infected with herpes simplex virus requires prior transcription and translation and (iii), since the enzyme preparation from infected cells differs from that of the host cell, it could be a host isoenzyme, an enzyme programmed by the virus or a host enzyme modified by virus-specific protein that binds to the enzyme.

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Comparison of Uridine Diphosphate Glucuronyltransferase Activities Synthesizing S- and O- β -D-Glucuronides

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The extent of heterogeneity in UDP-glucuronyltransferase activities synthesizing various O- β -D-glucuronides is still uncertain (Dutton, 1971; Mulder, 1971; Howland *et al.*, 1971). This mechanism also forms S- β -D-glucuronides of diethyldithiocarbamic acid (Dutton & Illing, 1969), thiophenol (Illing & Dutton, 1970) and o-aminothiophenol and p-nitrothiophenol with concomitant production of UDP (G. J. Dutton & H. P. A. Illing, unpublished work). We now report some properties of this latter UDP-glucuronyltransferase activity ('S'-enzyme), principally towards aromatic thiol substrates, with some comparisons of activity ('O'-enzyme) towards phenolic analogues.

Both 'S'- and 'O'-enzymes occurred almost exclusively in microsomal fractions of the mammalian or avian liver, kidney cortex and stomach examined; pH optima were similar, although in liver that for p-nitrothiophenol was sharper than that for p-nitrophenol. With these two substrates, 'S'-enzyme was notably less activated than 'O'-enzyme on storage, or on treatment with detergents or UDP-N-acetylglucosamine.

Development of activities towards p-nitrophenol and p-nitrothiophenol in perinatal mice was almost identical, contrasting with differences observed between various phenolic substrates (Dutton, 1966). Both activities were induced precociously on culturing chick-embryo liver with or without phenobarbital (Dutton *et al.*, 1970), or on injecting eggs with phenobarbital; activity towards p-nitrothiophenol seemed to respond the more rapidly.

In liver microsomal preparations from both Wistar and Gunn rats activities towards p-nitrothiophenol and p-nitrophenol were similar; activities were not

increased by added diethylnitrosamine. Marked differences occurred between activities towards o-aminothiophenol and o-aminophenol. In liver microsomal preparation from Wistar rats activities towards o-aminophenol were lower than towards o-aminothiophenol; diethylnitrosamine raised the former, but not the latter, activity until both were approximately equal. In the preparation from Gunn rats activity towards o-aminophenol was virtually absent, whereas that towards o-aminothiophenol was near 'activated' values obtained with the preparation from Wistar rats; diethylnitrosamine again did not increase activity towards the thiol but raised the 'O'-enzyme activity (Stevenson *et al.*, 1968) to this high value. Gunn rats do not seem defective in UDP-glucuronyltransferase activity towards o-aminothiophenol, and in both rat strains this activity remains uninfluenced by diethylnitrosamine.

Differences therefore exist between 'S'- and 'O'-enzyme activities towards a given substrate in its aromatic thiol or phenolic forms; but these differences seem no greater, and are often less, than the differences existing between activities of the 'O'-enzyme towards various phenolic substrates.

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Desaturation of Stearate by Sheep Tissue Microsomal Preparations

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Cook & Reiser (1968) showed that, in mitochondria-free preparations of sheep adipose tissue the triglycerides of which contained 34% stearate, desaturase activity towards stearate was considerably less than that in the adipose tissue of the pig and the rat, the triglycerides of which contain considerably less stearate. However, the proportion of stearate in the triglycerides of individual adult sheep varies greatly between different bodily sites, ranging from less than 5% in the pinnae of the ears, through 10-20% in subcutaneous adipose tissue, to more than

30% in perinephric adipose tissue (Duncan & Garton, 1967). Although the high proportion of stearate in perinephric triglycerides is probably associated with the incorporation of exogenous stearate derived from hydrogenation of dietary unsaturated C₁₈ acids in the rumen (Duncan & Garton, 1967), some of the acid is evidently of endogenous origin, as evidenced by the observation that the perinephric triglycerides of sheep reared on a lipid-free diet contained 24% stearate compared with 11% in their subcutaneous triglycerides (Duncan *et al.*, 1971), suggesting that desaturase activity may be greater in subcutaneous tissue.

Accordingly, the desaturation of [1-¹⁴C]stearate was studied with microsomal preparations from both subcutaneous and perinephric adipose tissue of five individual sheep; the method used was that of Bickerstaffe & Annison (1969), except that stearate was added in solution in propylene glycol (Gellhorn & Benjamin, 1964). Desaturase specific activities, expressed as nmol of stearate converted into oleate/30min per mg of microsomal protein, were 9.9 and 15.0 (mean values) respectively for perinephric and subcutaneous tissue; the difference was statistically significant ($P < 0.05$).

Corresponding mean values for liver microsomal preparations from sheep (10), rats (4) and hens (3) were 1.5, 13.0 and 26.5 respectively, showing that marked differences exist between species (cf. Cook & Reiser, 1968; Thompson & Allen, 1969). Whereas lactating mammary tissue of the rat (Lossoy & Chaikoff, 1958) and the rabbit (Bu'lock & Smith, 1965) shows no capacity to desaturate stearate, that of the cow (Laurysens *et al.*, 1961), goat and pig (Bickerstaffe & Annison, 1970) has considerable desaturase activity. Sheep mammary tissue obtained from animals in full lactation was found to be as active as subcutaneous adipose tissue, although, as the gland regressed, desaturase specific activities fell to less than 1.0.

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Uptake of Vitamin E by Rat Small-Intestinal Slices

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Previous reports have suggested that vitamin E (α -tocopherol) is absorbed more efficiently by the intestine from a micellar dispersion than from an emulsion (Thompson, 1969; MacMahon & Thompson, 1970). Bile salts are known to be necessary for absorption (Gallo-Torres, 1970). They are required for the formation of mixed micelles with the products of fat digestion, namely β -monoglycerides and free fatty acids (Hofmann & Borgström, 1962). These results implicate the need for a micellar dispersion of α -tocopherol before its absorption from the intestinal lumen. We have examined the effect of systematically varying the composition of the incubation medium on uptake of tritiated α -tocopherol by slices of rat small intestine, to obtain more information about molecular events relating to absorption.

About 82% of the radioactivity recovered from tissue total lipids was associated with the mucosal layer, and was shown by t.l.c. to be mostly unchanged α -tocopherol. Uptake of α -tocopherol was just as effective from dispersion in 10mM-sodium taurodeoxycholate alone, and when 5mM-mono-olein was present, or even when 5mM-oleate was added to the system. Uptake was also as effective from 10mM- and 30mM-sodium taurodeoxycholate. Changing the pH of the medium from 5.3 to 7.2 did not alter uptake from dispersions in 10mM-sodium taurodeoxycholate and 5mM-mono-olein. When an oil phase, 5mM-glycerol trioleate, was present in equilibrium with a micellar phase, uptake was decreased from 8.96 to 3.90nmol/g of tissue. When α -tocopherol was dispersed with triolein in Krebs-Ringer phosphate buffer, pH 6.3, i.e. in the complete absence of a micellar phase, uptake was decreased considerably from 6.48 to 2.17nmol/g of tissue. When the concentration of α -tocopherol in the incubation medium, consisting of 10mM-sodium taurodeoxycholate with or without 5mM-mono-olein, was increased beyond the micellar solubilizing capacity of the systems (i.e. up to 200 μ g/ml), no change in slope of a graph of uptake against α -tocopherol concentration was observed.

It appears that a micellar phase is probably the preferred form from which uptake of vitamin E occurs, although alteration of the composition of the micelles did not affect the uptake. There is some evidence to suggest that the emulsifying properties of bile salts are also important.

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