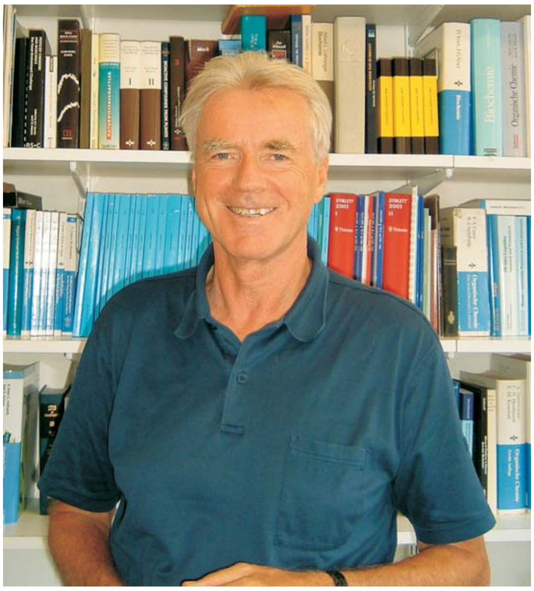
SYNLETT

Editorial

Chemists face, day by day, the challenge of generating, isolating and identifying target molecules. In order to reach this goal the synthetic chemist can use all elements of the periodic table, and can greatly vary the reaction temperature and reaction pressure. In addition, syntheses might be carried out with the help of light, electrical current, microwaves, sonication, etc., and reactions are possible in the gaseous, liquid and/or solid state. For the isolation and purification steps, a huge number of methods have been developed, and the identification of the compounds occurs by physical, chemical and/or biological techniques. Because of this plethora of methods, synthesis will always be good for new and surprising developments, and a broadenin spectrum is needed in order to synthesize large and complex molecules. Helpful for the planning of syntheses are the rules and principles of physical chemistry. As the details of reaction mechanisms are known only for a limited number of simple systems, an increase of knowledge in this area is also crucial for the progress of chemical synthesis.

Nature is confronted by the same synthetic challenges. Synthesis and transformation of molecules is vital for its existence, but Nature performs this under strict boundary conditions. It cannot freely choose between all elements of the periodic table, and the reaction conditions are constrained to those of the surrounding biosphere. Nature does not plan syntheses knowing the rules of synthetic or physical chemistry but it uses evolution to fulfill this job. In order to set evolution into work, Nature had to learn how molecules can be used to gain, store, transfer, and employ the knowledge of synthetic processes. This led to the creation of cells, the building blocks of life. Crucial in cellular systems are biopolymers (proteins, DNA, RNA, poly- and oligosaccharides) and lipids that make the storage and transfer of molecular information possible. Replication led to the invention of evolution that tests the quality and usefulness of the synthesis. A typical achievement of enzymatic or cellular synthesis is compartmentalization of the reaction system, as well as regulation, reversibility and repair of the synthetic process. This is a challenging goal for laboratory synthesis in the future.

With the Account of Jörg Hartig and Isabelle Seemann on “Artificial Ribozyme-Based Regulators of Gene Expression” in this issue of *SYNLETT* we will start broadening the scope of *SYNLETT* Accounts and *SYNTHESIS* Reviews by including developments in the area of biomolecular processes. I hope that synthetic chemists will accept this offer and take their time to wade through these Accounts and Reviews.



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