Meet Prof. Weiwei He, Thieme Chemistry Journals Awardee 2025!

Prof. Weiwei He *is an associate professor in the School of Pharmacy, East China University of Science and Technology (P. R. China). After obtaining her PhD from The Scripps Research Institute (USA) in 2013, she carried on there as a postdoctoral fellow until 2014 before taking up her current position.*

Thieme: Which field of organic chemistry are you interested in the most and why?

Prof. He: I am particularly interested in chemical genetics, especially forward chemical genetics, as it highlights the power of organic chemistry in biological research. Small molecules, designed and synthesized through organic chemistry, serve as precise tools for probing cellular processes and uncovering molecular mechanisms. While traditional genetics is based on the central dogma, our expanding understanding of biological complexity suggests that it alone cannot fully account for certain aspects of protein regulation, such as protein–protein interactions, subcellular localization, and protein phase separation, which are not exclusively determined by genetic sequences. In contrast, forward chemical genetics leverages small-molecule perturbation to induce phenotypic changes, allowing for the identification of cellular targets and the elucidation of underlying mechanisms. By directly interacting with their targets, small molecules can influence protein folding and thereby modulate various biological properties, such as interactions and localization. This offers unique insights into complex biological regulation beyond genetic control and highlights the pivotal role of organic chemistry in advancing our understanding of life at the molecular level.

Thieme: Following that, what is the focus of your current research activity?

Prof. He: My research focuses on organic-chemistry-driven approaches in chemical biology, advancing from fundamental target identification to the development of novel therapeutic strategies, particularly in protein regulation, targeted protein degradation, and autophagy modulation. Specifically, I explore:
1. Target Identification and Mechanistic Studies.
(a) Utilizing forward chemical genetics to identify cellular targets of bioactive small molecules and uncover novel protein functions. (b) Investigating autophagy and protein homeostasis mechanisms, particularly their interplay with cellular signaling in cancer and neurodegenerative diseases.

2. Development of Targeted Protein Degradation Strategies. (a) Building upon mechanistic insights, designing small-molecule probes to selectively degrade disease-associated proteins. (b) Exploring novel protein degradation mechanisms for therapeutic applications. By integrating organic synthesis, chemical genetics, and mechanistic studies, my research aims to develop innovative small-molecule tools to uncover new regulatory mechanisms in protein homeostasis and advance strategies for targeted protein degradation.

Thieme: What do you think about the modern role and prospects of organic chemistry?

Prof. He: Modern organic chemistry has evolved beyond traditional molecular synthesis, becoming a highly interdisciplinary field that intersects with biology, materials science, artificial intelligence (AI), and environmental science. Among these, chemical biology exemplifies how organic chemistry drives innovation, enabling breakthroughs in molecular medicine, drug discovery, and biological regulation.
Organic chemistry provides powerful tools to investigate and manipulate biological systems at the molecular level. Small molecules synthesized through organic chemistry can selectively modulate protein functions, probe complex pathways, and serve as therapeutic agents—offering insights beyond what genetics or protein biochemistry alone can achieve. Cutting-edge technologies such as PROTACs, AUTACs, molecular glues, and bioorthogonal chemistry showcase their impact by enabling precise protein degradation, autophagy modulation, and in vivo chemical labeling.
The future of organic chemistry lies in its continued integration with AI-assisted molecule design, automated synthesis, and sustainable chemistry. AI-driven retrosynthetic analysis accelerates bioactive molecule discovery, while machine learning enhances drug design precision. As organic chemistry further intersects with synthetic biology, metabolic engineering, and precision medicine, it will remain a cornerstone of scientific innovation and therapeutic advancement.

Thieme: Which difficulties are there for young upcoming chemists in your field? Do you have any tips?

Prof. He: Young chemists today face challenges in navigating the rapidly evolving research landscape, particularly the balance between following trends and maintaining scientific originality. While trending topics attract attention and funding, blindly pursuing them can lead to short-lived, unoriginal research. Instead, developing a unique scientific perspective and staying true to one's research vision is key to long-term success. Tips: 1. Cultivate independent scientific taste. Choose research questions that genuinely excite you and align with your expertise—breakthroughs often come from unconventional thinking. 2. Stay curious and keep learning. Maintain a strong theoretical foundation while adapting to new methodologies. 3. Build a diverse network. Collaborations can provide fresh perspectives and amplify research impact. 4. Be patient and resilient. Scientific progress takes time—persistence and critical thinking are essential for meaningful discoveries.

Thieme: What is your most important scientific achievement to date and why?

Prof. He: One of my most significant scientific achievements is the target identification and mechanistic characterization of indole terpenoid mimics, revealing how spindle microtubule assembly is essential for Cdh1-mediated proteolysis of CENP-A. This study provided key insights into chromosome segregation, uncovering an unexpected link between microtubule dynamics and CENP-A regulation. This work highlights the power of small-molecule perturbation in biological research. Despite CENP-A's crucial role in chromosome segregation, its regulation in higher organisms remained unclear due to the lack of tools to modulate its dynamics. Although our small molecule primarily targets microtubules, its effect on microtubule dynamics created a valuable opportunity to investigate CENP-A regulation, demonstrating how chemical biology can uncover complex cellular mechanisms. Beyond the discovery itself, this achievement reflects the

power of persistence and scientific rigor. Overcoming experimental challenges and refining hypotheses led to deeper mechanistic insights. This experience reinforced my belief that true scientific progress requires curiosity, resilience, and the willingness to challenge conventional paradigms.

Thieme: Could you tell us something about yourself outside the lab, such as your hobbies or extra-work interests?

Prof. He: Outside the lab, one of my favorite hobbies is swimming. It serves as both a way to relieve stress and a great form of exercise to stay physically active. The rhythmic motion of swimming helps clear my mind, allowing me to recharge and maintain focus in my research.