

## Book reviews

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### **Aminophosphonic and aminophosphinic acids: chemistry and biological activity**

Valery P. Kukhar and Harry R. Hudson (eds)

John Wiley & Sons Ltd, Chichester, 2000

xxv + 634 pages. £175

ISBN 0-471-89149-5

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This is a substantial and authoritative work that will be of keen interest to pharmaceutical and organophosphorus chemists as well as to synthetic and structural chemists working in this field. The major part of the book covers the natural occurrence, synthesis, asymmetric synthesis, biological properties, separation, characterization and structural data of aminophosphonic acids, aminophosphinic acids and related peptide analogues. The last one-third reviews applications in the fields of agrochemicals and medicine, including drug development aspects. Each of the 18 chapters is divided into headed sections, making it easy to locate areas of specific interest.

Chapter 1, on Naturally Occurring Aminophosphonic and Aminophosphinic Acids (APAs), provides good coverage of 2-aminoethylphosphonic acid and related compounds as well as phosphonopeptides. There are also sections on the biosynthesis, biodegradation and origin of APAs. The next five chapters are comprehensive in their coverage of the synthesis of  $\alpha$ -,  $\beta$ - and  $\omega$ -APAs, phosphorylated side-chain APAs and peptide derivatives, and of asymmetric synthesis. There are five chapters on physical methods, including column chromatography, NMR, X-ray crystallography, mass spectrometry and GC-MS, and determination of the stability constants of metal complexes. The chapter on NMR spectroscopy discusses the potential of the technique for a series of  $\alpha$ -*N*-arylamino- $\alpha$ -arylmethanephosphonic esters. Modelling studies are included in the NMR and stability constant chapters. The chapter on the use of APAs as agrochemicals includes a survey of their potential applications. There are sections on plant-growth regulators, herbicides, fungicides and insecticides. There are five chapters on biological activities and their role as inhibitors. The metabolic processes and mode of inhibition involved are given due attention and their uses as neuroactive inhibitors are covered in some detail. Drug development is included in the chapter covering the role and design of APAs as transition-state analogue inhibitors for proteolytic enzymes. This is followed by a separate chapter on the design and synthesis of HIV protease inhibitors. Two chapters on the potential application of APAs as antithrombic agents and collagenase inhibitors complete the biological section.

There are plenty of clear structural diagrams and reaction schemes which will make this book attractive to chemists. There are also some useful figures showing

spectra and modelling results — the latter including 16 coloured plates. The excellent organization of the text, using sub-headings together with contents lists and indexes, facilitates the location of the comprehensive collection of information gathered from over 2300 references. The book should assist and encourage the development of the pharmaceutical applications of organophosphorus compounds. It will be useful for introducing new workers to these fields, as well as occupying an important place on many reference bookshelves.

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### **Pills, potions and poisons: how medicines and other drugs work**

T. Stone and G. Darlington

Oxford University Press, Oxford, 2000

xvi + 476 pages. £18.99

ISBN 0-19-850403-9

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This book, written by a pharmacologist and a physician/rheumatologist, will prove understandable even to those without a medical or scientific background. For chemists the absence of structural formulae is restrictive, but many possibly unfamiliar words are defined in the glossary.

The book is divided into 26 chapters and a prime objective is to explain the course/origin of many medical conditions and the way in which both natural and synthetic drugs can prove beneficial if not curative. The introductory chapter explains the use of brand names for drugs, many of which are cited in the index, and the final chapter is devoted to the development of new drugs. In each chapter references are made to individuals who initiated or made significant contributions to the development of individual drugs and studied the mechanism of their action; they include quite a number of Nobel prize winners. Many useful diagrams are included to illustrate, for example, the role of the chemical transmitter acetylcholine and the mechanism of potential antiviral drugs. At the end of chapters concerned with, for

example, breathing, digestion and pain killers, a list of available drugs is included under their commercial names. For chemists it would have been useful if chemical names or structures had been included. There are some interesting and amusing pictures, such as Hogarth's illustrations of the effect of a severe headache on a seated man (in the chapter on migraine), and insanity (in the chapter on schizophrenia). Gout of the foot also has a fascinating illustration.

Historical aspects of medicine make interesting reading as well: the clinical thermometer was invented by Sanctorius in the 16th Century and evidently the ancient Greeks knew the analgesic effect of aspirin, present in the bark of the willow tree. In fact the whole story of aspirin is excellently described, including its use to prevent blood clotting. Additionally of great interest is the story of opium, which the British East India Company was responsible for distributing profitably in the 19th Century; in about 1850 it could be bought from respectable grocery shops in the UK.

The description of Parkinson's disease and the possibility of developing more effective drug treatments, including those which block adenosine receptors in the brain, is well described and the chapter covering the brain disorder schizophrenia, which affects about five people in every 1000, accentuates the way in which drugs which are effective for schizophrenia simultaneously induce parkinsonian symptoms. Recently developed drugs give some cause for optimism in the treatment of both conditions.

Three chapters are concerned with blood, its components and the essential roles of iron, vitamin B<sub>12</sub> and various hormones. These include the way in which the

body regulates blood pressure, the occurrence of strokes and heart attacks, and the various chemicals which can control these conditions. The historical introduction to the chapter on infections and infestations is well written and includes an account of microbial adaptation to antibiotics. Cancer is treated separately: currently over 50% of people diagnosed with invasive cancers survive due to better diagnostic testing and more effective drug treatment.

The chapter on poisons includes the toxicity of arsenic, lead, carbon monoxide, strychnine and cyanide. This is less satisfactorily presented and even gives the impression that cyanide is a molecule; arsenic is described as a heavy metal. An explanation of the bonding of CO to the Fe of haemoglobin would have been welcome. In fact the many roles of metals in biological systems might have been accentuated in several chapters.

Drugs of recreation and misuse feature in the book and include ethanol, nicotine, caffeine, cocaine, cannabis and ecstasy; their mode of action and the effects of addiction are discussed. The discussion under alcohol might well deter a reader from over-indulgence.

The chapters covering steroids and rheumatic and bone disorders are very informative and interesting, as is the account of vitamins, although again the more chemical aspects such as the role of free radicals are not adequately described. Despite these minor criticisms this is a book that should have a very wide appeal and might even boost the morale of readers suffering from one or more of the conditions described.

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