03. CRYSTALLOGRAPHY IN BIOCHEMISTRY AND PHARMACOLOGY

03.4-08 MODEL COMPOUNDS FOR ENZYME-SUBSTRATE INTERACTIONS. By C. P. Huber, P. R. Carey and D. J. Phelps. Division of Biological Sciences, National Research Council of Canada, Ottawa, Canada KIA OR6.

The enzyme papain forms enzyme-substrate intermediates with various cinnamic acid derivatives, and X-ray diffraction and resonance Raman spectroscopy have been used jointly in studying the mode of interaction. The r. R. spectra of the intermediates are distinctly different from those of the unbound substrates and a group of model compounds has been found which mimics the absorption and r. R. properties of the acyl enzymes and substrates. Crystal structure determinations have been made for 4-dimethylamino-3-nitrocinnamic acid (DMANCA) and 4-dimethylaminocinnamoyl imidazole (DMACI). The former represents the free product and the latter mimics the spectral properties of the bound substrate. By comparison with the DMANCA structure, there is a clear tendency in the DMACI structure toward quinoid character and a small but significant shortening and lengthening of the ethylenic single and double bonds respectively. We believe that a high degree of polarization of the ethylenic double bond may be occurring in the substrate in the active site by interaction of the acyl residue with protein dipoles and/or hydrogen bonds.

For 4-dimethylamino-3-nitrocinnamic acid (DMANCA), the absolute configuration was determined (I) by the Bijvoet difference method and is the same as that of other clerodane compounds, Clerodendrin A (Rogers, 1973), 3-epicaryoptin (Ley, 1973), Clerodin (Rogers, 1973), and Ajugareptansone A (II) and Ajugareptansone B (III), which was solved using the Patterson search system (Woolf, 1978). The absolute configuration was determined (I, II) by the Bijvoet difference method and is the same as that of alkaline related compounds, Clerodendrin A 3-bromo benzene chlorhydrin (Kato, Munkata, Katayama, J.Chem.Soc. Perkin. II, 1973).

03.4-09 CRYSTALLOGRAPHIC STUDIES ON THE INTERACTION OF ALKALI AND ALKALINE EARTH METAL SALTS WITH PEPTIDES. By P. Chakrabarti, K. Venkatesan and C. N. Rao, Department of Organic Chemistry and Solid State and Structural Chem. Unit, Indian Institute of Science, Bangalore, India.

Binding of alkali and alkaline earth metal salts to peptides and proteins is of great importance to many biophysical phenomena. Unfortunately, little is known about the nature of binding of these salts to the peptide bond. We have, therefore, chosen N-methylacetamide as a model peptide and prepared its complexes with LiCl, NaClO4, KSCN, MgCl2, CaCl2 and carried out systematic X-ray structure analyses of these crystaline complexes. The binding of the metal changes the peptide geometry considerably and a regularity has been found in the approach of the metal cations to the carbonyl group.

03.4-10 THE STRUCTURE AND ABSOLUTE CONFIGURATION OF THREE AJUGAREPTANSONES. By C. Miravitlles and X. Solans, Instituto "Jaime Almera", C.S.I.C., Etipieacus 15, Barcelona-1, Spain. G. Germain and J.P. Declercq, Laboratoire de Chimie Physique et de Cristallographie, Université de Louvain, I Place Louis Pasteur, B-1345, Louvain-la-Neuve, Belgium.

The description of the isolation and chemistry of the three natural closely related compounds, Ajugareptansone-p-Bromobenzoate (I), Ajugareptansone A (II) and Ajugareptansone B (III), is made by Camps, Coll, Cortel and Messeguer (1979) (Tetrahedron Lett, 19, 1709-1712) and Camps, Coll and Cortel (1981) (Tetrahedron Lett, in press). These compounds exhibit an insect antifeedant activity and are dipterones with a clerodane skeleton. The structure (I and II) was solved using the MULTAN system of computer programs (Main, Woolfson, Lessinger, Germain and Declercq, 1975), and the structure (III) was solved using the Patterson search system (Braun, Hornstra and Leenhouts, Philips Res. Repts., 1969, 24, 85-118). The refinements of the three structures were made using the SHELX program system (Sheldrick, 1976) SHXLX. The absolute configuration was determined (I, II) by the Bijvoet difference method and is the same as that of other clerodane compounds, Clerodendrin A 3-bromo benzene chlorhydrin (Kato, Munkata, Katayama, J.Chem.Soc. Perkin. II, 1973, 69-73) 3-epicaryoptin and Clerodin (Rogers, Unal, Williams, Loy, Sim, Joashi and Ravindranath, J.Chem.Soc. 1979, 97-99).