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Editorial

New Innovations in the Field of Medicinal Chemistry

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EDITORIAL NOTE

A stimulating field is medicinal chemistry, as it connects many scientific disciplines and allows for cooperation in researching and creating new drugs with other scientists. This is in contrast to other areas of medicine that concentrate primarily on the theory and foundations of medical science. In clinical medicine, in order to identify, treat, and avoid illness, medical professionals evaluate patients.

Medicinal chemistry is a discipline that involves pharmaceutical drug design, production, and synthesis. The field combines chemistry skills, especially synthetic organic chemistry, pharmacology, and other biological sciences. Evaluating the properties of current medicines is also part of medicinal chemistry.

Since the oldest civilizations, the use of plants, minerals, and animal parts as medicines has been documented. The means of drug development have also grown with the evolution of science. New molecules of potential pharmaceutical interest,' hits,' are natural products, or compounds created by computer chemistry, or compounds produced by chemical library sampling, combinatorial chemistry, and biotechnology pharmaceuticals. Because of its pharmacological, pharmacodynamic and pharmacokinetic properties, the "hit" compound is strengthened by chemical or functional group changes, turning it into a lead compound. A lead compound should have a structure known and an action mechanism known.

Pharmaceutical biotechnology

A recent field of medicinal chemistry is pharmaceutical biotechnology, developing new therapeutic and diagnostic products. Peptides and proteins, hormones of various origins, and enzymes, including vaccines and monoclonal antibodies, are popular products. In pharmaceutical biotechnology, the development of new drugs is accomplished by genomics, transcriptomics, proteomics, pharmacogenomics and metabolic.

Important steps for drug discovery

In the discovery of new medicines for the treatment of many kinds of diseases, natural products have been significant sources of lead compounds. Below are the crucial steps of the drug discovery from the natural products:

1. Selection of the organism
2. Sample collection
3. Extraction
4. Purification and Isolation
5. Structure modification
6. Toxicology
7. Bioassays

After a "hit" compound is identified by biological assessment, the optimization of a lead compound can be carried out. The goal of the optimization is to enhance the drug's absorption, delivery, metabolism and excretion (ADME properties), to minimize toxicity and to improve efficacy. Chemical synthesis, computational chemistry and/or combinatorial chemistry may be used for optimization. The SAR studies and the preliminary mechanism of action should take these into consideration.

When the structural 3D image of the target is usable, computational modulation of a lead molecule will increase the specificity, adapting the molecule to the target. Computational chemistry's use to create almost ideal matches for a target often decreases the risk of side effects and toxicity. Computational chemistry is also helpful in practically leading compounds with better absorption properties and less metabolic degradation to be produced and screened. With chemical modifications, optimization of composition, and enhancement of pharmacokinetics, natural compounds can be subject to lead optimization. It is important to point out that the study of the biological activity of the compounds isolated in parallel with the lead compound can reach some important SAR conclusions.

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