HYSICAL BIOCHEMISTRY

PM-E3

I.M.R. AND E.S.R. STUDIES OF STAPHYLOCOCCAL PROTEASE. H. Dulas, P. Leduc and G. Drapeau, Department of Chemistry and licrobiology, University of Montreal, Montreal, Canada. (intr. by R.H. Marchessault, Department of Chemistry, University of Montreal.)

The extracellular proteolytic enzyme of Staphylococcus aureus is composed of a single polypeptide chain of about 12,000 in molecular weight and the amino acid composition indicated and unusually high content of dicarboxylic amino acid (35%) and of proline residues (10%). The enzyme has a unique specificity for clearing carboxyl-terminal side of either aspartic acid or glutamic acid and exibits maximum activity at pH 4.0 and 7.8. The N.M.R. technique was used to study the effect of pH and temperature of the protease. The major changes in the spectra are in the aromatic proton region and suggested a gradual exposure of these groups to the aqueous medium in going to higher pH values. Mono- and dinitroxide analogs of DFP were used to label the enzyme at the active site. The spectra are comparable to labeled subtilisin BPN'. In conclusion, the staph protease has a rather "open" or "loose" structure in the native form.

FPM-E4

CONFORMAL CHANGES OF POLYPEPTIDES IN INTENSE ELECTRIC FIELDS. A.J. Bennett* and C.P. Bean, (intr. by D.C. Golibersuch), General Electric Research and Development Center, Schenectady, N.Y. 12305

Employing a simple "all or none" statistical theory, a calculation is given of the phase diagram in electric field-temperature space for the helix-coil transition of a polypeptide with nonpolar residues but charged end groups. The principal results are i) the transition field extrapolated to absolute zero is on the order of millions of volts per centimeter, ii) the normal transition temperature of large molecules is predicted to be significantly affected by fields as low as 30,000 v/cm, and iii) for temperatures just above the helix-coil transition temperature, the application of a field to a large molecule causes an initial transition to the helix state and with a further isothermal increase of field the coil state returns. The theory is extended to the case of the unfolding of a globular protein in an electric field. The fields are somewhat lower than those for the helix-coil transition and are always single valued at a given temperature. Lastly the effect of including the presence of charged residues is shown to decrease the estimated critical fields but keep them of the same order of magnitude as those given for the case of nonpolar residues.

FPM-E5

A DIRECT DETERMINATION OF THE
SOLUTION. II: CONFORMATION O
NMR AND A SHIFT REAGENT. N. S.
Biological and Medical Researc
Illinois, 60439 and T. A. Vict
Hospital, Evanston, Illinois,

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FPM-E6

CONFORMATIONAL ANALYSIS O
J.R. Weintraub and A.J. Hopfing
Western Reserve University, Cle

A set of empirical potential fun
energy calculations of polymers,
properties of a number of methyl-
methylamine, phenyl-n-propylami
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far from the ring. The folded con
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