic engineering tools to visualize and study mRNA trafficking, local mRNA translation and organelles. In addition, we used proximity-based labeling techniques for visualization and proteomic characterization.

My PhD research at the UMC Utrecht (prof. Jeroen Pasterkamp and prof. Leonard van den Berg labs) on the neurodegenerative disease amyotrophic lateral sclerosis (ALS) led me to first encounter the world of RNA biology and in particular, a cell's ability to localize mRNAs and locally translate them. In ALS, RNA-binding proteins are mutated and during my PhD I investigated the mechanisms of how these mutations can lead to disease. I then moved to the University of Cambridge (prof. Christine Holt lab) for a postdoc, to dive into local mRNA translation in neurons, and in particular in axons. I received a Rubicon grant to investigate how external stimuli can affect axonal mRNA translation and regulate the specific translation of certain mRNAs through cell surface receptors. I then moved to Utrecht University (dr. Ginny Farías lab) where I obtained a Veni grant to investigate the role of the endoplasmic reticulum (ER) in axonal mRNA translation. I found that the axonal ER plays an important role in local translation and I developed various tools to study the role of the axonal ER in this process.





Using these tools, I now aim to further investigate the extent to which the axonal ER regulates mRNA trafficking and the local proteome, how this is regulated and which neuronal functions this supports, in particular at the pre-synapse.

Selected publications:
Koppers M, Ozkan N, Nguyen HH, Jurriens D, McCaughey J, Stucchi R, Altelaar M, Kapitein LC, Hoogenraad CC, Farias GG. Axonal ER tubules regulate local translation via P180/RRBP1-mediated ribosome interactions. bioRxiv, 2022

Koppers M, Cagnetta R, Shigeoka T, Wunderlich LCS, Vallejo-Ramirez P, Qiaojin Lin J, Zhao S, Jakobs MAH, Dwivedy A, Minett MS, Bellon A, Kaminski CF, Harris WA, Flanagan JG, Holt CE. Receptor-specific interactome as a hub for rapid cue-induced selective translation in axons. eLife, 2019 Nov 20;8:e48718.

Figure 1: Superresolution microscopy image of the axonal ER and ribosomes
Figure 2: Confocal microscopy image of a hippocampal neuron stained for newly synthesized proteins

Five Rosalind Franklin Fellowships awarded at RUG

- **Gosia (Małgorzata) Włodarczyk-Biegun** at the Zernike Institute for Advanced Materials

- **Kawsar Hagshenas** at the Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence
- **Marina Trombetta Lima** at the Groningen Research Institute of Pharmacy
- **Marion Nicolaus** at the Groningen Institute for Evolutionary Life Sciences
- **Nicole Gervais** at the Groningen Institute for Evolutionary Life Science

Projects granted by NWO

The projects listed are the projects granted by NWO that have a connection with Biology of Molecules, Cells and Tissues.

Please follow the links for full granting information.

OC-M

Read more >

Conquering the coronavirus replication centre
Dr. Montserrat Barcena-Martin & Prof. dr. Eric Snijder (LUMC/LUMC)

Coronaviruses use infected cells to make copies of themselves that propagate infection. To replicate their genomes, coronaviruses hijack cellular membranes to build up specialized replication compartments. These work as control centres to make the process efficient and hide it from antiviral cellular defences. Recently, we discovered a unique protein complex that provides a gate in the membranes of these replication compartments. Here, we plan to decipher how this gate and the replication organelles are built and function, which will be key to devise plans to assault these viral fortresses to block virus replication and disease.

Targeting Wnt signalling by vaccination for prevention and management of colorectal cancer
Prof. dr. Arjan Griffioen & Prof. dr. Louis Vermeulen (AUMC/AUMC)

Colorectal cancer (CRC) results in almost 900,000 deaths per year despite a large variety of treatment strategies. Therefore, patients need more precise treatments addressing molecular pathways involved in differentiation, proliferation and migration of malignant cells, to improve treatment of CRC or entirely prevent it from developing. Within this project, we propose a new vaccination strategy aimed at inhibiting Wnt signalling, an evolutionary conserved CRC signalling target, followed by validation of the vaccines in both premalignant and advance CRC mouse models, with the aim to pave the way towards the clinic for vaccines that improve both prevention and treatment of CRC.

How do transcription factor proteins choose their partners?
Prof. dr. ir. Richard Immink & Dr. Aalt-Jan van Dijk (WUR/WUR)

To regulate gene activity, proteins named ‘transcription factors’ work together with specific partner proteins in complexes. Identification of these specific partners is essential to understand which genes can be activated or repressed, but

Food for thought: Changing a deadly microbe’s diet to understand its weak spots
Dr. Robert Jansen (RU)

Tuberculosis (TB) has plagued humans for thousands of years and remains one of the leading causes of death worldwide today. We know that the bacterium that causes TB has many weak spots, but we do not know how to exploit them to fight TB. Researchers will now

currently requires time-consuming laboratory experiments. However, the recently produced wealth of genome information, in combination with the advances in artificial intelligence, now enable the development of computer models that can predict protein-protein interactions. Here, we will combine artificial intelligence with laboratory experiments to develop a robust computer model that can reliably predict plant protein-protein interactions.

feed this deadly microbe different diets and test how they affect its weak spots. Understanding the weak spots will ultimately allow the development of new drugs to fight TB, a disease that still kills over a million people every year.

Boosting cognitive skills by manipulating the brain extracellular matrix
Dr. Fred de Winter (KNAW-NIN)

The central question of this project is: can brain plasticity be improved by manipulation of the extracellular environment around the contacts (synapses) between nerve cells? We test the hypothesis that specialized structures around nerve cells, the so-called perineuronal nets (PNN), contain proteins that inhibit brain plasticity, and we focus on a unique component of PNN, the axon guidance protein Semaphorin3A. We will interfere with the function of semaphorin3A and study the effects on cognitive flexibility. We expect that the knowledge created in this project can be used to improve cognition in diseases of the brain in which cognitive abilities decline.

How neurons achieve life-long memory of their identity.
Dr. Jeroen van Zon & Dr. Gert Jansen (AMOLF/EMC)

Neurons existing in many different kinds and are not renewed during our lifetime. How do neurons ensure that during this entire time they never accidentally lose their cell type identity? The researchers use microscopy, behavioral analysis and computer simulations to uncover the mechanisms that form this memory in the neurons of a simple worm. Because the structure of the molecular networks that form this memory are conserved from worm to man, this project will also give insight into the memory of human neurons and how this is possibly perturbed in neurodegenerative disease.

Visualizing single RNA polymerase complexes upon DNA damage
Dr. ir. Jurgen Marteijn & Dr. Tineke Lenstra (EMC/NKI)

Damage in the DNA inhibits transcription of genes by RNA polymerase II, which copies the genetic information of the DNA into RNA. This inhibition of RNA polymerases results in severe cellular dysfunction and accelerated aging. In this proposal, we develop a novel microscopy-based approach that can measure the effects of DNA damage on individual RNA polymerase complexen in living cells. Using this approach, we will be able to discover what exactly happens to RNA polymerase when it encounters DNA

How growth drives the cell division cycle
Dr. Andreas Milias-Argeitis (RUG)

Cell growth and division are fundamental processes, whose proper coordination is essential for cell viability and the health of an organism. However, we still do not fully understand how this coordination arises. In this project, we will investigate how the proteins that regulate cell growth are also able to affect key events of the division cycle. To this end, we will generate a detailed map of these interactions via a combination of single-cell experiments and mathematical modeling. Our work will contribute to the understanding of fundamental cellular processes which are ultimately linked with human health.

damage, and how this affects transcription of genes.

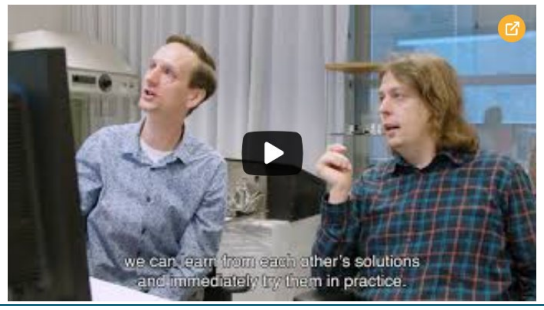
Perspectief

Read more >

3D Nanoscale Imaging (3DNI): Imaging at the smallest scales

Consortium lead: Sjoerd Stallinga

The 3DNI programme develops technology for super-fast 3D imaging of atoms, molecules, and cells. **Read more >**



Rubicon

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Uncovering the biophysical principles that govern the interaction between cells and antimicrobial peptides

Dr. A. Fragasso, Delft University of Technology -> United States -> Stanford University -> 24 months

The future of global healthcare is threatened by the rising antibiotic resistance. Antimicrobial peptides bear potential as promising alternatives to standard antibiotics. The researcher will focus on understanding what makes these peptides so effective at killing bacteria and engineer novel synthetic peptides with even better antimicrobial properties.

Unravelling key mechanisms of nuclear pore complex biogenesis

Dr. E.F.E. Kuiper, University of Groningen -> United States -> Yale University -> 24 months

The nuclear pore complex is the gateway to our DNA and crucial for cellular health. It is one of the largest complexes in the cell, but how does the cell make sure that it is correctly assembled? This research aims to elucidate quality control checkpoints in nuclear pore complex biogenesis.

Division from cooperation

Dr. K. K. Nakashima, Stratingh Institute, University of Groningen -> France -> Institut de Science et d'Ingénierie Supramolécularies, Université de Strasbourg -> 24 months

Cells undergo growth and division cycles to achieve replication, a pillar of life. Scientists cannot explain how primitive cells could divide, even though it is clear they succeeded. This project combines the chemical power of coacervates with the biophysics of vesicles to test a hypothesis of a primitive division mechanism.

Clearance of von Willebrand factor

PhD, MSc, MD, F. Atiq -> Erasmus University Medical Center Rotterdam -> Ireland -> Royal College of Surgeons -> 24 months

Von Willebrand factor (VWF) has an important role in haemostasis. Reduced levels or an abnormal function of VWF is defined as von Willebrand disease (VWD). Clearance of VWF is important in the development of VWD. The aim of this study is to gain new insights into the clearance of VWF.

Diversity and Reproducibility in Morphogenesis
MSc. L. A. Hoffmann -> Lorentz Institute (Leiden University) -> United States -> Harvard University -> 24 months

I will develop a theoretical model to learn general rules governing the growth of leaves and wings, answering the question: How do leaves and wings of the same species grow reproducibly always into the same shape while the shapes for different species can show a huge diversity?

Shining light on oncogenic protein modifications
Dr. J. Volarić -> University of Groningen -> United Kingdom -> Imperial College London -> 24 months

Cancer-causing proteins (oncoproteins) are modified by the cellular machinery after production, yet the dynamic nature of this process makes it challenging to study. By using lightreactive molecules as tools with precise control in time and space, researchers can investigate the role of oncoproteins in cancer.

3D bioprinting of human miniature bones
Dr. B.W.M. de Wildt -> Eindhoven University of Technology -> Switzerland -> ETH Zürich -> 24 months

Miniature bones can facilitate direct drug testing for treating human bone diseases, thereby reducing the need for animal experiments. This research focusses on 3D bioprinting of human miniature bones in which the cellular and structural complexity.

Vici

Read more >

Systematic identification of DNA methylation response elements and their readers
Prof. dr. T. Baubec, Utrecht University

Genomes contain over twenty thousand genes and their activity must be tightly regulated to promote cellular functions and to prevent cancer. Chemical modifications of DNA, such as methylation, can switch genes OFF without altering their DNA sequence information. This epigenetic control is an important layer of gene regulation. However, it is not well understood which genes respond to DNA methylation and how this repression is mediated. By using a combination of experimental and computational assays, we will systematically test the role of DNA methylation on gene activity and obtain

Bridging the gap: How proteins rule cell junctions and cell junctions rule proteins
Dr. ir. B.J.C. Janssen, Utrecht University

Proteins determine the distance between cells in tissues and this distance simultaneously influences proteins on the cell surface. This feedback has a role in the development and function of tissues, as well as in diseases such as cancer and neurological disorders. For instance, in the nervous system the speed of the axonal action potential is determined by the cell-cell distance and the differentiation of cells depends on an increasing cell-cell distance. The researchers will visualise at atomic level how proteins determine these distances and how these distances influence tissue function.

important insights into the impact of this modification on cellular function.

Orchestration of long-range gene regulation by cohesin and transcription factors
Dr. E. de Wit, Netherlands Cancer Institute

In our bodies genes need to be activated at the right time and the right place. Many of these genes are activated by pieces of DNA that are located far away in the genome. The folding of our genome plays an important role in the correct regulation of these genes. We will investigate which factors are important in this process. This will lead to a better understanding how genes are regulated during embryonal development and what happens in developmental disorders.

Vacancies

- Professor in Microbiome Engineering, University of Amsterdam
- Faculty position Dep. Molecular Biology and Genetics, Koç University, Istanbul, Turkey
- Multiple Faculty positions, Lee Kong Chian School of Medicine, NTU, Singapore

Contact

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