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# Biologically Active Agents in Nature

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## EDITORIAL


Nature is an amazing source of all kinds of molecules, with an almost infinite variety of different structural variations. These molecules often have specific functions and many of them have biological activities which can be of use to humans. They may provide lead compounds for the development of new drugs or they may be indispensable tools in biomedical research. While many are substrates for life processes, there are also toxins, hormones, and molecules with other functions. An estimate of the current interest in natural products can be gleaned by the attempts of the pharmaceutical industry to introduce them into drug discovery programmes. With the introduction of high-throughput screening protocols, the capacity is present to pass large numbers of compounds through a wide variety of bioassays. Since Nature's architecture provides such an unpredictable range of skeletal types and novel substances, it is of immense value to evaluate as many natural products as possible.

In addition to the isolation and characterization of biologically active substances, there is also a tremendous amount of work to be done in the elucidation of their modes of action, their specific functions, and their transformations *in situ*.

The molecules of interest can be produced by plants, microbes, and animals of terrestrial and marine origin. The different organisms and the different environments contribute to the diversity of compounds found. When considering plants, *e.g.*, one thinks immediately of the importance of centuries-old drugs such as the alkaloid morphine (from *Papaver somniferum*, Papaveraceae). Newer examples include the antileukaemic molecules vincristine and vinblastine from the Madagascar periwinkle, *Catharanthus roseus* (Apocynaceae). In the last couple of years, anticancer drugs from the yew tree, *Taxus brevifolia* and *T. baccata* (Taxaceae), have been put on the market. These are very effective for the treatment of ovarian and other cancers. The Chinese plant *Artemisia annua* (Asteraceae) is the source of the antimalarial sesquiterpene artemisinin, important for its activity against resistant *Plasmodium* strains. Most of the currently employed antibiotics are of microbial origin; large screening programmes are currently in force to find new metabolites and to keep one step ahead of the problems of resistance.

It is impossible to summarize all aspects of biologically active natural products in a small space, so in this issue of CHIMIA, a selection has been made of topics from several areas of high current interest. Prof. *Nakanishi* of Columbia University, New York, gives a fascinating insight into the unraveling of certain specific problems involving biologically active molecules, including the story of the structure elucidation of ginkgolides from

*Ginkgo biloba* (Ginkgoaceae). Preparations from the leaves of this tree are used in the treatment of problems involving peripheral blood circulation and cerebral ischaemia; worldwide sales worth hundreds of millions of dollars per year. Other contributions deal with further natural products of plant origin and also molecules from microbial sources. To give an idea of the diversity of the biologically active compounds, a section is also devoted to the isolation of toxins from snake venoms. By this means, a taste is given of the sort of research being undertaken in this very diverse field.



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The Editorial Board of CHIMIA thanks Prof. *K. Hostettmann*, the coordinating Guest-Editor, for his enthusiastic planning and the efficient realization of the present issue on 'Biologically Active Agents in Nature'.