Chemistry of Natural Compounds, Vol. 45, No. 4, 2009

A new monograph to enrich any scientific library

I. F. Makarevich, N. V. Kovganko, I. S. Chekman, G. V. Zagori

CARDIOTONIC STEROIDS

For the first time, all aspects of the investigation of natural and transformed cardiosteroids (cardiac glycosides and aglycones, cardenolides and bufadienolides), and their applications in medicine, are presented together in one book, making this 687-page edition unique in its field.

The monograph consists of two parts. The first contains comprehensive reference materials on natural cardiosteroids. All the natural glycosides and aglycones discovered up to the year 2009 are presented, and information is given about the natural sources of these compounds (26 families of plants, 92 genera, and many species), together with a list of substances for each natural source. In addition, poisons (of toads, snakes, beetles and other insects) containing protective cardiosteroids are described. Next, methods of isolation and chemical structure detelmination are discussed, as well as the relationship between the structure and action of the substance, including the correlation of thermodynamic stability and biological activity. Finally, other scientific information, generalizations, and patterns that are important for bioorganic chemistry in general are presented.

The chemistry of cardiotonic steroids has made great progress in the last 15–20 years. Many complicated natural structures have been discovered and investigated, including glycosides with sugars doubly or even triply bound to the aglycones, and glycosides with unusual steroidal structures.

Now it is not unusual for 20–30 and even 60–80 compounds of this class to be isolated from one natural source. For example, *Nerium odorum* alone yields 87 isolable cardiotonic steroids.

The most surprising event of the last 10 years was the discovery of cardiac glycosides (ouabain and digoxin derivatives) present in the human body. These endogenous cardiac glycosides, produced in the adrenal cortex and hypothalamus, appear to be new types of hormones.

The second part of the monograph, "Transformed glycosides and aglycones," describes the work and papers of some outstanding synthetic chemists, as well as experimental techniques and methods. Many biologically active derivatives, such as alkaloid and amino acid derivatives, and nitrocardenolides, are synthesized on the basis of cardiac glycosides and aglycones. These derivatives combine a number of vital pharmacotherapeutic properties: cardiotonic, antiarrhythmic, coronary vasodilating, antihypoxic, anti-inflammatory, and so on. This handbook describes a total of 3350 compounds of the cardiosteroid series.

The chapter "Pharmacology and clinical pharmacology of cardiac glycosides" is devoted to the practical applications of cardiac glycosides. Despite the fact that medicine has been enriched by many cardiotonics of nonglycosidic nature, cardiac glycosides are still widely used in practical cardiology, and in some cases are irreplaceable. For instance, it is often observed that atrial fibrillation is stubbornly resistant to medical treatment by other means, and in such cases application of cardiac glycosides is inevitable.

This monograph is aimed at researchers working on fundamental and applied aspects of organic and bioorganic chemistry, the chemistry of natural compounds, biochemistry, and pharmacology. In addition, it will be of great benefit to cardiologists, physicians, pharmacists, and specialists in the pharmaceutical industry, in chemical and biochemical ecology, and in biotechnology. Students and teachers at universities and institutes specializing in these areas will also find this handbook an invaluable resource.

The authors

Any queries should be addressed to:
Prof. I. F. Makarevich
Prodol′naya str. 3B, ap. 44,
Kharkov-85,
Ukraine, 61085
e-mail: erycard@yandex.ru

Translated from Khimiya Prirodnykh Soedinenii, No. 4, p. 510, July–August, 2009.

