Editorial

The European Federation for Medicinal chemistry and Chemical Biology (EFMC) and the Swiss Chemical Society (SCS), Division for Medicinal Chemistry & Chemical Biology (DMCCB) hosted the *2nd International Symposium on Chemical Biology* (EFMC-ISCB) in January 2025 in Basel, Switzerland. The meeting brought together leading scientists to showcase the latest advances in the field of Chemical Biology, which is focused on the use of chemical methods to understand biological processes. As an inherently interdisciplinary research field, the contributions covered diverse classes of biomolecules and explored the mechanisms governing living systems using tools, methods and analytical frameworks involving molecular structures. We acknowledge the valuable contributions of all the speakers and poster presenters at the EFMC-ISCB 2025 symposium and their active participation in creating a welcoming atmosphere, filled with great science and innovations in Chemical Biology.

This special issue covers a selection of topics that were presented in the scientific sessions that covered mechanistic insights into cell-targeted therapeutics, advancements in probe design and platform technologies for uncovering biological pathways and drug target space, the discovery and application of peptide macrocycles, proximity-based chemical biology for drug discovery, advances in activity-based protein profiling and high-throughput chemical proteomics, chemical biology of chromatin and the epitranscriptome, as well as new modalities and specific strategies for RNA modification and degradation.

M. Rabar, ***A. Zenz*** and ***S. Kath-Schorr*** from the University of Cologne provide a detailed summary of recent achievement and challenges in generating an expanded genetic alphabet of synthetic nucleic acids with an increased information content for site-specific labelling and other applications.

A. M. Fleming and ***C. J. Burrows*** from the University of Utah discuss the analysis of DNA lesions and G-quadruplex folding in the human telomere sequence by home-built and commercially available nanopore sequencing devices.

R. Micura, ***A. Lusser*** and colleagues from the University of Innsbruck highlight fluorescent light-up aptamers (FLAPs) with a special focus on advances in synthesis and applications of covalently linked fluorogens to RNA aptamers.

Z. Lin from Rutgers University, ***B. A. Garcia*** from Washington University and their colleagues discuss new insights into protein arginylation and the biological roles of this post-translational modification in protein degradation as well as novel regulatory roles modulating protein interactions, stability, and crosstalk with other modifications.

The review by ***J. Bonnici***, ***C. J. Schofield*** and ***A. Kawamura*** from Newcastle University and the University of Oxford discusses the mechanistic flexibility and substrate scope of Jumonji C histone demethylases - a class of epigenetic regulators that have been recognized to modulate posttranslational arginine modification states.

A. P. A. Janssen, ***M. van der Stelt*** and coworkers from Leiden University established a gel-based assay for serine hydrolase inhibitor screening by multiplexed activity-based protein profiling using fluorophosphonate probes and report the discovery and characterization of several hits with micromolar potency.

Y. Liu and ***P. Wu*** from the MPI of Molecular Physiology in Dortmund summarize recent structural and mechanistic insights of monovalent and bivalent small molecules that have shown pre-clinical efficacy in modulating the stress sensor IRE1α *via* binding to its RNase or kinase domains.

M. Serafini and ***R. Moreira*** from the University of Lisbon focus on AKT as a critical mediator of the phosphatidylinositol-3-kinase (PI3K) signalling cascade and a central therapeutic target in oncology, that has been potently and selectively suppressed by AKT-targeting PROTACs.

L. Mach and ***M. Nazare*** from the Leibniz-Forschungsinstitut für Molekulare Pharmakologie (FMP) Berlin describe novel fluorescent probes with improved spatial and temporal resolution for investigating cannabinoid receptor type 1 biology and molecular pharmacology.

We extend our sincere gratitude to all authors for accepting our invitation to contribute their work to this special issue of *CHIMIA*.

Claudia Höbartner – Universität Würzburg, Würzburg, Germany
Uwe Grether – F. Hoffmann-La Roche, Basel, Switzerland

Cover image created by Pinxipictus, reproduced with permission from EFMC/LDO.
The *CHIMIA* Editorial is very grateful to Claudia Höbartner and Uwe Grether for their great efforts in organizing this issue on *Advances in Chemical Biology: Insights from EFMC-ISCB 2025* showcasing recent advances in Chemical Biology from Switzerland and beyond.