PROCEEDINGS OF THE BIOCHEMICAL SOCIETY

The 503rd Meeting of the Society was held at University College London, Gower Street, London, W.C.1, on Monday and Tuesday, 23 and 24 March 1970, when the following papers were presented:

SYMPOSIUM ON 'THE BIOCHEMISTRY OF STEROID HORMONE ACTION'

Oestrogen Action: a Study of the Influence of Steroid Hormones on Genetic Expression

By GERALD C. MUELLER. (*McArdle Laboratory, University of Wisconsin, Madison, Wis. 53706, U.S.A.*)

Acceleration of genetic expression mechanisms is a common feature of the response of target tissues to a wide spectrum of steroid hormones. In each case the interaction of the hormone with a specific receptor system appears to trigger the response. In studies on the mechanism of oestrogen action it is evident that the hormone reacts initially with receptors in the cytoplasm but is rapidly translocated to the nucleus. This translocation, which appears necessary for the ensuing hormone response, is independent of the synthesis of RNA and protein. The hormonal activation of genetic expression, however, requires the synthesis of protein for both the initial activation step and the amplification of the hormone response. Evidence for at least two roles of protein synthesis in the hormone response will be presented. In the attempt to elucidate the manner in which the receptor initiates the hormonal response studies have been carried out on the changing character of the receptor after interaction with the hormone. Characterization studies reveal the oestrogen receptors of the cytoplasm to exist as 9S molecular complexes composed of a 4S oestrophilic (A) unit and a non-oestrogen-binding (B) unit; the latter can be dissociated further to subunits B' and C. Incubation of the native 9S complex at 37°C in the absence of hormone converts it into a sensitized form, which rapidly dissociates on interaction with the hormone even at 0°C. The 4S oestrophilic units, which are derived in this process, fail to reassociate or hybridize with fresh B units obtained by dissociation of the native 9S complexes with 0.3M-KCl. The failure of the system to reassociate appears to be due to the release of the small C subunit, which in turn modifies the character of the oestrophilic A units. The relationship of the modified A units of the cytoplasmic receptor complex to the non-associating oestrophilic unit that is extractable from the nuclei will be discussed in terms of possible roles of the oestrogen-receptor subunits in the control of nuclear RNA polymerase activity.

Interaction of Steroid Hormones with Histones

By M. SLUYSER. (*Department of Biochemistry, Antoni van Leeuwenhoek-Huis, Het Nederlands Kanker Instituut, Amsterdam C, The Netherlands*)

Various steroid hormones stimulate protein synthesis in their target tissues. Evidence that these steroids enhance the synthesis of RNA in these tissues is well documented. This raises the question whether the hormones, or metabolites thereof, interact with chromosomal proteins, thereby increasing the template activity of the chromatin. Studies in this laboratory have shown that steroids attach to histones both *in vitro* and *in vivo*. This appears to be mainly a non-covalent binding to hydrophobic groups, which are located towards the C-terminal regions of the arginine-rich histones. The kinetics of these interactions have been investigated. The results will be discussed in relation to a possible involvement of histones in the mechanism of hormone action.

Steroid Hormones, Ribonucleic Acid Transport and the Regulation of Cytoplasmic Translation

By T. H. HAMILTON. (*Department of Zoology, University of Texas at Austin, Austin, Tex. 78712, U.S.A.*)

Steroid Hormones and Enzyme Induction

By N. LANG. (*Universitäts-Frauenklinik, 53 Bonn den Venusberg, Germany*)

The Effect of Steroids on Transport of Electrolytes through Membranes

By R. FRASER. (*Medical Research Council Blood Pressure Unit, Western Infirmary, Glasgow W1, U.K.*)

The structure and properties of cell membranes appear remarkably stereotyped, irrespective of the locus of the membrane in the cell or of the origin of the cell itself. Among the most universal of the properties of the cell surface is its ability to maintain a high intracellular/extracellular ratio of K⁺