Book Review

The Alkaloids: Chemistry and Pharmacology, Volume 39
Edited by A. Brossi
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The first volume of the well known series "The Alkaloids", edited by R. H. F. Manske and E. L. Holmes, appeared in 1950 and since then subsequent volumes have been published at the rate of six or seven per decade until 1980 when there was a veritable explosion of 20 volumes between 1981 and 1991. As a group of fascinating natural products, the alkaloids continue to excite the interest of many active scientists. The cumulative index of titles at the end of this current volume attests to the wide range of structural types which have been investigated for their chemistry and their pharmacology.

Volume 39 has seven chapters, each being written by an expert or experts in the field. The topics include betalains, benzodiazepines, phenanthrenes, ellipticine and related alkaloids, Khat and *Taxus* alkaloids and alkaloid histochemistry.

The betalains are pigments (e.g. those found in beet) which are chemically related to L-dopa. As a group of compounds, they have special significance to species of plants in the Caryophyllales which have developed these pigments for colouring leaves, flowers and fruits to the exclusion of the more usual anthrocyanins.

Benzodiazepine alkaloids are a small group of alkaloids which are derived from anthranilic acid. The seven membered benzodiazepine ring is formed as a cyclic peptide involving the carboxyl and amino groups of anthranilic acid and another amino acid (e.g. L-phenylalanine, L-tryptophan, L-glutamine). Benzodiazepidine alkaloids have been isolated from three genera of micro-organisms, namely *Penicillium*, *Aspergillus* and *Streptomyces*. Anthramycin, which has antitumour activity, is probably the best known member of the group. These natural products do not appear to possess the tranquillizing, hypnotic, anticonvulsant or muscle relaxant properties of the synthetic benzodiazepines which are in clinical use.

The phenanthrene alkaloids, derived biosynthetically from aporphines, are derivatives of 1-(2-aminoethyl) phenanthrene. As a group of alkaloids, they do not appear to have attracted a great deal of pharmacological interest although their biological activities are known to include antimicrobial, cytotoxic, hypotensive, sedative and dopamine receptor stimulation.

Ellipticine and related alkaloids represent another small group of alkaloids, in this instance being pyridino [4,3-b] carbazoles, obtained from species of *Ochrosia* and *Strychnos*. The chapter on the synthesis and antitumour activity of these alkaloids comprises some 113 pages with 290 references. Many attempts have been made to improve the biological effects of the natural product molecules including the addition of carrier molecules which aim to deliver the anticancer drug to specific targets, e.g. the synthetic ellipticine-oestradiol, ellipticine-enkephalin conjugates. Clinical trials of elliptinium were in phase II when the chapter was being prepared.

Khat (*Catha edulis*) is widely used as a drug in southern Arabian and east African countries in order to produce stimulation and euphoria. Psychic dependence is developed and the habit disrupts the lives of habitual users. (−)-Cathinone, one of the Khat alkaloids, acts similarly to (+)-amphetamine. The alkaloids fall into two classes, the phenylalkylamines and the cathedulins which are polyesters of polyhydroxylated dihydroagarofurans.

The alkaloids of *Taxus* species (yew) are complex diterpenes. One of these alkaloids, taxol, acts on tubulin. It is of current interest as an anticancer drug and when the chapter was in preparation phase II clinical trials were in progress.

The microdetection of alkaloids in plant and animal tissues is useful for biosynthetic and toxicological studies. The chapter on the histochemistry of alkaloids reviews the detection methods which are available and includes a section on histochemical chromatography.

One minor criticism of the volume concerns the index, which could be improved; it concentrates mainly on chemical names and is not so much concerned with plant sources, biological and pharmacological properties. Nevertheless, volume 39 maintains the high standards of the series and Arnold Brossi is to be congratulated on editing yet another excellent volume which adds further to our knowledge of the natural sources, biosynthesis, synthesis, chemical reactions, structure determination and phamacological properties of alkaloids. The review chapters are well written and extensively referenced to original scientific publications.

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