Bioconjugate Chemistry

Editorial

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Linking the Biological and Synthetic Worlds

The worlds of biological and synthetic chemistry both offer incredible diversity. Biology provides complex architectures including proteins, nucleic acids, and polysaccharides. These biomacromolecules have a wide range of applications in the life sciences, including as therapeutics and imaging agents. Synthetic chemistry, on the other hand, provides a tool for atom-by-atom control over molecular structure that can be used to obtain molecules and materials inaccessible through biology. Synthesis has contributed greatly to the life sciences through creation of an enormous range of drugs, dyes and other tools.

Integrating the complex motifs available from biology with the precision of synthetic methods provides the potential for the generation of new hybrids with capabilities beyond those of either approach alone. Interfacing these two worlds, however, is challenging. Biomacromolecules are complex and often delicate systems that can be very challenging to functionalize cleanly and reliably.

In this ACS Select Virtual Issue, we highlight some of the recent advances in bioconjugation chemistry. These publications describe new strategies for functionalization of biomacromolecules, as well as the use of synthetic molecules as building blocks for assembly using biological machinery. The resultant conjugate systems have new and exciting properties, as demonstrated in new therapeutic and imaging applications.

"Cyborg" combinations of man-made and biological systems provide access to new constructs featuring enhanced functional capabilities. We hope that this collection will stimulate your imagination and encourage you to make your mark on the complex and important interface between the man-made and biological worlds.

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