The products of the reaction in either direction have been identified by paper chromatography. Under suitable conditions (cf. Fig. 1) the equilibrium may be so shifted that the reaction is quantitative in either direction. This has made it possible to assay and identify specifically 3α-hydroxysteroids and saturated 3-ketosteroids in quantities of 1 microgram or less. The enzyme also provides a one-step stereospecific synthesis of androsterone from androstane-3,17-dione.

The equilibrium constants of α and β hydroxysteroid dehydrogenase-catalysed reactions are such that at *p*H 7·4 the oxidation of 17β-OH groups and the reduction of the 3-keto groups to 3α-OH groups are favoured. These enzymatic mechanisms may be responsible for two of the three postulated steps in the conversion of testosterone to androsterone and etiocholan-3α-ol-17-one. Although the enzyme responsible for hydrogenation of the double bond remains unidentified, this reaction presumably precedes the reduction of the 3-keto group. Preliminary experiments have demonstrated the presence of 3α-hydroxysteroid dehydrogenase in mammalian tissues.

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Enzyme Inhibition

Katchalski, Berger and Neumann[1] have recently described the inhibition of pepsin by polylysine, polyornithine and poly-*p*-amino-phenylalanine. We would suggest that this is not an isolated effect but is an example of a widespread non-specific action of high molecular weight polyelectrolytes on many enzymes.

During recent years a number of references to such action have accumulated. For example, Hahn and his collaborators[2] have described the inhibition of hyaluronidase by polymers prepared from formaldehyde and various hydroxybenzoic acids; another team in Sweden[3] has studied the inhibition of this enzyme, and of acid and alkaline phosphatases, hexokinase, urease and β-amylase, by phosphate polymers of various aromatic hydroxy and amino compounds. Heparin has been shown to inhibit hyaluronidase[4], ribonuclease, deoxyribonuclease[5] and α-amylase[6]; nitrated and acetylated hyaluronic acid[7], cellulose and chitin sulphates[8] inhibit hyaluronidase; phenolsulphonic acid – formaldehyde polymers inhibit hyaluronidase[9], nucleases and α-amylase; polystyrene sulphonate, if of sufficient molecular size, also inhibits hyaluronidase (unpublished observations). The only characteristics which these inhibitors, with their varied chemical composition, appear to have in common are (*a*) high molecular weight, (*b*) polyanionic structure, and it seems probable that all substances with these two properties will exert some degree of inhibition against certain enzymes. It will be interesting in due course to discover the manner in which the potency varies with molecular size and with both proportion and type of anionic groups. We should mention, however, that a third feature has been suggested[10] as necessary for inhibition of this kind, namely, that the molecules should be filamentous, since it is claimed that sulphonated glycogen and amylopectin, which are globular in form, do not inhibit hyaluronidase.

In view of the obvious importance of this general effect, it might be useful to introduce the term 'macroanion' for this class of substance and thus to refer to 'macroanionic inhibition'.

The work of Katchalski, Berger and Neumann[1] now suggests that a similar class of high molecular weight polycationic inhibitors ('macrocations') may also exist, these acting possibly upon a different group of enzymes.

Heparin (a macroanion) reverses this macrocationic inhibition of pepsin[1], in a manner similar to the reversal of the macroanionic inhibition of hyaluronidase by the macrocations protamine and methylgelatin[3]. Both effects must be due to some form of macroanion – macrocation interaction. A similar interaction may be involved also between enzymes and inhibitors of the type considered here and indeed in certain enzyme-substrate reactions themselves. Further study of the susceptibility of enzymes to macroanionic and macrocationic inhibition in concert with their chemical and physico-chemical properties may usefully further our understanding of enzyme action and inhibition both *in vivo* and in isolated systems.

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Fractional Precipitation of Nucleic Acid

Melville *et al.*[1] have recently used turbidity measurements to follow the fractional precipitation of high polymers from solution. The turbid suspensions were found to be stable if very dilute polymer solutions were used. Nucleic acids are precipitated from aqueous solution by acids, cationic detergents, positively charged polyelectrolytes and alcohol. Stable suspensions are produced when hydrochloric