ammonia-lyase levels in several plants include multiple effects on enzyme activation, enzyme inactivation and enzyme synthesis probably regulated at the translation level. Dr P. Schopfer (University of Freiburg), on the other hand, presented evidence that the regulation of gene transcription by phytochrome is a likely mechanism for the control of several enzymes in *Sinapis alba*. Perhaps the most striking contribution to the conference was read in the absence of its author (Professor Y. Yamamoto, Nagoya University) which reported evidence for the photoregulation *in vitro* of NAD kinase activity in cell-free extracts. This is the first report of an enzyme activity being associated with, or regulated by, phytochrome outside the plant cell and will undoubtedly stimulate many workers to attempt confirmation of the results.

DIFFERENTIATION

Models or Molecules?

from a Correspondent

THE most impressive feature of the first international conference on cell differentiation, held in Nice from September 13 to 16, was the paucity of novelty; there were hardly any new concepts and few new results. In part this was due to the hysterical pace. Speakers were allowed, on average, fifteen minutes for their presentations. Most responded to this challenge by describing their techniques and results in great detail. Of course, there were some outstanding exceptions, but the general impression was of the failure of indifferent molecular biology to provide any insight into the fundamental processes of differentiation, let alone to describe it adequately.

Dr F. H. C. Crick (Medical Research Council Laboratory of Molecular Biology, Cambridge) presented his new theory of eukaryotic chromosome structure, one of the most welcome aspects of which, as Dr S. Brenner (MRC Laboratory of Molecular Biology) pointed out, is that it will stop people talking about reverse transcriptase. He suggested that the chromosome contained "globular" (looped) DNA and "fibrous" DNA. The globular portions correspond to the bands of polythene chromosome, the fibrous portions to the interband regions. The interband regions contain genetic information for messenger RNA synthesis, the bands are control elements. On being questioned after his presentation, Dr Crick successfully destroyed all attempts to introduce facts as counter evidence by demonstrating, or by just stating, that the facts were predicted, indeed demanded, by his model.

Dr M. H. Cohen and Mr A. D. J. Robertson (University of Chicago) presented a mixture of theory and experiment, supported by two fascinating films, to explain some features of the aggregation of cellular slime moulds. Their most important result is the demonstration that aggregation can be artificially controlled by pulses of cyclic AMP released periodically from a microelectrode. As Dr Brenner put it, the work seemed interesting enough to become controversial.

Dr S. A. Newman (University of Chicago), in a theoretical paper, showed that in a multi-enzyme system stability could be achieved if each enzyme had a monotonically increasing activity with increasing substrate concentration; non-monotonicity, such as in the characteristic bell-shaped activity function found *in vitro* leads to instabilities. This correlates well with known activities of multi-enzyme systems *in vivo*.

Dr N. K. Jerne (Basle Institute for Immunology) introduced the section on immunology with a review of some recent research work on antigen receptor sites in lymphocytes. There are about 10^4 per cell. Although they are usually randomly distributed, appearing to "float" in the membrane, on binding with receptor antibody they aggregate into islands containing about 10^3 molecules. On incubation at 37° C the islands merge to form a cap which is then ingested; this might act as a trigger for lymphocyte multiplication. Other work Jerne described emphasized the enormous number, at least a thousand, of idiotypes (molecules with identical binding properties but different electrophoretic mobilities) that can be produced by cells of an inbred mouse strain to the same antigen. This is a further indication of the incredible flexibility of protein tertiary structure.

POLYPEPTIDE HORMONES

Membrane Interactions

from a Correspondent

THE relation between the structure of polypeptide hormones and their function was the subject of a colloquium held on September 2 at the University of Sussex and attended by members of the Biochemical and Chemical Societies. In the morning session which was devoted to insulin, Dr T. Blundell and other members of Professor Hodgkin's group at the University of Oxford described how the earlier work on the three-dimensional structure of insulin is now being followed up. The species variations in the primary structure of at least twenty insulins are now known, so that it is possible to speculate on which groups of residues are significant in biological and immunological reactions, and it is becoming feasible to identify those residues which when modified give rise to conformational changes. It now seems likely that some non-polar residues towards the terminus of the β chain may be responsible for interaction with membrane receptors.

In the same session, Dr P. T. Grant (University of Aberdeen) suggested that zinc may stabilize the storage form of the hormone. Dr H. Zahn and his colleagues (Aachen Technical University) discussed how they synthesize analogous insulin. Several modified insulins have now been made and their biological and immunological activities have been tested. In the last contribution of the morning session, Dr E. R. Arquilla (University of California) described the work of his group on reactivity of modified insulins with antisera. Again the emphasis was on how alterations in the C terminal groups of either chain might alter conformation and hence immunological activity.

One important conclusion which emerged from the morning session was that in spite of exciting progress, knowledge of the state of aggregation of insulin in biological fluids will be essential for defining just how insulin acts at membranes.

The afternoon session was devoted to papers on the structure-activity relationships of several other polypeptide hormones. In an excellent summary of the hormonal polypeptides of the upper intestine, Professors Mutt and Jorpes (Karolinska Institutet, Stockholm) compared the amino-acid sequences of gastrins, secretins and pancreozymin, and pointed out some interesting similarities between the glucagon and calcitonin sequences. Dr W. Rittel (Ciba-Geigy Ltd, Basle) discussed the effects of chemically modified corticotropins on adrenal stimulation and on lipolysis in adipose tissue. Structural modifications cause parallel alterations in activity in these two differing tissues. Dr M. Wallis (University of Sussex) gave an interesting contribution on growth hormones, prolactins and placental lactogens. He speculated on how rates of evolution might be determined by comparison of differences in the primary structure of hormones from related species.

Finally, Dr M. Rodbell and his colleagues (National Institutes of Health, Bethesda) suggested a possible model for the interaction of small polypeptide hormones such as glucagon with cell membranes. Rodbell postulated that the binding of glucagon takes place by non-covalent bonds to the membrane, perhaps through the C terminal 6 residues, whereas the N terminal histidine of glucagon is essential for biological activity. The membrane-bound glucagon then undergoes a conformational change, such that it activates adenylate cyclase.