important in the metabolism of cholecalciferol, it is less important than skeletal muscle and adipose tissue as a storage site for unchanged cholecalciferol.

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Callow, R. K., Kodicek, E. & Thompson, G. A. (1966). *Proc. R. Soc. B*, **164**, 1.

Mawer, E. B. & Backhouse, J. (1969). *Biochem. J.* **112**, 255.

Neville, P. F. & DeLuca, H. F. (1966). *Biochemistry, Easton*, **5**, 2201.

Formation and Interconversion of Ketone Bodies in Tissues of Developing Lambs

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The rates of acetoacetate production by homogenates of adult sheep liver were compared with those found in livers obtained from foetal lambs by using the method described by Williamson, Bates & Krebs (1968), in which acetyl phosphate, CoA and phosphotransacetylase (EC 2.3.1.8) are used as an acetyl-CoA-generating system. The rate of acetoacetate production in adult sheep liver was 1.37 ± 0.56 (mean $\pm$ S.E.M.) $\mu\text{mol/min per g wet wt. of tissue at } 37^\circ\text{C}$, whereas it was barely measurable in foetal livers at 113 days gestational age and at 140 days it was only 15% of the adult rate. Acetoacetate production was also measured in placental cotyledons and in some cases it was found to be greater in this tissue than in maternal liver.

The activity of 3-hydroxybutyrate dehydrogenase (EC 1.1.1.30), which mediates the interconversion of acetoacetate and 3-hydroxybutyrate, was determined in the liver, heart and cerebral cortex of foetal and 15-week-old lambs by the method of Lehninger, Sudduth & Wise (1960). In the immature foetus (100–110 days) the activities of this enzyme were 0.51 ± 0.27 unit, 1.20 ± 0.18 units and 0.07 ($0.00, 0.14$) unit in liver, heart and brain respectively (1 unit of activity is defined as $1 \mu\text{mol of NADH formed/min per g wet wt. of tissue at } 37^\circ\text{C}$). In the mature foetus (140 days) the activities had risen to values of 0.88 ± 0.16 unit, 3.86 ± 0.53 units and 0.72 ($0.64, 0.79$) unit, and in the 15-week-old lambs the activities were even higher, being 1.45 ± 0.19 units, 20.48 ± 1.36 units and 1.30 ($0.90, 1.70$) units. In placental cotyledons 3-hydroxybutyrate dehydrogenase activity was similar to that of mature lamb liver.

Thus it would appear that the immature foetal lamb liver is incapable of synthesizing acetoacetate but can interconvert ketone bodies, whereas the

term foetus is capable of both the synthesis of acetoacetate and its conversion into 3-hydroxybutyrate, although at lower rates than those found in the adult sheep. These results support the findings of Alexander, Britton, Cohen & Nixon (1969). Their foetal perfusion studies indicated that there is little endogenous acetoacetate production in foetal lambs of 113 and 132 days, and they also showed that foetal sheep can convert infused acetoacetate into 3-hydroxybutyrate and can oxidize acetoacetate. However, these authors considered that ketone bodies contribute little to the nutrition of the foetus because of the low permeability of the placenta to these substrates.

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Alexander, D. P., Britton, H. G., Cohen, N. M. & Nixon, D. A. (1969). In *Ciba Found. Symp.: Foetal Autonomy*, p. 95. Ed. by Wolstenholme, G. E. W. & O'Connor, M. London: J. and A. Churchill Ltd.

Lehninger, A. L., Sudduth, H. C. & Wise, J. B. (1960). *J. biol. Chem.* **235**, 2450.

Williamson, D. H., Bates, M. W. & Krebs, H. A. (1968). *Biochem. J.* **108**, 353.

The Solution of Erythrocyte Membranes in Organic Solvents

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The low solubility of many of the proteins of cell membranes causes great difficulties in their isolation and study. Detergents are widely used to disrupt membranes (Bakerman & Wasemiller, 1967; Schneiderman & Junga, 1968; Rosenberg & Guidotti, 1969), but the proteins solubilized thereby may be micellar and irreversibly associated with detergent. Some organic solvents have been reported to solubilize membranes (Blumenfeld, 1968; Rega, Weed, Reed, Berg & Rothstein, 1967; Zwaal & van Deenen, 1968; Zahler, 1968) though the conditions used have often been such as might degrade glycoproteins present.

Here a search has been made for some organic solvents of human erythrocyte membranes in order to determine the necessary structural features of good solvents (miscible with water) and the extent to which they dissociate and degrade the proteins and glycoproteins of the membrane.

Human erythrocyte 'ghosts' (ORh+, water-washed, at 2%, w/w) were used as a standard membrane preparation. Solvents were studied at 90%, 60% and 30% (v/v) concentrations, at pH 9,