and its synthesis of glycogen from uridine diphosphate glucose (UDPG)¹. There is now a parallel situation in another area of glycogen metabolism, namely, repeated evidence from tracer experiments that the conversion of glucose into glycogen in liver and muscle does not proceed by way of glucose-6-phosphate. Several reports, originating with Beloff-Chain *et al.*² and most recently by Threlfall³, combine to indicate that there is a pathway from glucose to α -glucose-1-phosphate—and thence to UDPG and glycogen—that does not have glucose-6-phosphate formation as an intermediate step. In other words, hexokinase, glucokinase, glucose-6-phosphatase acting in its synthetic role, all forming glucose-6-phosphate, together with phosphoglucomutase, converting the 6-phosphate into α -glucose-1-phosphate, may well have no direct role in the conversion of glucose into glycogen.

It occurred to us that an answer to the problem might be found by examining the actions of two enzymes already known in muscle, namely, α -glucose-1-phosphate kinase⁴ and α -glucose-1-phosphate dismutase⁵. These enzymes catalyse the following reactions

Both reactions have previously been studied in terms of their production of α -glucose-1,6-diphosphate, the coenzyme of phosphoglucomutase. They may, however, serve a different purpose. Reaction (2) is reversible, and can be written as

If reactions (1) and (3) are added together we have

The whole system can be expressed as

Reaction (4) would be essentially irreversible because of the irreversibility of reaction (1). Experiments to test the hypothesis are in progress.

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Redox Pump Theory for Active Secretion of Hydrogen Ions

PERMIT me to bring to the notice of Professor Britton Chance and Leena Mela an obvious omission from the references to their paper¹ on proton movement in mitochondrial membranes. Is it possible that they can discuss the release of hydrogen ions at interfaces, associated with redox processes, without mentioning Conway's redox pump theory² for the active secretion of hydrogen ions by the cells of the gastric mucosa? Conway's theory, which predates other redox theories mentioned, specifically suggests electron transfer from flavoproteins to cytochromes as being particularly favourable for the active release of hydrogen ions from the cells of the gastric mucosa. He has also presented evidence³ for a similar mechanism in fermenting yeast.

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BIOLOGY

Pharmacodynamics of Dieldrin in Pigeons

CONSIDERABLE interest has been aroused in recent years by the presence of residues of organochlorine insecticides in the tissues of birds in Great Britain, and a comprehensive review of the situation up to 1965 has been made¹. No information has been published yet on the pharmacodynamics of any of these compounds in birds. We are investigating this topic and some of our results are summarized in this report.

A group of pigeons was fed a diet containing 50 p.p.m. of the main constituent of technical dieldrin, that is, 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octa-hydro-1,4-endo, exo-5,8-dimethanonaphthalene (HEOD) for 6 months. The pigeons were then fed a normal diet and killed at intervals. The concentrations of HEOD in the adipose tissue, brain, liver and breast muscle of the birds were determined by gas-liquid chromatography in combination with an electron capture detector. The results of the determinations are shown graphically in Figs. 1 and 2. It is apparent that HEOD was being eliminated from the body of the pigeons, and that the concentration of HEOD in the four body tissues was decreasing in an approximately exponential manner. Further, the rates of decrease of HEOD in the four tissues were similar.

The regression lines for the relationship between the concentrations of HEOD in the tissues (transformed to their corresponding logarithms) and time of feeding on the normal diet have been calculated; these are given in Table 1 and are also given in Figs. 1 and 2. An analysis of covariance² of the transformed results shows that the four rectilinear regression lines fit the data satisfactorily (that is, the mean squares of the deviations from linearity are not significantly different from the within group mean squares) and that there is no significant departure from parallelism. Consequently the pooled slope of the regression lines can be calculated. This pooled slope is -0.0064 (confidence limits, $P=0.95$, $0.0055-0.0073$). The concentration of HEOD in these four tissues has been decreasing in parallel and so it can be postulated that the total content of HEOD in the whole bodies of the pigeons has been declining at this rate. Consequently the change