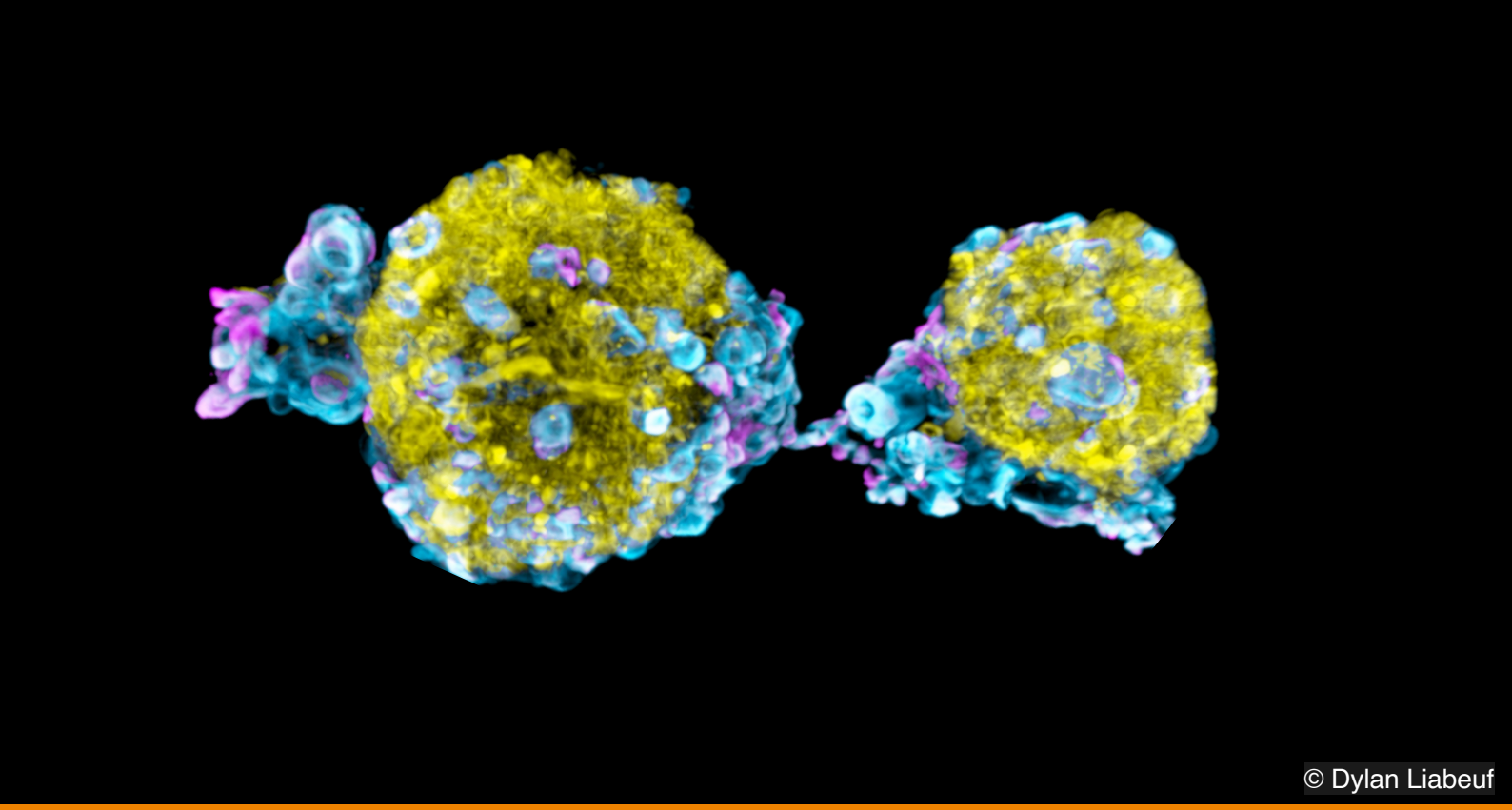


SYMPOSIUM

Berlin Organoid – 1st Edition

Sept. 24, 2025 - BCRT-Cranach Haus Auditorium*

The organoid technology has been rapidly adopted by a broad number of laboratories worldwide. It provides a unique model system to study development, tissue homeostasis, regeneration, tissue repair and disease mechanisms. This technological revolution in biology has opened new opportunities across a wide range of fields. The first edition of the Berlin Organoids Symposium will bring together leading experts from diverse disciplines who use organoids for modelling disease and cell-based therapy applications.

The event will highlight recent advances in the field, covering topics from fundamental organoid biology to translational applications. By uniting scientists from various institutions and expertise, we hope to catalyse new ideas and foster lasting collaborations that will shape the future of organoid research in Berlin and beyond.

SPEAKERS:

Sina Bartfeld – Technische Universität Berlin (TUB), Charité-Universitätsmedizin Berlin
Lukas Ehlen (Schmück-Henneresse lab) – Berlin Institute of Health at Charité (BIH)
Silke Frahm (Diecke lab) – MDC Plateform, Max Delbrück Center (MDC)
Mina Gouti – Max Delbrück Center (MDC)
Anna Löwa (Hocke lab) – Charité-Universitätsmedizin Berlin
Jakob Johannes Metzger – Max Delbrück Center (MDC)
Milad Rezvani – Berlin Institute of Health at Charité (BIH)
Agnieszka Rybak-Wolf – Max Delbrück Center (MDC)
Michael Sigal – Charité – Universitätsmedizin Berlin
Harald Stachelscheid – CUSCO Platform, Berlin Institute of Health at Charité (BIH)
Ludovic Vallier – Berlin Institute of Health at Charité (BIH) – Max Planck Institute Molecular Genetics (MPI-MG)

BIH Berlin Institute of Health @Charité

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STEMCELL™ TECHNOLOGIES

ORGANIZERS: Ludovic Vallier – Dylan Liabeuf – Anastasiia Maksiuk

*Föhrer Straße 15,13353, Berlin

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Berlin Organoid Symposium

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Abstracts

PROGRAM

Wednesday, September 24, 2025

9.00am – 9.15am **Welcome**

9.15am – 9.30am **Introduction** by Ludovic Vallier

Session 1 9.30am – 10.20am: *Epithelial Organoids – Liver* — Chair: Dylan Liabeuf
Speaker 1: Milad Rezvanni
Speaker 2: Ludovic Vallier

10.20am – 10.50am **Coffee break / Poster session**

Session 2 10.50am – 11.40am: *Epithelial Organoids - Gut* — Chair: Merrit Romeike
Speaker 1: Michael Sigal
Speaker 2: Sina Bartfeld

11.40am – 1.30pm **Lunch / Poster session**

Session 3 1.30pm – 2.20pm: *Epithelial Organoids – Lungs* — Chair: Laura Avila
Speaker 1: Lukas Ehlen
Speaker 2: Anna Löwa

Industry Talk 2.20pm – 3.00pm — Chair: Dylan Liabeuf
STEMCELL Technologies: Carla Sanjurjo Soriano
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3.00pm – 3.30pm **Coffee break / Poster session**

Session 4 3.30pm – 4.45pm: *Ectodermal Organoids* — Chair: Irene Talon
Speaker 1: Mina Gouti
Speaker 2: Jakob Johannes Metzger
Speaker 3: Agnieszka Rybak-Wolf

Session 5 4.45pm – 5.35pm: *Organoid Platforms* — Chair: Fabian Bachinger
Speaker 1: Harald Stachelscheid
Speaker 2: Silke Frahm

5.35pm – 7.00pm **Social hour and Posters**

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Berlin Organoid Symposium

ABSTRACTS



Milad Rezvani

https://rezvanilab.org

Charité - Universitätsmedizin Berlin, Freie Universität Berlin and Humboldt Universität zu Berlin, Department of Pediatric Gastroenterology, Nephrology and Metabolic Medicine, Berlin
Berlin Institute of Health (BIH) at Charité-Universitätsmedizin Berlin, BIH Center for Regenerative Therapies (BCRT), Berlin.
Division of Pediatric Gastroenterology, Hepatology and Nutrition, Cincinnati Children's Hospital Medical Center, OH, USA.

Title: Organoids Deconstruct Liver–Immune Tissue Interactions

Human stem cell-derived organoids are transforming our capability to model liver development and disease. However, the ability of current organoids to elucidate how immune cells may guide the formation of solid tissues, such as in the liver, remains unclear. To deconstruct the liver–immune niche in development, we generate human Fetal Liver-like Organoids (FLOs) that self-organize a developing hepatobiliary architecture, filled with yolk sac-like hematopoiesis.

Through organoid-intrinsic crosstalk, FLOs develop early myeloid differentiation and reveal a macrophage-driven bias toward hepatocyte differentiation from a bipotent progenitor, a mechanism previously unknown. Mouse models lacking macrophages during specific embryonic windows of hepatobiliary development confirm findings from FLOs.

Together, liver-immune organoids provide a platform for understanding liver–macrophage communication, establishing macrophages as key regulators of hepatocyte development.

SESSION 1: LIVER

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Berlin Organoid Symposium

ABSTRACTS



Ludovic Vallier

https://www.bihealth.org/en/notices/regenerative-hepatology

Berlin Institute of Health at Charité - Universitätsmedizin, Center for Regenerative Therapies, 13353 Berlin, Germany; Max-Planck-Institute for Molecular Genetics, 14195 Berlin, Germany.

Title: Everything you always wanted to know about liver organoids (but you were afraid to ask)

The liver fulfils a broad spectrum of vital functions including metabolism of lipids and blood detoxification. The liver is also a unique organ for its capacity of regeneration. Indeed, this organ can regrowth two third of its mass few weeks after resection, the front-line therapy against hepatocellular carcinoma. Our group takes advantage of organoids derived from primary tissues and human Pluripotent Stem Cells to study liver development, liver regeneration and liver diseases. We then combine the resulting knowledge to develop cell-based therapy which not only repair the injured tissue but also protect the organ against further damages. The presentation will describe the different liver organoids currently available and their applications not only to investigate basic mechanisms but also to establish new therapeutic approaches against diseases affecting the liver.

SESSION 1: LIVER

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Berlin Organoid Symposium

ABSTRACTS



Michael Sigal
https://hepatologie-gastroenterologie.charite.de/metas/person/person/address_detail/prof_dr_med_michael_sigal

Department of Hepatology & Gastroenterology, Charité Universitätsmedizin Berlin, Campus Virchow-Klinikum and Campus Charité Mitte, 13353, Berlin, Germany.
Berlin Institute for Medical Systems Biology, Hannoversche Straße 28, 10115, Berlin, Germany.

Title: Mesenchymal-epithelial interactions in gastrointestinal health and disease

The gastrointestinal epithelium is surrounded by different subsets of mesenchymal stromal cells. We have developed new ex vivo tools to study the interplay between the epithelium and stroma.
We find that crypt formation is guided by a constant signaling reinforcement between the two compartments along the crypt axis. We also find that sensing of disruptions of such reinforcement mechanisms is important for the Initiation of injury repair programs and tissue regeneration, while they are also highjacked in the context of carcinogenesis.

SESSION 2: GUT

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Berlin Organoid Symposium

ABSTRACTS



Sina Bartfeld

https://www.tu.berlin/medbt/ueber-uns

Department Medical Biotechnology, Institute of Biotechnology, Technische Universität Berlin, Berlin, Germany.
Si-M/Der Simulierte Mensch, Technische Universität Berlin and Charité Universitätsmedizin Berlin, Berlin, Germany.

Title: Infection, inflammation and cancer in the gut - organoids as model

Infections are still a major health threat worldwide. In the gastrointestinal tract, the epithelial lining acts as barrier between the microorganisms of the gut and the body. The epithelial cells can sense microorganisms, which activates innate immune signaling pathways and leads to an inflammatory response. Chronic inflammations, for example caused by infection with the gastric pathogen *Helicobacter pylori*, can cause many diseases, including cancer.

We use adult stem cell-derived organoids to analyze the molecular basis of innate immune signaling in the epithelium and to study infections of the gastrointestinal tract. We generated a biobank of human and murine organoids covering 6 sites from stomach to colon. RNA-sequencing showed that the tissue identity is conserved in the adult stem cells. Moreover, components of the epithelial innate immune sensing, such as toll like receptors, are part of the tissue identity and highly organized along the gastrointestinal tract. Using this biobank of organoids, we identified the molecular mechanism of tropisms of different infections, including *H. pylori*, Enteropathogenic E. coli, or SARS-CoV-2.

SESSION 2: GUT

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Berlin Organoid Symposium

ABSTRACTS



Lukas Ehlen

https://www.bihealth.org/de/forschung/arbeitsgruppe/ag-schmueck-henneresse-experimentelle-immuntherapien

Berlin Institute of Health (BIH) at Charité — Universitätsmedizin Berlin, BIH Center for Regenerative Therapies (BCRT), Experimental Immunotherapy, Berlin

Department of Anesthesiology and Intensive Care Medicine, Charité – Universitätsmedizin Berlin, Berlin, Germany

Title: Lung tumoroids as a testing platform for precision immunotherapy and beyond

Lung cancer, the leading cause of cancer-related mortality, presents challenges for standard-of-care therapies and innovative treatments like CAR T cells due to tumor heterogeneity and resistance. To support personalized treatment decisions, we developed a platform using matched lung tumoroids and healthy lung organoids. Long-term propagating tumoroids retained original tumor identity, as validated by multi-omic analyses, accurately replicating patient responses to standard-of-care therapies.

The platform enabled identification of individual CAR T-cell responses and associated mechanisms, revealing complex interactions between target antigen density and immunoregulatory pathways.

We are developing a complementary short-term tumoroid assay preserving tumor identity and microenvironmental context, enabling therapeutic testing within one week of resection, providing a rapid testing option for time-critical clinical scenarios. Together, these short- and long-term tumoroids form an integrated framework supporting rapid treatment evaluation and longitudinal testing for therapy refinement. This platform enables personalized therapy testing, immunotherapy development and biomarker-guided patient stratification in lung cancer.

SESSION 3: LUNGS

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Berlin Organoid Symposium

ABSTRACTS



Anna Löwa
https://infektiologie-pneumologie.charite.de/hocke_group/team

Department of Infectious Diseases, Respiratory Medicine and Critical Care, Charité-Universitätsmedizin Berlin, Corporate Member of Freie Universität Berlin and Humboldt-Universität zu Berlin, 10117 Berlin, Germany.

Title: ASC-derived lung organoids as models for respiratory infection

Understanding the interplay between pathogens and the heterocellular compartments of the human lung is critical for developing immunomodulatory therapies for pneumonia. In this presentation, ASC-derived alveolar- and bronchial-like lung organoids are introduced alongside ex vivo lung tissue as models to study innate immune responses to infection. We describe organoid generation and an integrated characterization approach across donors and passages that combines advanced imaging and transcriptomics. Exemplary applications of the organoid models in pneumonia research highlight their relevance for infection biology. We outline ongoing efforts to optimize and standardize the infection model to ensure reproducibility and enhance translational use.

SESSION 3: LUNGS

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Berlin Organoid Symposium

ABSTRACTS



Mina Gouti
https://www.goutilab.com
https://www.mdc-berlin.de/de/gouti

Stem Cell Modeling of Development & Disease Group, Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC), 13125, Berlin, Germany.

Title: Building the next generation of human neuromuscular models to study disease

Locomotion results from the interaction between muscles and the nervous system. Dysfunction of such cells results in deadly diseases such as spinal muscular atrophy (SMA) and amyotrophic lateral sclerosis (ALS). Neuromuscular diseases often show regional selectivity but the underlying reasons remain obscure due to the lack of a suitable human model system. We have used human pluripotent stem cell derived axial stem cells, the building blocks of the posterior body, to simultaneously generate spinal cord neurons and skeletal muscle cells that self-organize in 3D to generate neuromuscular organoids (NMOs). NMOs contain functional neuromuscular junctions supported by terminal Schwann cells. They contract and develop central pattern generator-like neuronal circuits. We are currently applying NMOs to study the early development of the human neuromuscular system and to model neuromuscular diseases.

This approach promises to uncover the sequence of events and provide greater insight into the mechanisms that lead to specific diseases by tackling previously inaccessible features of neuromuscular junction biology. The scalable nature of NMOs will provide an ideal platform for drug screening and developing targeted therapies paving the road to personalized medicine.

SESSION 4: ECTODERMAL ORGANOIDS



Jakob Metzger
https://www.mdc-berlin.de/person/dr-jakob-johannes-metzger

Berlin Institute for Medical Systems Biology, Max Delbrück Center for Molecular Medicine in the Helmholtz Association, Berlin, Germany.

Title: Reproducible Brain Organoids for Disease Phenotyping and Screening

Brain organoids are powerful tools for studying human-specific aspects of neural development and for modeling neurodevelopmental disorders. However, their application in phenotyping subtle early disease phenotypes and in high-throughput screening has been limited by challenges in reproducibility and scalability.
To address these limitations, we developed micropatterned neural organoids with high structural and cellular reproducibility, designed to capture early stages of human cortical development and to detect disease-associated deviations.
As a proof of concept, we modeled DYRK1A syndrome, a severe neurodevelopmental disorder. Organoids generated from isogenic cell lines carrying patient-specific heterozygous nonsense mutations in *DYRK1A* exhibited early defects in progenitor expansion and altered neurogenic trajectories, mirroring cellular phenotypes observed in patients.
Our system is compatible with high-throughput assays and enables statistically robust phenotyping. By enabling the early detection of disease phenotypes and underlying pathways, these organoid models provide a powerful platform for mechanistic studies and therapeutic development in neurodevelopmental disorders.

SESSION 4: ECTODERMAL ORGANOIDS

SYMPOSIUM

Berlin Organoid Symposium

ABSTRACTS



Agnieszka Rybak-Wolf

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Organoid Platform, Berlin Institute for Medical Systems Biology (BIMSB), Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC), Berlin

Title: Brain organoid technologies to model human brain diseases

Understanding how the human brain function in both health and disease remains one of the greatest challenges in modern science, yet hindered by limited availability of human samples and ethical restrictions.

In recent years, 3D human brain organoids have emerged as a groundbreaking experimental system that overcomes many of these limitations. Derived from human pluripotent stem cells, brain organoids are genetically tractable and capable of recapitulating key aspects of early brain development, including cellular diversity, spatial organization, and functional properties reminiscent of the fetal brain.

In my presentation, I will provide an overview of recent advances in the brain organoid field and showcase several exemplary projects that illustrate how this technology can be leveraged to model human brain diseases. These include applications in the study of neurodevelopmental disorders, neurodegenerative diseases, and brain infections, highlighting the potential of organoids to transform our understanding of brain pathology and support the development of novel therapeutic strategies.

SESSION 4: ECTODERMAL ORGANOIDS

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Berlin Organoid Symposium

ABSTRACTS



Harald Stachelscheid
https://www.bihealth.org/de/forschung/wissenschaftliche-infrastruktur/core-units/stammzellen

Berlin Institute of Health at Charité - Universitätsmedizin Berlin, Core Unit Pluripotent Stem Cells and Organoids, 13353 Berlin, Germany.

Titel: BIH Core Unit pluripotent Stem Cells and Organoids (CUSCO): workflows, tools and applications

Abstract to be announced

SESSION 5: ORGANOID Platforms

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ABSTRACTS



Silke Frahm

https://www.mdc-berlin.de/de/pluripotent-stem-cells#t-team

Stem Cell Technology Platform, Max-Delbrück-Center for Molecular Medicine, Robert-Roessle-Str. 10, 13125 Berlin

Title: Glucocorticoid Receptor Dysfunction is a Modifiable Pathology in Parkinson's Disease: Cross-Species Evidence from □-Synuclein Models

Posttraumatic stress disorder is a risk factor for Parkinson's disease (PD), but the role of stress hormones in α-synuclein (α-syn) accumulation remains unclear. We examined the impact of glucocorticoids in three α-syn overexpression models: transgenic mice, brain organoids, and patient-derived iNeurons. Across all models, glucocorticoid receptor (GR) dysfunction emerged as a consistent pathological feature. Surprisingly, glucocorticoid exposure reduced α-syn accumulation in diseased—but not control—models. PD brain organoids showed dysregulation in neurodegeneration and inhibitory neurotransmission genes (e.g., MAPT, NPAS4) and functional deficits, such as reduced burst strength. Dexamethasone treatment reversed these molecular and physiological impairments. These findings identify GR dysfunction as a modifiable contributor to PD and suggest glucocorticoids as a potential therapeutic avenue. Notably, fetal-stage brain organoids and 2D iNeurons mirrored adult mouse phenotypes, enabling insights into early PD mechanisms and potentially reducing reliance on animal models.

Co-authors: Vivian Schulz, Maren Wendt, Franz Theuring, Sebastian Diecke

SESSION 5: ORGANOID Platforms

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Carla Sanjurjo Soriano
Field Applications Scientist
https://www.stemcell.com/

Title: Advancing Organoid Models: Introducing New Capabilities for Intestinal, Pulmonary and Hepatic Research

Organoids are advanced 3D culture systems that closely replicate human tissue architecture and function, offering physiologically relevant models for studying development, disease, and drug response. STEMCELL Technologies supports this research by providing high-quality reagents and defined media systems for the reliable establishment, expansion, and differentiation of organoid cultures. In this presentation, we introduce IntestiCult™ Plus for simultaneous expansion and differentiation of intestinal organoids, PneumaCult™-NGEx for scalable expansion of human bronchial epithelial cells with retained differentiation potential and physiological relevance, and the STEMdiff™ Hepatic Organoid Kit for generating liver organoids from pluripotent stem cells. These tools enable researchers to model tissue-specific biology with donor fidelity, advancing applications in regenerative medicine, disease modeling, and toxicity testing. Together, these innovations provide a robust platform for accelerating organoid-based research across multiple human organ systems.

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Marc Reudelster
Field Applications Scientist
Dries Van Hemelenz
Sr. Account Manager

https://vizgen.com

Title: The use of Spatial Transcriptomics in 3D Models, a case study

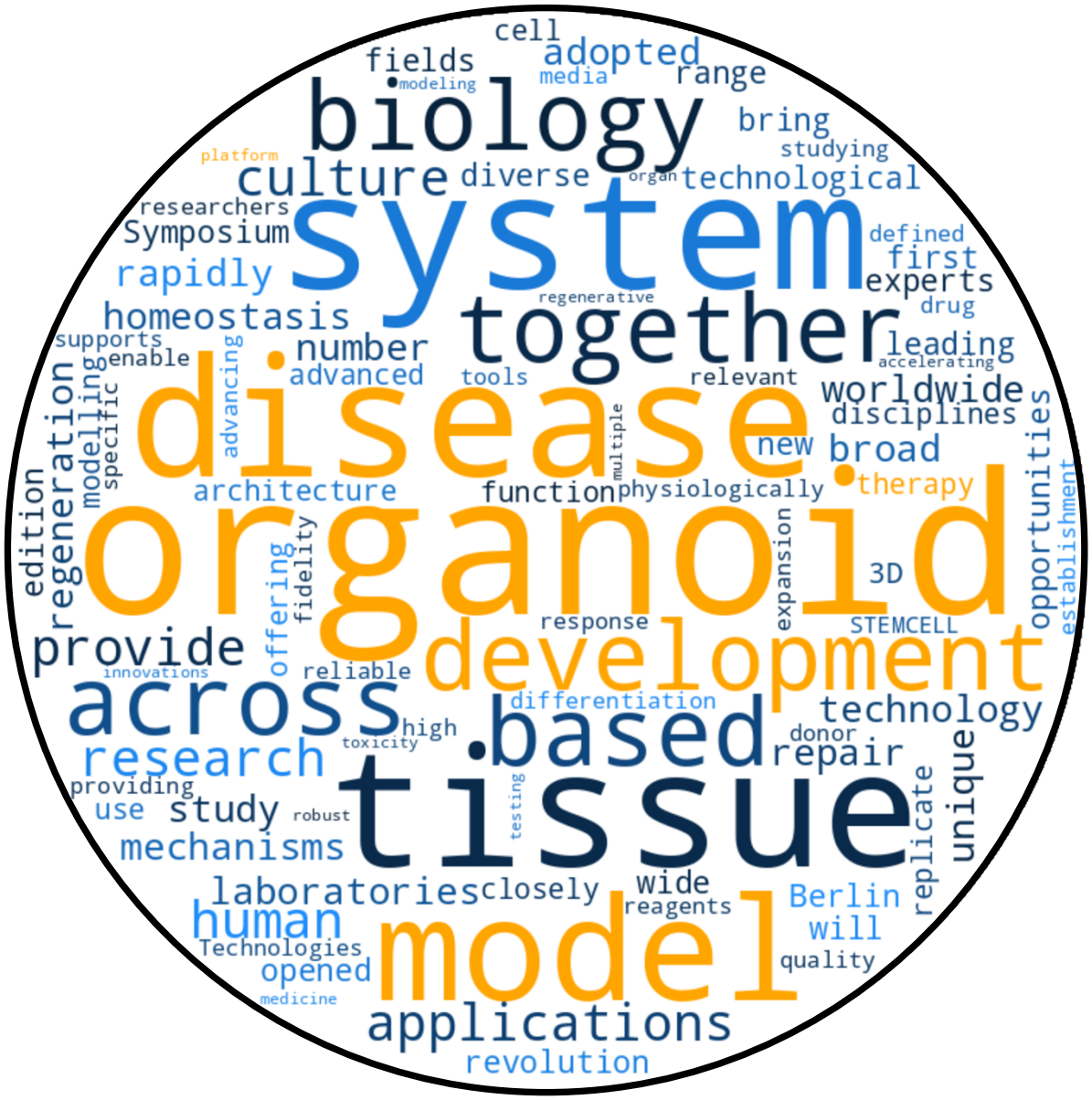


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