

Reflecting on the Past and Looking Forward to the Future of Bridging Chemistry and Biology

It might seem to some that it was only yesterday when Stuart Schreiber and K. C. Nicolaou came together to launch a new journal called *Chemistry & Biology*. At that time, 20 years ago, they recognized that a growing number of researchers were operating at the interface of chemistry and biology but had limited options when it came to publishing their work. Thus, supported by their peers and emboldened by the quality and significance of insights that came out of these research efforts, Schreiber and Nicolaou initiated *Chemistry & Biology*, a new journal for a new field, to promote interdisciplinary research and encourage crosstalk between chemists and biologists (Figure 1). The basic intention of the new journal was to make science accessible to both sets of readers. *Chemistry & Biology* would then offer a unique place where ideas from both areas would cross-pollinate and, to take the metaphor a step further, blossom into a research discipline with the ability to tackle both chemical and biological questions with the same energy, intensity, and drive and to offer solutions to problems spanning cell biology, biochemistry, biotechnology, pharmacology, drug discovery and development, and organic chemistry. The interdisciplinary efforts did indeed flourish, and with them the new journal, which was over the years supported by the launch editors, a dedicated group that over the years included Patrick Baeuerle, Gerald Joyce, Gregory Verdine, Peter Leadlay, Thomas Kodadek, Ronald Breaker, Michael Famulok, Peter Seeberger, and Wolfgang Wohlleben, and in-house editors Rebecca Ward, Victoria Mountain, Gail Mitchell Emilsen, and Lara Szewczak. The journal continues to be enthusiastically guided by the current editorial team, who are behind this editorial and this special issue, and supported by past and present members of the editorial board and the members of a broad scientific community, who contribute to the journal as authors and reviewers.

The focus of the journal on publishing reports that combine chemistry and biology in creative ways has remained constant over the years. We are broadly interested in publishing research results across a number of different topics, including reports that provide insights into how small molecule-mediated cellular processes can be studied, modulated, reconstructed, and designed; the mechanisms of formation and transformation of small molecules; peptide and protein engineering and design; metabolic engineering; synthetic biology; systems-level analyses that include metabolomics, lipidomics, glycomics, and proteomics; how small molecules are employed for signaling and communication purposes at different levels (intra- and inter-cellular and intra- and interspecies); how viruses, cells, and organisms develop resistance to small molecules; how small molecule protein conjugates are generated, distributed, and function; natural products, their biosynthesis and mechanism of action; structure, function, mechanism, and engineering of enzymes; chemistry, biology, and technology of RNAs and DNAs; chemical biology of lipids and sugars; and numerous studies that employ small molecule-based probes to illuminate biology, enable

biotechnology, or inform medicine. As you may appreciate, this list can go on and on and continues to be in flux, as the field evolves and transforms itself and uncovers new spheres of interest and new fields in which a combination of chemical thinking and biological inquiry can have a meaningful impact on finding the answers to challenging questions.

We think that the reviews and perspectives included in this special anniversary issue highlight the breadth of our interests. A perspective by one of our founding editors, K.C. Nicolaou, argues for the need to initiate transdisciplinary collaborations between chemistry, biology, and medicine in order to push the boundaries of current drug discovery and development processes. Another issue of relevance to these processes is the widespread use of Lipinski's rule of five, and in their review, Doak et al. elaborate on the importance of going beyond this rule and accessing the chemical space of compounds that do not conform to it. A long-standing challenge for drug discovery and development has been the ability to target protein-protein interactions, and Arkin et al. discuss how these efforts have evolved over time and yielded some interesting examples that are currently in clinical trials. Murry and Baeuerle provide a perspective on developing biologicals as human therapies, thus highlighting one of the fastest growing areas of interest to pharmaceutical and biotechnology industries. Metabolism is the topic of two reviews that discuss it from different angles: DeLaBarre et al. review current efforts to target metabolism as a way of treating cancer, and Medina-Cleghorn and Nomura review innovative metabolic mapping techniques. Screening technologies for small molecule discovery are the topic of the review by Janzen, who also provides a historical view on how screening emerged as a specific scientific discipline. Functional RNAs and DNAs remain one of the core interests of the journal and two perspectives, by Mayer and Famulok and by Joyce and Breaker, discuss how far we have come in this area since the launch of the journal. One of the big outstanding issues in natural product discovery is how to successfully mine the microbiome, and the review by Milshteyn et al. offers a summary of the currently employed strategies. Using small molecules as probes to uncover new insights into biology and physiology has been a core interest of the journal from its inception, and a perspective by Kodadek offers arguments for using "antigen surrogates" as probes to study immunology. Focusing on small molecule probes are reviews by van Hattum and Waldmann, which summarizes the most recent work on developing chemical biology tools to control RAS signaling; by Finley and Copeland on small molecule modulators of chromatin remodelers; and by Huber and Sakmar on probes for GPCRs. Finally, Finn and McKay and Rakhit et al. offer two different views on using chemical biology strategies to modulate protein function via Click chemistry or via manipulating protein levels on a posttranslational basis, respectively.

Chemistry & Biology continues to evolve with the field and has been making changes to offer the authors and reviewers an exceptional level of open interaction with the Editors. For



Figure 1. Cover of the First Issue of *Chemistry & Biology*

example, we offer direct access to the in-house editor, Milka Kostic, via Skype or phone to all the authors who are invited to prepare a revision for the further consideration by the journal, and we are pleased with how many of our authors have taken advantage of this opportunity to discuss their work directly. The Editors are also available to provide advice on whether a given study is a strong candidate for submission through presubmission inquiry. The bottom line is that we recognize that every paper we consider is the result of a great deal of effort on the part

of the authors, and we are committed to making the process of editorial and peer review evaluation as open, fair, constructive, and timely as possible. Recognizing the importance of making the accepted manuscript available soon after acceptance, we now publish all articles online ahead of print, and with this issue we will start broadcasting news about the newly published content through a dedicated Twitter channel, @CellChemBiol, and we hope the community joins the 140 character conversations. Finally, as the field of chemical biology expands, we look forward to growing with it, and to that end we have recently introduced the Resource, a new article type to facilitate publication of chemical tools and methods that enrich currently available toolkit for basic and translational biomedical research. We also introduced *Chemistry & Biology Select*, a new journal section in which we provide brief comments on a few editorially selected articles from recent literature that might be of high general interest to chemical biology community. We encourage you to explore our new features.

Chemistry & Biology is now 20 years young, and going forward we hope to remain relevant in chemical biology community as one of the premier journals that support cross-pollination of chemistry and biology and dissemination of the fascinating discoveries that are inspired by the chemical biology way of doing research.

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