Cell News

Newsletter of the German Society for Cell Biology full electronic version 02/2023





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Editorial	4
DGZ Member Meeting 2023	5
DGZ Awards Ceremony 2023	6
Meeting Reports	
DGZ International Meeting "Cell Physics" 2023	7
14 th Symposium "Physics of Cancer" 2023	8
21st Workshop "Cell Biology of Viral Infections" - Cytoskeleton	10
From Ultrastructure to Function – A Tribute to Werner W. Franke	12
Impressum	13
DGZ Focus Workshops	14

Dear members of the DGZ,

today, we reflect on an exciting inaugural year for the new board of the German Society of Cell Biology. Through our different initiatives, awards and conferences we have been dedicated to supporting fundamental cell biology research and fostering an environment of collaboration. We continue to steer the DGZ toward greater engagement and inclusivity, ensuring the representation of diverse voices in the field.

One of the cornerstones of our Society's success lies in the continued emphasis on our monthly Focus Workshop series. These online symposia serve as vibrant exchange where researchers from very different fields converge to explore the intersections of various disciplines within cell biology. By fostering these connections, we hope to blur the traditional boundaries of research, fostering collaborations that drive innovative breakthroughs. It's in these interdisciplinary dialogues that new ideas flourish and novel approaches emerge, pushing the boundaries of our understanding.

The recent success of the "Cell Physics" meeting in Saarbrücken stands as a testament to the power of collaboration. Organized by Sandra Iden together with the CRC 1027, this gathering served as a platform for esteemed researchers to delve into the intricacies of cell physics. The event not only showcased groundbreaking research but also exemplified the strength that emerges when diverse expertise converges. Such initiatives underscore the importance of interdisciplinary dialogue in unraveling the complexities of cell biology. With the ongoing elections for new DFG panels, including the panel for cell biology, we urge all members to exercise their right to vote. Many esteemed members of the DGZ are part of the candidate list, representing the vibrant spectrum of cell biology research in Germany. Your support is pivotal in shaping the future landscape of fundamental cell biology research in our country.

As we anticipate the coming months, mark your calendars for two significant events: the online DGZ award session on November 29th and our members' meeting on December 12th. The award session will honor exceptional contributions to cell biology, celebrating achievements on all career stages. Meanwhile, the members' meeting promises insightful discussions, networking opportunities, and a chance to collectively shape the DGZ's future endeavors.

The past year has been a testament to our collective dedication to advancing cell biology. By fostering collaboration and embracing diverse perspectives, the DGZ continues to support fundamental cell biology research in Germany. As we look ahead, let's remain committed to pushing the boundaries of knowledge and innovation in the fascinating realm of cells.

Warm regards,

The DGZ Board!

DGZ Mitgliederversammlung 2023

Liebe Mitglieder der Deutschen Gesellschaft für Zellbiologie!

Wir laden Sie ein zur diesjährigen Mitgliederversammlung der DGZ, die am

Dienstag, 12. Dezember 2023, 12.00 Uhr – 14.00 Uhr online über zoom

stattfinden wird.

Die Meeting ID und das Passwort werden allen Mitgliedern rechtzeitig per E-Mail zugeschickt.

Tagesordnung:

- 1. Bestätigung des Protokolls der letzten Sitzung
- 2. Jahresbericht des Präsidenten mit anschließender Diskussion
- 3. Geschäfts- und Kassenbericht über das abgelaufene Kalenderjahr
- 4. Bericht der Rechnungsprüfer:in
- 5. Entlastung des Vorstandes
- 6. Mitgliederversammlungen online über zoom
- 7. Sonstiges

DGZ Member Meeting 2023

Dear Members of the German Society for Cell Biology!

We would like to invite you to this years' member meeting of the DGZ, which is going to take place on

Tuesday, December 12, 2023, 12:00 h – 14:00 h online via zoom

The meeting ID and password will be communicated via individual e-mail to all members in due time.

Agenda:

- 1. Confirmation of the minutes of the last meeting
- 2. Annual report of the president with discussion
- 3. Report on finances of the past calendar year
- 4. Auditors' report
- 5. Discharge of the board
- 6. Member meetings online via zoom
- 7. Other items



The 2023 DGZ AWARDS

November 29th 12:30-16:00 (UTC +1)

Zoom-ID: 859 1573 3336 Passcode: awards23

12:30	Introduction
12:40	Nikon Young Scientist Award to ALEXANDRA SCHNELL Harvard Medical School and Whitehead Institute, Boston, USA Th17 cell heterogeneity in tissue inflammation
13:00	Werner Risau Prize to MACARENA FERNÁNDEZ CHACÓN Universidad Loyola Andalucia, Sevilla, Spain Incongruence between transcriptional and vascular pathophysiological cell states
13:20	Walther Flemming Award to FLORIAN WILFLING Max Planck Institute of Biophysics, Frankfurt <i>Ultrastructural analysis of autophagy using correlative cryo-electron tomography</i>
13:40	BINDER Innovation Prize to FABIAN ERDEL Centre for Integrative Biology, Toulouse, France How cells shape their chromatin landscape
14:00	Carl Zeiss Lecture by JOCHEN GUCK Max Planck Institute for the Science of Light, Erlangen Feeling for cell function

15:00 Q&A with all prize winners

2023 Carl Zeiss Lecture





Jochen Guck Feeling for cell function



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<image>

Alexandra Schnell Th17 cell heterogeneity in tissue inflamm



Macarena Fernández Chacón congruence between transcriptional and vascular pathophysiological cell states



Florian Wilfling Ultrastructural analysis of autophagy using correlation

cryo-electron tomography



Fabian Erdel How cells shape their chromatin landscap

DGZ International Meeting Cell Physics 2023, Saarbrücken

From 10th to 13th October 2023, we were finally able to meet in person again at this year's DGZ International Meeting at Saarland University in Saarbrücken, which was jointly organized by the DGZ and CRC 1027. Around 300 participants were able to enjoy the exciting data presented by 39 invited speakers, in 28 short talks and on 135 posters (55 % female speakers). Topics included immune biophysics, cytoskeleton, mechanobiology, cell-cell adhesion, intercellular communication, active transport processes, heterogeneity and diversity, cross-scale signaling, membrane remodeling, multicellular dynamics and single cell biology. Two presentations dealt with funding opportunities for young scientists at the DFG and the ERC. Together with our colleagues from the French Society for Cell Biology SBCF, we held a joint German-French session on cell biology, with scientific presentations by Florence Niedergang, Isabelle Tardieux, Cristina Cardoso and Jörg Höhfeld. Besides all the science, the networking continued with some off-campus activities (climbing park, visit to the World Heritage Site Völklinger Hütte, a long hike and other daily sports activities). We ended the last evening with a lively conference party in the Aula. On the last day, the prizes for two outstanding short presentations and 4 poster presentations were awarded after a vote by the participants (awardee list here: https://cell-physics.uni-saarland.de/#awards).

We are grateful to the DFG for important financial support of the conference as well as funding many of the projects presented. In addition, we would like to thank our industrial sponsors for funding various awards: Our gold sponsors ibidi GmbH, Thorlabs GmbH, acCELLerate, plus further sponsors Carl Zeiss Mikroskopie Deutschland, and The Company of Biologists/Open Biology.

Organizing committee:

Sandra Iden, Franziska Lautenschläger, Ludger Santen, Jochen Hub and Heiko Rieger

More information at the meeting webpage: <u>https://www.cell-physics.uni-saarland.de</u>





Cell Physics 2023 CRC 1027 & DGZ International Meeting Saarland University, Saarbrücken, October 10-13, 2023



14th International Symposium "Physics of Cancer"

The conference was held October 04 – 06, 2023 at the Center for Biotechnology and Biomedicine (BBZ), Leipzig

There are great possibilities for major advancements in cancer treatment if unifying principles and a mechanistic knowledge of cancer are revealed. We need a thorough understanding of this remarkably complicated and diverse disease if we are to combat cancer. This entails discovering physics-based general patterns of malignant tumor behavior and fusing it with our understanding of the distinctive genetic changes and molecular expression behavior. The purpose of the research topic "Physics of Cancer" is to identify these physical patterns of tumor behavior, comprehend them mechanistically, and ultimately translate them into novel ways for cancer diagnostics and treatment. In this sense, the advancement of this multidisciplinary research methodology benefits medical research. Finding broad physical mechanisms underlying the development and spread of tumors in the human body is the aim of this field, which focuses on the impact of both passive and active factors on cell migration, proliferation, and signaling.

The most recent advancements in this discipline have been featured at the 14th International Symposium on "Physics of Cancer." Traditional topics covered in four focus sessions were tumor cell dynamics, the relationship between the tumor and its surroundings, and the biophysical characteristics of malignant cells and tissues and their implications for the mechanobiology of cancer cells. In addition to the founder of the annual meeting Josef Käs (Leipzig University), this year's conference was organized by Pere Roca-Cusachs Soulere (IBEC Barcelona), Anna Taubenberger (TU Dresden), Ben Fabry (FAU Erlangen) Mareike Zink (Leipzig University) and Jörg Schnauß (Leipzig University).

The conference was hosted in a hybrid style in order to allow for international contributions and to reach and attract a worldwide audience. The majority of the talks were delivered in person, however some speakers opted to show their most recent research findings online. Every discussion was broadcast live for internet viewers. A particular adjustment was made to the timetable to accommodate the presenters' varying needs. Over 100 people from all over the world attended our annual conference, demonstrating the strong international interest in it.

Out of the abstracts submitted, 25 invited lectures and 8 contributed talks were chosen. Nine of the 33 speakers were women. Each of the 27 posters was delivered in person. The conference is summarized in the form of an excerpt in the sections that follow, which also feature specific lectures from the various sessions that are particularly pertinent.

First day:

The symposium started with the sessions on Cancer cell and tissue mechanics and was opened by Pep Pamies (Nature Biomedical Engineering) with the title "Accelerating the impact of cancer mechanopathology". In his role as editor within the Nature publishing group, he conveyed the role of selective journals in accelerating research, and provided examples of how journals can drive meaningful changes in peer review. By providing examples in the area of cancer mechanopathology, he argued that a deeper understanding of the myriad ways that the mechanics of cellular and tissue microenvironments trigger or exacerbate cancer will open up pathways for new interventions. Subsequently, Timo Betz (Georg-August University Göttingen, Germany) spoke about "Quantifying intracellular mechanics by active and passive measurements" effectively opening the topic of cancer cell and tissue mechanics. He introduced his studies on active force generation and mobility in different cellular systems using a combination of optical tweezer-based cell mechanics measurements with precise particle fluctuation analysis. Jing Guo (Charité Berlin, German) effectively bridged the gap between the cellular and tissue level in her presentation "Investigate the biomechanical traits of hepatocellular carcinoma with MRE". Jing reported about MRE-based approaches to identify and diagnose the stiff hepatocellular carcinoma in the background of softer surrounding tissue. Paul Janmey (University of Pennsylvania, USA) highlighted the role of the cellular nucleus within his talk "Deformation of metabolically intact isolated nuclei".

The first day was concluded by a classical concert for all participants.

Second day:

The day was comprised of the focus session on Cancer cell mechanobiology.

Xavier Trepat (IBEC Barcelona, Spain) presented maps of the three-dimensional cell-ECM and cell-cell forces in mouse intestinal organoids grown on soft hydrogels. These maps revealed a non-monotonic stress distribution that defines mechanical and functional compartments. He emphasized that cancer stem cells contribute mechanical stability to the cancer stem cell niche whereas differentiated cancer cells display are more dynamic phenotype that favors metastatic progression. Within his talk "Feeling the force: molecular tools for quantifying cellular traction forces", Khalid Salaita (Emory University, USA) described an ensemble of methods to measure cell mechanics and especially DNA tension probes offering possible applications as forces sensors. Carlos Perez-Gonzalez (Institut Curie, France) showed results in his talk "Self-organizing principles driving tumor hierarchy and stemness" indicating that, even in the absence of external cues, cancer cells have an intrinsic ability to distribute different cell types and functions in time and space to grow a hierarchical tumor-like tissue. In the talk "Oxidative stress regulates talin mechanosensing", Sergi Garcia-Manyes (King's College London, UK) explained how specific oxidation post-translational modifications on protein mechanosensors can affect cellular mechanotransduction.

One of the highlights of the second day was the bestowal of the young scientist award (funded by the DGZ) for the best posters, which were announced after the poster session.

The first price was awarded to Kristina Havas (IFOM ETS-The AIRC Institute of Molecular Oncology, Milan, Italy) for her work and presentation on "Surviving under pressure: mechano-metabolic regulation of cell density homeostasis". Several high quality posters were presented and award decisions were tough. In the end, the jury decided to share the second place between Antje Garside (TU Dresden, Germany) for her poster on "Studying the mechanical and morphological phenotype of prostatic cancer-associated fibroblasts", Grégoire Lemahieu (Max Planck Institute for Medical Research, Germany) for his poster on "Deciphering the role of RAB5A-mediated tissue fluidification in cancer spheroid dynamics and their mechanical properties" and Pablo Gottheil (Leipzig University, Germany) for his study on "State of Cell Unjamming correlates with distant Metastasis in Cancer Patients", respectively.

In the evening of the second conference day, all invited speakers were invited to the conference dinner at the "Café Cantona".

Third day:

The first sessions of this day were dedicated to Tumor cell dynamics. Elisabeth Cavalcanti-Adam (MPI Heidelberg, Germany) talked about her work to track the behavior of cancer cells within a mechanically perturbed system through live-cell imaging and traction force microscopy. By experimentally manipulating the adhesion strength, she quantitatively assessed the effect on the unjamming process revealing that altering cell-matrix adhesion significantly impacts the mechanical response of cancer cells during unjamming. Specifically, reducing cell-matrix adhesion weakens the overall cohesive forces within the system, leading to a more fluid-like and gas-like behavior and increased cellular motility. Within his talk "Chemo-mechanical diffusion waves orchestrate collective dynamics of immune and cancer cell podosomes", Vivek Shenoy (University of Pennsylvania, USA) showed his integrated theoretical and experimental approach to study how collective wave dynamics arise from the coupling between chemo-mechanical signaling and actin diffusion. This sheds light on the role of podosomes in immune cell mechanosensing within the context of wound healing and cancer immunotherapy. Erik Sahai (Francis Crick Institute, UK) demonstrated

that stromal fibroblasts can be invasion suppressing. Intriguingly, the location of the points of invasion can be related to the spatial organization of stromal fibroblasts near, but not at, the tumor stroma boundary.

After lunch, the day continued with the sessions on Tumor microenvironment interactions. The session was opened by Amaia Cipitria (Biodonostia Health Research Institute, Spain) describing her approaches to understand to understand cancer dormancy and early metastasis. She showed results of several complementary techniques providing novel insight of homing of cancer cells in the bone marrow, their microenvironment and onset of early bone metastatic lesions. Heiko Enderling (MD Anderson Cancer Center, USA) reported in his talk "High resolution modeling of cell migration in the tumor immune ecosystem" about high-resolution analyses of the population level consequences of different biological rules, and how to best harness them for therapeutic intervention. Johanna Ivaska (University of Turku, Finland) talked about how cells can uncouple their response from stiffness. In cancer, stiffening of the tumor stroma is considered as an instrumental contributor to tumor progression and cell responses such as migration and spreading are considered as a proxy for increased matrix rigidity. The presented results seemingly uncover mechanisms that uncouple this link and enable cells to migrate towards softer environments or spread efficiently on soft supports.

The symposium included a mixture of talks from different scientific disciplines and provided new insights into cancer-related research that lead to lively discussions.

Author: Jörg Schnauß, Leipzig University.

Acknowledgements

We proudly acknowledge the following supporters of this year's symposium:



Meeting report of the 21st workshop "Cell Biology of Viral Infections" of the German Society for Virology (GfV) in Schöntal

Gabrielle Vieyres¹ and Christian Sieben²

For its 21st edition, the "Cell Biology of Viral Infections" Workshop of the German Society of Virology (GfV) reconvened at the beautiful Kloster Schöntal, 70 km south of Würzburg. The meeting was organized from October 18-20th and attracted 39 participants, mostly PhD students and postdocs. In 2022, Gabrielle Vieyres (Leibniz Institute for Virology) and Christian Sieben (Helmholtz-Centre for Infection Research) took over the meeting series. This year's topic on the "Cytoskeleton" was well represented by four invited keynote speakers from Germany, Austria and the United Kingdom. The program encompassed 4 sessions, covering the different steps of the viral replication cycle (early events in virus infection, virus-host interface, viral replication and morphogenesis). In addition, one session was specifically devoted to the cytoskeleton, the focus of this year's meeting. The meeting underscored the necessity of gaining a more comprehensive perspective on the cytoskeleton, an integral component of cellular biology, to establish a fundamental grasp of viral cell biology.

The first keynote lecture was given by Dr. Katharina Scherer from the University of Bonn on "Tracing the reorganization of the cytoskeleton during viral infections with light microscopy". Dr. Scherer presented her work on using advanced microscopy to follow the chronology of Herpes Simplex Virus 1 (HSV-1) infection within a cell. Using reporter "timestamp" viruses and high-resolution imaging she could correlate distinct steps of the viral replication cycle with striking alterations of various cellular organelles such as the ER and Golgi apparatus but also the cytoskeleton. The used timestamp viruses express fluorescent early and late viral protein reporters, which could be used to classify the replication cycle into four distinct stages. Cellular changes could then be associated with a specific stage of viral replication. The following session of the meeting was devoted to early events in virus infection and included presentations on virus-receptor interaction, cell entry and the development of Lassa anti-spike protein antibodies.

The first day was concluded by the second keynote lecture by Prof. Franziska Lautenschläger from Saarland University. Prof. Lautenschläger presented an exciting overview of her group's activities with respect to cell migration and intermediate filaments. She reported on two modes of cell movement that depend on the cellular microenvironment and can be mimicked using different sample chamber geometries. Using such devices, cells can be tracked to better understand and extract motion patterns associated with a specific cellular context. The Lautenschäger group uses a number of microscopy and force probing technologies for their research which nicely highlights the use of quantitative imaging in cell biology and biophysics.

The second day was kicked off by the keynote lecture from Prof. Michelle Peckham on "Seeing into the cytoskeleton". Prof. Peckham has a long-standing expertise in muscle physiology, specifically the structure and cell biology of myosins. During the talk, Prof. Peckham highlighted the many different flavors of myosins and how their cellular functions can be probed using genetic knock-out systems in combination with the exquisite use of fluorescence microscopy. A further highlight of the talk was the recently published structural investigation of the shutdown state of myosin-2 which will form the basis to better understand disease-causing mutations. Prof. Peckham finished by introducing affimers, small recombinant binders that hold great potential for instance as new labeling tools in combination with super-resolution microscopy.

As the fourth keynote lecture, Prof. Florian Schur from the Institute of Science and Technology Austria (ISTA) took us for a deep dive across resolutions and between structure and function of the actin cytoskeleton with a focus on the Arp2/3 complex that nucleates branching of the actin cytoskeleton and is critical for lamellipodia formation and cell migration. Prof. Schur presented his results on an exciting study investigating the role of specific subunit isoforms within the Arp2/3 complex. During the second part of his lecture, he then illustrated the power of cryo-electron tomography and subtomogram averaging to decipher the organization of the vaccinia virus core revealing a number of new organizational structures.

Among the variety of topics and methods covered, we would like to highlight the use of cryo-EM to illuminate the structure of the vaccinia virus core, to gain insight into the mechanism of viral transcript release and in progeny virus production, as illustrated by our plenary speaker, Prof. Schur, but also other contributors. The participants further enjoyed several talks about membraneless organelles relevant in Ebola and Nipah virus replication. In this context, the prize for the best presentation was after voting of all participants awarded to Nico Becker, from the University Marburg, who discovered and presented how Nipah virus phosphoprotein P sequesters the innate immune adaptor proteins STAT1/2 to virus-induced inclusion bodies, thereby antagonizing the antiviral interferon response in the infected cells. We would like to thank all participants of the workshop for their excellent presentations, the stimulating discussions and the friendly atmosphere throughout the three days. Furthermore, we express our gratitude to the German Society for Virology (GfV), the German Society for Cell Biology (DGZ), and the company ReBlikon GmbH for their support. The workshop would not have been possible without their generous contributions. The 22nd workshop "Cell Biology of Viral Infection" of the German Society of Virology (GfV) will take place from November 4 to 6th 2024, again at Schöntal Monastery. For updates, please visit our website at https://cellviro.g-f-v.org/.

1 Research Group Cell Biology of RNA Viruses, Leibniz Institute of Virology, Hamburg, Germany

2 Nanoscale Infection Biology Group, Helmholtz Centre for Infection Research, Braunschweig, Germany and Institute of Genetics, Technische Universität Braunschweig, Braunschweig, Germany



The 21st edition of the "Cell Virology of Viral Infections" Workshop of the GfV took place from October 18th to October 20th at the Kloster Schöntal.



Nico Becker, PhD student at the Philipps University of Marburg and winner of the best presentation award, surrounded by the organizers Christian Sieben and Gabrielle Vieyres. Nico Becker was awarded the prize for his presentation on the mechanism underlying the antagonism of the interferon response by the Nipah virus phosphoprotein P. The symposium "From Ultrastructure to Function" dedicated to the late Professor Werner W. Franke took place from September 27 to 28, 2023 at the German Cancer Research Center in Heidelberg. Friends, former students and colleagues gathered for two days not only to commemorate his many achievements and contributions to cell biology but also to bear witness to how the scientific seeds he planted developed over the years. The meeting was devoted to three major topics: Nuclear Architecture and Dynamics, Cytoskeletal Filaments and Cell Junctions. The distinguished speakers hailed from regions extending beyond Europe, including Israel, the United States, the United Kingdom and even Australia. In addition to individuals directly impacted by Werner Franke, the event attracted next-generation scientists carrying on his research legacy as well as several members of his family. The meeting provided an opportunity to rekindle old friendships and create new networks. Eschewing a mere sentimental review of the past, all talks were poised to outline up-todate and future research in cell biology. In line with this, the last session was entitled Quo vadis? and aimed to illustrate how cell biology guides advances in the diagnosis and treatment of human disease. As Brigitte Franke-Berendonk, Werner Franke's widow, pointed out, the symposium was completely in keeping with the spirit of Werner Franke, one that he would not have missed had he had the opportunity to attend himself, as it perfectly combined intensive scientific discussion with camaraderie to get to the truth of the matter.



Welcome by Michael Baumann, Brigitte Franke-Berendonk Roland Moll Remembering Werner Franke

and gene knockdown

Evolution of the lamin protein family

How cohesin folds the genome by loop extrusion

Nuclear Architecture and Dynamics

Ada/Donald Olins		

Ricardo Benavente Reimer Stick Jan Michael Peters

Cytoskeletal Filaments

Fiona Watt Harald Herrmann Frans Ramaekers Roy Quinlan Nikolas Haass

Ingrid/Roland Moll

Cell Junctions

Sergey Troyanovsky Mareike Barth Rudolf Leube Benjamin Geiger Sandra Iden

Quo vadis? Klaus Pantel Ian Mather Structure and assembly of intermediate filaments Cell biology of lamins in health and disease Binding of BFSP1 to the plasma membrane Compression-dependent microtubule reinforcement comprises a mechanostat which enables cells to navigate confined environments Significance of keratins in the pathological diagnosis of primary and metastatic carcinomas, including Merkel cell carcinoma α-Catenin and plakophilins in the assembly of cadherin clusters Cordial connections How the keratin cytoskeleton stays in tune with the fabric of life Adherens junction biology 1981-2023 Cell adhesion, polarity and mechanical signals in homo- and heterotypic cell-cell interactions in the epidermis

Nuclear architecture and m-RNA synthesis during cell differentiation, dehydration

Differentiation in stratified squamous epithelia and squamous cell carcinoma

The synaptonemal complex of mammalian meiosis: from ultrastructure to pathology

Keratins as markers of disseminating tumor cells in cancer patients Butyrophilin: From Band 12 to a multifunctional protein





DGZ Focus W	orkshops 2023 –	2024
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Zoom, last Tuesday of a month, noon - 2pm

Zoom- ID: 961 7810 6979 Passcode: DGZ FW

(for questions contact Sandra Iden, sandra.iden@uks.eu)

November 28, 2023	Membrane Organization and Contact Sites Maria Bohnert, Julia Groß
January 30, 2024	Mitosis and Meiosis Simone Reber, Thomas Mayer
February 27, 2024	Imaging for Cell Biology Helge Ewers, Kay Grünewald
March 26, 2024	Functional organization of the nucleus Zuzana Storchova, Cristina Cardoso
April 30, 2024	Cell Adhesion and Extracellular Matrix Carsten Grashoff, Sara Wickström
May 28, 2024	Cellular and Organismal Proteostasis Thorsten Hoppe, Jörg Höhfeld

Impressum

Publisher: Deutsche Gesellschaft für Zellbiologie e.V. (DGZ) (German Society for Cell Biology)

Editor- in- Chief: Prof. Dr. Roland Wedlich-Söldner, Präsident (Universität Münster)

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Media Creation: Werner Rehberger WR Grafik-Design 68799 Reilingen wr@wr-grafikdesign.de

Full electronic version

Frequency of publication: 3-4 issues yearly

If you are interested in advertising, please contact the DGZ office (dgz@dkfz.de)

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