and degradation and by the availability of apoenzymes (Kaplan, 1966). The evidence in support of any one of these hypotheses is meagre.

Flavokinase is the first enzyme in the biosynthesis of flavin coenzyme from riboflavin. This reaction is essentially irreversible and specific for the substrates ATP and riboflavin (Giri *et al.*, 1958). The second enzyme, FAD synthetase, catalyses the reversible reaction yielding FAD and PP_i in the forward reaction (Giri *et al.*, 1960).

The enzymes cleaving FAD function optimally at pH 3.8 (Ravindranath & Appaji Rao, 1971), pH 7.4 (Kumar *et al.*, 1965) and pH 9.4 (Ravindranath & Appaji Rao, 1968). The enzyme cleaving FAD at pH 9.4 is inhibited uncompetitively by AMP and non-competitively (linear) by ATP. The partially inactivated enzyme is activated by ADP (Ravindranath & Appaji Rao, 1969). Reversible denaturation with urea causes decreased affinity and increased activity. This enzyme contains zinc, which can be replaced by cobalt without significantly altering the properties of the enzyme. The enzyme functioning optimally at pH 7.4 changes its locus of attack on treatment with thiol-group reagents. This change appeared to be due to the reduction of a disulphide bond in the protein. The V_{max} , K_m and temperature optima were unaltered. The non-specific acid pyrophosphatase probably has a scavenging function and is significantly activated by AMP.

These results suggest that AMP formed during the initial stages of hydrolysis slows down the rapid degradation of coenzyme nucleotides. On the other hand ATP, a substrate for both the biosynthetic reactions, inhibits in a non-competitive manner, presumably by affecting the rate-limiting release of AMP. This control would permit the biosynthesis to proceed uninterrupted. Compartmentation of these enzymes could be an additional parameter in the control of coenzyme nucleotides.

- Giri, K. V., Krishnaswamy, P. R. & Appaji Rao, N. (1958) *Biochem. J.* **70**, 66
 Giri, K. V., Appaji Rao, N., Cama, H. R. & Kumar, S. A. (1960) *Biochem. J.* **75**, 381
 Kaplan, N. O. (1966) in *Current Aspects of Biochemical Energetics* (Kaplan, N. O. & Kennedy, E. P., eds.), p. 447, Academic Press, New York
 Kumar, S. A., Appaji Rao, N. & Vaidyanathan, C. S. (1965) *Arch. Biochem. Biophys.* **111**, 646
 Ravindranath, S. D. & Appaji Rao, N. (1968) *Indian J. Biochem.* **5**, 137
 Ravindranath, S. D. & Appaji Rao, N. (1969) *Arch. Biochem. Biophys.* **133**, 54
 Ravindranath, S. D. & Appaji Rao, N. (1971) *Indian J. Biochem. Biophys.* in the press

Structure and Possible Regulatory Properties of Plant Aldolases

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Fructose diphosphate aldolase has been purified from a variety of plant and animal sources. Spinach leaf aldolase has been isolated in homogeneous form in our laboratory and shown to resemble mammalian aldolases, although the molecular weight is smaller. The enzyme is a tetramer with molecular weight 120000, compared with 160000 for mammalian aldolases. The fructose 1,6-diphosphate/fructose 1-phosphate activity ratio is approx. 20:1, and both activities are decreased during removal of the C-terminal tyrosine residues with carboxypeptidase. However, the four tyrosine residues are not equally sensitive, and loss of activity towards fructose 1,6-diphosphate is associated with removal of the one or two most sensitive residues. This suggests a co-operative interaction between the subunits. Aldolase is found in both chloroplasts and cytosol, and two forms can be separated by chromatography.

A pentapeptide isolated from the active site has been shown to have the sequence Leu-Leu-Lys-Pro-Ser. This sequence is similar to that found in all aldolases from animals, both invertebrate and vertebrate, in which the corresponding sequence is Leu-Leu-Lys-Pro-Asn. The possible significance of this homology will be discussed.

Generation of Reducing Potential in Photosynthesis

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The utilization of light energy for assimilation of CO₂ into cellular material requires that the available (and absorbed) electromagnetic energy be converted into chemical free energy. It is generally accepted that the end products of this conversion process are reduced ferredoxin and ATP plus molecular O₂.

During the past 2 years we have isolated and purified a new carrier that functions to accept electrons from photosystem I and in the reduced form serves as the reductant for ferredoxin reduction. This new factor, termed 'ferredoxin-reducing substance', is a peptide of low molecular weight (about 4600) and appears to contain an isoflavone chromophore.

Initially we demonstrated that the photoreduction of NADP⁺ by sonicated chloroplast fragments required the presence of ferredoxin-reducing substance. To demonstrate unequivocally that ferredoxin-reducing substance functions on the reducing side of photosystem I, the reduction of NADP⁺ was