found. Pent-4-enoyl-CoA was a good substrate for the acyl-CoA dehydrogenases (K_m approx. $2\mu\text{M}$) and the product was almost certainly penta-2,4-dienoyl-CoA. A 3-oxoacyl-CoA thiolase (EC 2.3.1.16) preparation (Stern, 1955) was strongly inhibited (by 50%) after preincubation for 5 min at 0°C with $5\mu\text{M}$ -penta-2,4-dienoyl-CoA. This inhibition appears to be irreversible and is not due to reaction of penta-2,4-dienoyl-CoA with CoA in the assay system. All other acyl-CoA species tested inhibited 3-oxoacyl-CoA thiolase only weakly (by approx. 50% at $100\mu\text{M}$).

Inhibition of 3-oxoacyl-CoA thiolase can explain the inhibition of fatty acid oxidation by pent-4-enoic acid as a consequence of the formation of its metabolite penta-2,4-dienoyl-CoA. The reactive vinyl group of penta-2,4-dienoyl-CoA may acylate thiol groups necessary for activity of this enzyme. This interpretation can also explain the requirement for the $\text{CH}_2=\text{C}-\text{C}-\text{CO}_2\text{H}$ group for hypoglycaemic activity of compounds related to hypoglycin (Anderson *et al.*, 1958) if the generalization is accepted that this activity depends on inhibition of β -oxidation (see Sherratt *et al.*, 1971). It is therefore postulated that these hypoglycaemic compounds are converted *in vivo* into metabolites, containing the structure $\text{CH}_2=\text{C}-\text{C}-\text{CO}-\text{S}-\text{CoA}$, which are supposed to inhibit 3-oxoacyl-CoA thiolase.

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A Four-Compartment Model of Glucose Transport and Metabolism in Rat Intestine *in vitro*

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In experiments designed to elucidate the quantitative fate of glucose during its transport across everted sacs of intestine (Porteous & Pritchard, 1972), [^{14}C]glucose (10mm) was placed initially in the

mucosal solution (compartment I) and [^{12}C]glucose (10mm) in the serosal solution (compartment IV). In the model, compartment II is defined as the mucosal layer of intestine consisting of epithelial cells (in immediate contact with the mucosal solution) and subepithelial tissue; compartment III consists of serosal muscle in immediate contact with compartment II on the one hand and with the serosal solution on the other. Lymph ducts and capillaries traverse the subepithelial layer of compartment II, and compartment III, to open into compartment IV.

After incubation for 20 min at 37°C , the specific radioactivity of glucose in compartments I and II, and of lactate in compartments I, II and IV, showed that neither of these metabolites had suffered dilution during concomitant glucose transport and metabolism; CO_2 was diluted approximately twofold. The increment of glucose in compartment IV appeared to have a specific radioactivity 1.37-fold greater than that of the glucose placed initially in compartment I; this observation was based on the tacit assumption that the net increment of glucose in compartment IV was due solely to a unidirectional flux of glucose from compartment I into the epithelial cells of compartment II, and thence into compartment IV. The latter stages of this flux depend on prior establishment of a high glucose concentration in the epithelial cells of compartment II (Porteous & Pritchard, 1972).

It is postulated that, while this necessary glucose concentration is being established, [^{12}C]glucose diffuses into compartment III from compartment IV without entering capillaries, and therefore without mixing with [^{14}C]glucose when it exits later from compartment II, via capillaries and lymph ducts, directly into compartment IV.

The model explains satisfactorily the anomalously high specific radioactivity of the net increment of glucose in compartment IV. The model also accommodates the other observations summarized above: dilution of $^{14}\text{CO}_2$ derived from [^{14}C]glucose could be due to metabolism of endogenous substrates and/or to serosal muscle metabolism of [^{12}C]glucose; [^{14}C]lactate, produced solely by epithelial-cell metabolism of accumulated [^{14}C]glucose (Porteous & Pritchard, 1972), would not be diluted.

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