2 being also a rod, some 470 Å long. This segment differs from the light meromyosin, or the whole rods, in being soluble for the full range of ionic strength at neutrality, and indeed its amino-acid composition shows it to be acidic, and distinctly rich in charged residues. There is no proline. Lowey *et al.* suggest that because the aggregation tendency in this part of the myosin molecule is absent, it may well serve the function of bending out of the filament axis during contraction to make contact with the actin filaments.

It is also reported that the light chains, known to be present in heavy meromyosin, are in subfragment-1. Finally, the ATPase activity, stimulated by actin and magnesium, is very much like that of heavy meromyosin, which supports earlier evidence that only one head is enzymatically operative at any one time. This would imply a control mechanism, possibly involving another part of the molecule. It may be recalled in this connexion that the ATPase activity of myosin is affected by chemical blocking of sulphydryl groups, which, as Trotta *et al.* reported, are not in subfragment-1. There are two types of thiol, one more reactive than the other. Reaction of the first leads to enhancement of the calcium–ATPase, but destruction of ITPase and potassium-dependent ATPase activity. When the other thiol is allowed to react, all activity is eliminated. Seidel (*Biochim. Biophys. Acta*, **180**, 216; 1969) has examined the effect of blocking only the less reactive group. To achieve this the reactive thiol is blocked with a reversible (disulphide-forming) reagent, the second with the irreversible N-ethylmaleimide, and the first group is then regenerated by addition of a thiol reagent. Qualitatively the effect of blocking the less reactive sulphydryl group is exactly the same as reaction of the other, in respect of the three types of activity. Thus at least one free thiol is needed for ATPase activity, but if these residues are indeed remote from the active site in the myosin heads, the manner in which the effect of blocking them chemically is transmitted is altogether obscure.

NUCLEIC ACIDS

All about RNA

from a Correspondent

SMALL RNA molecules were the subject of a colloquium held at the University of Glasgow on May 30 by the Biochemical Society. Besides *t*RNA molecules there are several low molecular weight RNAs of unknown function in living matter, for example 5*S* RNA (120 residues) bound to ribosomes and the "7*S*" species (140 residues), which is hydrogen bonded to the RNA component of the eukaryocyte ribosome.

To study these RNAs, as U. V. Loening (University of Edinburgh) pointed out, it is essential to use powerful fractionation techniques. Although chromatography is suitable for large amounts of material, gel electrophoresis gives the greatest resolution. Although the resolution pinpoints the difficulties of preparing undegraded RNA, it has made possible the recent preliminary characterization of messenger RNAs for haemoglobin and antibody formation in several laboratories.

G. G. Brownlee (University of Cambridge) outlined the fingerprinting techniques which he has developed for primary sequence determination of small ^{32}P-labelled RNA molecules. The method shows that the sequence of 5*S* RNA from man is different from that of *E. coli*. By contrast, Brownlee was able to show, in collaboration with R. Williamson (Beatson Institute, Glasgow) that 5*S* RNA from man and mouse gives identical fingerprints.

The sequences of thirteen *t*RNAs are now known, so that it has been possible to predict a common secondary structure for *t*RNAs, based on a four arm clover leaf configuration. On the basis of this, and X-ray data, W. Fuller, S. Arnott and J. Creek (King's College, London) proposed a new three-dimensional molecular model. It has one arm of the clover leaf ("TψC" arm) between another two (the "anticodon" and "amino-acid" arms) so that the three helical regions are coaxial and constitute a long helical stem. The variable "dihydrouracil" arm and the "extra" loop come close to one another to form a knob on this stem.

R. H. Burdon (University of Glasgow) considered the problem of biosynthesis. In animal cell cytoplasm there is a *t*RNA precursor which is converted to *t*RNA in a process involving the removal of ten to fifteen residues and the methylation of certain bases. 5*S* RNA of the ribosome does not seem to arise as a result of cleavage from the large ribosomal precursor RNA although its synthesis seems to be linked to that of ribosomal RNA.

U. Z. Littauer (Weizmann Institute) presented compelling evidence for the synthesis, in *E. coli* infected with T4, of certain *t*RNAs coded for by the phage genome. He used a powerful new technique, developed with V. Daniel and S. Sarid, which is capable of detecting specific *t*RNA–DNA hybrids. This was based on the finding that N-acetylation of aminoacyl-*t*RNA renders the aminoacyl ester bond stable to the conditions of hybrid formation.

ENZYMES

Two Forms of a Phosphatase

from a Correspondent

UNDERLYING the apparently simple process of glycogen breakdown is an intricately coordinated system involving several auxiliary enzymes and their respective activators. The enzyme that phosphorolyses glycogen is phosphorylase *a*, the characteristics of which have been known since the pioneering work of the Coris and their pupils twenty-five years ago.

Phosphorylase *a* is the active form of the enzyme, but there is also an inactive form, phosphorylase *b*, produced by the action of the enzyme phosphorylase phosphatase. The inactivation is reversed by yet another enzyme, phosphorylase kinase; and this is, in its turn, dependent on a further subsidiary cycle of activation.

An important study of phosphorylase phosphatase from pigeon breast muscle was carried out recently by C. A. Chelala and H. N. Torres in L. F. Leloir's Institute in Buenos Aires (*Biochim. Biophys. Acta*, **178**, 423; 1969). They have shown that this enzyme exists in two interconvertible forms and have, moreover, demonstrated a coordination between phosphorylase phosphatase and phosphorylase kinase, the two enzymes governing the level of active phosphorylase. Chelala and Torres observed that when a phosphatase