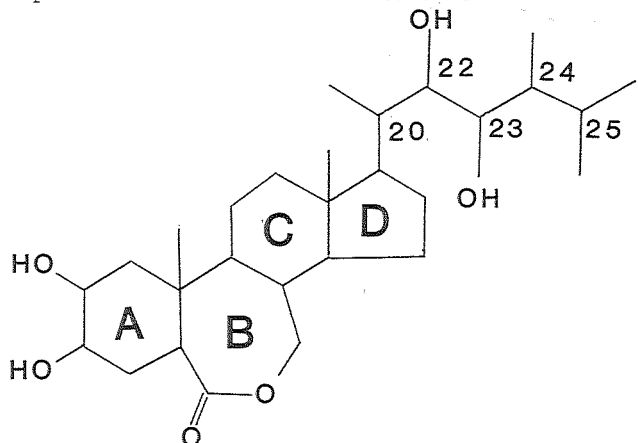


03.1-03 STRUCTURE ACTIVITY RELATIONSHIPS IN BRASSINO STEROIDS. By Judith L. Flippen-Anderson and Richard Gilardi, Laboratory for the Structure of Matter, Naval Research Laboratory, Washington, D. C. 20375, U.S.A.

Brassinolide (I) is an extremely potent naturally occurring plant growth promoting steroid. The structure of brassinolide, which was obtained in minute quantities from large amounts of rape pollen, was established by an x-ray single crystal analysis (M. D. Grove et al. *Nature*, 281, 216-217 (1979)). The seven-membered lactone moiety found for the B-ring in brassinolide was unprecedented in a natural steroid.



Since the structure was published, several groups of chemists have synthesized brassinolide. However, the synthesis is costly and time consuming and the yields are quite low. Therefore, other researchers are searching for isomers and analogs of brassinolide which are more easily synthesized, yet still exhibit a physiological activity similar to that of the natural product. Several such molecules have been synthesized (B. N. Mandava, USDA, Beltsville, Maryland, USA) and the structures of four of these materials have been determined. All four molecules differ from brassinolide in the stereochemistry of the C20-C25 side chain. In addition, two of the molecules have slightly modified structures, i.e. substitution of a $-C_2H_5$ moiety for the $-CH_3$ group on C24 and in one molecule the lactone group on ring B is flipped from what it was in brassinolide, i.e. -O6-C7- instead of -C6-O7-.

All of these compounds show the same type of physiological activity as the natural product but are less potent. The structures of these molecules will be compared in an effort to understand the relationship between their structures and relative activities. They will also be compared to other physiologically active steroids which have been isolated from plants and animals.

03.1-04 CRYSTAL STRUCTURE AND CONFORMATION OF 2'-FLUORO-5-iodo-ARABINOFURANOSYLCYTOSINE. By G.I. Birnbaum and M. Cygler; Division of Biological Sciences, National Research Council, Ottawa, Canada K1A 0R6; and K.A. Watanabe and J.J. Fox, Memorial Sloan-Kettering Cancer Center, Cornell University, New York, N.Y. 10021, U.S.A.

The title compound (FIAC) is one of the most potent new antiviral agents. It has excellent activity against herpes simplex viruses I and II as well as against Herpes Zoster; it is currently undergoing clinical trials. An X-ray analysis was undertaken in order to determine details of its geometry and conformation, this being the first such study of a fluoro-arabinonucleoside. Crystals of FIAC (from methanol) belong to the monoclinic space group $P2_1$ with cell dimensions $a = 4.747$, $b = 14.017$, $c = 18.514$ Å, $\beta = 90.28^\circ$. There are two molecules in the asymmetric unit which are related by a pseudo-twofold screw axis, making the structure pseudo-orthorhombic ($P2_12_12_1$). At the present stage of the refinement $R = 6.5\%$. The conformation of the two independent molecules is almost identical: *anti* about the glycosidic bond and C(3') endo (3E) pucker of the sugar ring. The $-CH_2OH$ side chain is disordered, with equal contributions of the *gauche-gauche* (g^+) and *gauche-trans* (t) rotamers. This conformation will be compared with that derived by 1H NMR spectroscopy. Details of this structure will be correlated with those of other arabinosides as well as with other antiviral nucleosides.

03.1-05 SYNTHETIC MODELS RELATED TO DNA-INTERCALATING MOLECULES : THE CRYSTAL AND MOLECULAR STRUCTURE OF CHLORO-QUINOLINE-PROPYL-ADENINE AND 8-BUTOXY-PSORALEN-THYMINE
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A number of studies have shown that many planar heteroaromatic molecules bind with nucleic acids. The binding has been frequently interpreted in terms of the intercalation model first proposed by Lerman (1) in which the interacting molecule is intercalated between two adjacent base pairs.

In order to investigate this specific problem of ring-ring stacking interaction, we have studied compounds in which two interacting rings are linked by a flexible hydrocarbon chain : chlorinated ring of chloroquine-adenine and psoralen ring-thymine. Furthermore psoralen binds photochemically to nucleic acids by photocyclization with the pyrimidine bases (2). Quinoline-propyl-adenine and 8-butoxy-psoralen crystallize respectively in space group $P1$ and C_c with $a = 8.209(2)$ Å, $b = 9.543(2)$ Å, $c = 14.547(4)$ Å, $\alpha = 97.57(2)^\circ$, $\beta = 91.45(2)^\circ$, $\gamma = 107.95(2)^\circ$ and $a = 8.646(3)$ Å, $b = 25.692(6)$ Å, $c = 8.599(3)$ Å, $\beta = 113.81(5)^\circ$.

The two structures were solved by direct methods. Quinoline-propyl-adenine crystallizes with five water molecules, shown in extended form with adenine and quinoline rings parallel (Fig.a) and important stacking between quinoline and adenine rings.