Title: Mechanochemistry: An Emerging Transformative Technology in Synthetic and Medicinal Chemistry

Abstract:
With the global promotion of sustainable development, the pharmaceutical manufacturing industry is undergoing a transformation centered on the "dual carbon" strategy. Green chemistry has emerged as a key driving force in this transition. Reducing the excessive use of organic solvents and stoichiometric chemical waste in pharmaceutical production is essential, and the development of efficient and broadly applicable synthetic strategies is of great significance. Mechanochemical synthesis enables efficient energy dispersion and mass transfer under solvent-free conditions, offering solutions to challenging transformations involving inert substrates, poorly soluble compounds, and the formation of metal clusters. Our research group focuses on the development of mechanochemistry-based synthetic methodologies, guided by drug-likeness and scaffold-hopping principles, to construct structurally diverse libraries of bioactive molecules. This work provides a green and sustainable approach for innovative drug discovery.

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Dr. Xiaofeng Wei is a Professor at the School of Pharmacy, Xi’an Jiaotong University. He received his Ph.D. in Pharmaceutical Sciences from the University of Tokyo in 2016 under the supervision of Professor Motomu Kanai. He subsequently held positions as a Special Researcher at the University of Tokyo, a Postdoctoral Fellow at the University of Zurich (with Professor Cristina Nevado), and a Medicinal Chemist in the Central Nervous System Drug Discovery Division at Takeda Pharmaceutical Company. Since October 2020, he has served as a Professor and Deputy Director of the Institute of Targeted Drug Research at Xi’an Jiaotong University. His research focuses on mechanochemistry-based synthetic methodologies and innovative drug discovery. To date, he has published over ten papers in journals including Journal of the American Chemical Society, Chem, Nature Communications, ACS Central Science, and Advanced Science.