agents and each subunit contains a reactive lysine residue capable of forming a Schiff base with the substrate (Kawahara & Tanford, 1966; Grazi, Rowley, Cheng, Tchola & Horecker, 1962). Class 2 aldolases occur in yeasts and bacteria. They are dimeric enzymes with molecular weights of about 80000 and, as they contain essential bivalent metal ions (Kobes, Simpson, Vallee & Rutter, 1969), are inhibited by chelating agents.

Studies of the primary structure of class 1 aldolase (as exemplified by muscle aldolase) are in progress in several laboratories (Sajgó, 1969; Anderson & Perham, 1970; Gracy, Lacko & Horecker, 1969), and it was therefore decided to study the primary structure of yeast aldolase in an attempt to ascertain whether the two different classes of aldolase are related structurally.

Yeast aldolase was prepared in pure crystalline form by a modification of an existing procedure (Richards & Rutter, 1961). It gave a single band by polyacrylamide-gel electrophoresis in the presence of 0.1% sodium dodecyl sulphate and the molecular weight of the subunit was shown to be 42000 ± 2000 , thus confirming the dimeric structure of the enzyme. Carboxymethylation with iodo[2- 14 C]acetate, as well as titration with 5,5'-dithiobis-(2-nitrobenzoic acid) in 4M-urea, indicated 10 cysteine residues/dimer, and the results of amino acid analyses show that the monomer consists of a single polypeptide chain containing about 360 amino acid residues, corresponding to a molecular weight of 40000. Moreover five radioactive peptides of unique sequence, each containing one residue of S-[2- 14 C]-carboxymethylcysteine, have been isolated and characterized from enzymic digests of the carboxymethylated enzyme.

A comparison of the sequences around the cysteine residues in these peptides (which together account for approx. 25% of the molecule) with the sequences of tryptic peptides containing cysteine derived from the rabbit (Sajgó, 1969) and sturgeon (Gibbons, Anderson & Perham, 1970) enzymes has so far shown no evidence of sequence homology between the class 1 and the class 2 aldolases.

In contrast with other glycolytic enzymes such as glyceraldehyde 3-phosphate dehydrogenase (G. M. T. Jones & J. I. Harris, 1971, in preparation), it therefore appears that aldolases from yeast and muscle are not structurally related and that they have evolved independently.

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Light-Induced Development of Enzymes of Glycollate Metabolism in Etiolated Bean Leaves

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Phosphoglycollate and glycollate are products of photosynthetic CO₂ fixation by the chloroplasts, but the subsequent metabolism of glycollate occurs outside the chloroplasts. In parallel to a study of the development of photosynthetic activity in the plastids of greening leaves, the activities of some of the enzymes of the glycollate pathway were determined. Greening was brought about by transferring 14-day-old dark-grown plants of *Phaseolus vulgaris* cultivar. Alabaster to continuous illumination of 700 μ W/cm². Of the activities investigated, phosphoglycollate phosphatase and NADPH-glyoxylate reductase have been reported to be wholly located in the chloroplasts (Thompson & Whittingham, 1967), catalase has been located exclusively in the peroxisomes, and glycollate oxidase and hydroxypyruvate reductase are also peroxisomal, although this may not be their only location (Tolbert, Yamazaki & Oeser, 1970).

With the exception of the chloroplast component of the measured NADPH-glyoxylate reductase activity, which declined, all of these enzymes increased about tenfold in activity/leaf during 96h of greening, but their activities remained constant or declined during similar periods in darkness. A lag phase in development of about 5h was found. Their behaviour thus resembled that of those photosynthetic carbon-cycle enzymes that are located exclusively in the chloroplasts (ribulose diphosphate carboxylase, phosphoribulokinase and NADP-linked triose phosphate dehydrogenase) and of ribose phosphate isomerase, which occurs both inside and outside the chloroplasts (Bradbeer, 1969, 1970). Those other carbon-cycle enzymes that occur both in the chloroplast and in the cytoplasm did not show a lag period and had smaller overall increases

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in activity during greening. It appears that the development of chloroplast and peroxisomal enzyme activities may respond to illumination in the same way.

The development of the activities of all of these enzymes of glycolate metabolism was unaffected by D-threo-chloramphenicol, in contrast with essentially complete and specific inhibition of the development of ribulose diphosphate carboxylase and phosphoribulokinase activities by this compound (Ireland & Bradbeer, 1971). This implies that the synthesis of these enzymes occurs on cytoplasmic ribosomes and not on chloroplast ribosomes. Codd & Merrett (1970) reported that D-threo-chloramphenicol inhibited the development of phosphoglycolate phosphatase in greening *Euglena*, but omitted the essential control experiment with one of the other chloramphenicol isomers.

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The Chemical Composition of Dogfish Myelin

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Purified myelin of most vertebrates hitherto investigated is characterized by the presence of basic encephalitogenic protein, by the marker enzyme 2':3'-cyclic nucleotide 3'-phosphohydrolase and by a relatively high concentration of glycolipid.

Dogfish (*Scyliorhinus caniculus*) myelin prepared and purified by the method of Norton (1971) gave electron micrographs closely resembling those of myelin from other species with a clearly defined intraperiod line. Gel electrophoresis in phenol-acetic acid-water (Takayama, MacLennan, Tzagoloff & Stoner, 1966) gave a double band of basic protein resembling those of myelin from the mouse and the rat, with a mobility slightly less than that of cytochrome c. The basic protein has also been examined in dilute-acid (pH 3) extracts of white matter, a procedure giving similar basic-protein patterns to extracts of isolated myelin (Martenson, Deibler & Kies, 1969). This preparation from dogfish on electrophoresis in 1M-acetic

acid (Martenson, Deibler & Kies, 1970) gave one main band and also two minor bands that migrated ahead of those seen with preparations from all other vertebrates examined, with mobilities similar to that of lysozyme. Electrophoresis at pH 10.6 (Martenson *et al.* 1969) gave three diffuse bands, a pattern again unlike that obtained with preparations from any other species. Not only was the protein electrophoretically different, but it failed to produce experimental allergic encephalomyelitis when injected with Freund's complete adjuvant into guinea pigs.

Also unlike that of other vertebrates, dogfish myelin was found to have no detectable phosphohydrolase activity. Although Cuzner, Davison & Gregson (1965) found similarity in the lipid patterns of vertebrate myelin preparations, further analysis has shown that the concentrations of sulphatide and cerebroside in dogfish myelin are equal whereas in other species the cerebroside concentration is 3-4 times that of sulphatide. The enhanced myelin sulphatide concentration in the dogfish is accompanied by a relatively low brain sulphatase activity. Our findings suggest a greater species variation in myelin composition than had previously been suspected. Further, it now appears that encephalitogenic activity is not an essential property of the basic protein thought to be localized in the intraperiod line of the myelin sheath (Dickenson, Jones, Aparicio & Lumsden, 1970; Adams, Bayliss, Hallpike & Turner, 1971).

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Relationship between Ribonucleic Acid Synthesis and the Mechanism of Enzyme Induction in Mammalian Liver

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The early, precise and orderly manner in which biogenesis of selected proteins is amplified after a corticosteroid hormone administration affords an