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# Editorial on Synthetic Chemistry in Pharmaceutical Industry

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**EDITORIAL**

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## EDITORIAL

Chemical synthesis is the artificial execution of beneficial chemical processes to produce one or more compounds in chemistry. Organic, inorganic, materials and even biological sciences are all covered under synthetic chemistry. Chemical synthesis makes use of the elements' inherent reactivity to build more sophisticated molecular structures by carefully executing chemical reactions. Physical and chemical manipulations, generally requiring one or more reactions, are used to achieve this. The technique is repeatable and dependable in current laboratory settings. A chemical synthesis entails the use of one or more chemicals that, when exposed to particular circumstances, will undergo a change. To create a desired result, a variety of reaction types can be used. This necessitates the use of a reaction vessel, such as a chemical reactor or a simple round-bottom flask, to mix the chemicals. To isolate the final product, many reactions need some sort of work-up or purification step.

The reaction yield is the amount generated during chemical synthesis. Yields are usually reported as a percentage of the total theoretical quantity that may be generated depending on the limiting reagent or as a mass in grams. A side reaction is a chemical reaction that occurs unintentionally and lowers the expected yield. Hermann Kolbe, a chemist, coined the term "synthesis."

Synthesis-trained chemists utilise their expertise to generate new types of matter. Imagine becoming the first to create a chemical concoction that has never been seen before! We synthesis compounds not simply because they are novel; the design and manufacture of novel compounds leads to a wide range of applications in medicines, materials, sensing, energy usage and storage and biological system insights. Novel catalysts are being synthesized to find more efficient ways to mass-produce the chemicals that keep us alive, as well as to create new variations that were previously unimaginable. Yale's synthetic chemistry programme includes everything from tying proteins together to preparing natural products to creating metal complexes in novel settings.

In pharmaceutical research and development, chemical synthesis is crucial. Campos, et al. discuss some of the benefits that have resulted from recent advances in synthetic techniques. Small-molecule catalysts activated by visible light, enzymes designed for flexibility beyond their inherent function and bio-orthogonal processes to selectively alter proteins for conjugation are highlighted in particular. High-throughput techniques are likewise positioned to speed up method optimization from small-scale discovery to large-scale manufacturing and complementing machine-learning technologies are only now becoming visible.

Synthetic chemistry breakthroughs have led to the development of several breakthrough treatments that have improved human health during the last century. To accelerate the development of the next generation of medications, continuous chemical innovation is necessary in the face of rising difficulties in the pharmaceutical business. Novel synthetic approaches not only provide access to previously inaccessible chemical matter, but they also stimulate new ideas about how we design and construct chemical matter. Some of the most significant recent breakthroughs in synthetic chemistry, as well as opportunities at the interface with partner disciplines, are set to alter the practice of drug discovery and development, according to the authors.