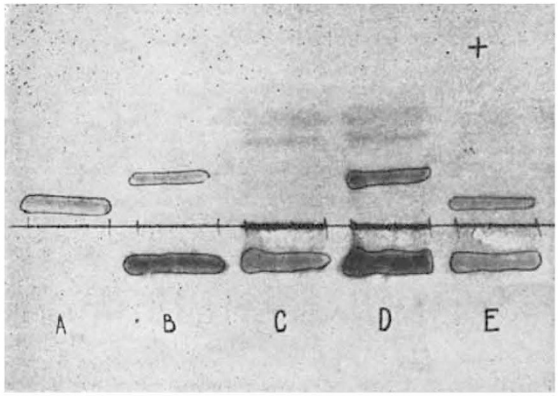

Fig. 2. Action of S-alanyl coenzyme *A* deacylase. *A*, S-alanyl coenzyme *A*; *B*, S-alanyl glutathione, lower spot (traces glutathione upper spot); *C*, S-alanyl coenzyme *A* + deacylase, spot: alanine; *D*, S-alanyl glutathione + S-alanyl coenzyme *A* deacylase; *E*, S-alanyl coenzyme *A* + glyoxalase II. Composition of incubation mixtures: 0·05 ml. Sörensen phosphate buffer *p*H 5·4, 0·05 ml. enzyme solution, 0·05 S-alanyl compound (2 mgm./ml.). Time, 15 min. at 20° C.

a rapid enzymatic hydrolysis of S-alanyl coenzyme *A* to alanine and Co*A*—SH takes place. The active deacylase is not identical with glyoxalase II [5]. A pure sample of glyoxalase II rapidly cleaves S-alanyl glutathione[1]; however, it does not, or only very slowly, hydrolyse S-alanyl coenzyme *A* (Fig. 2).

S-Alanyl coenzyme *A* deacylase is present mainly in the mitochondria and microsome fractions of liver. However, it is also present in smaller concentration in the plasma fraction of the liver homogenate.

Attempts to demonstrate an enzymatic acyl transfer of the alanyl group to other amino-acids or to the SH group of cysteine have been unsuccessful thus far, because of the rapid, possibly competing, enzymatic hydrolysis of S-alanyl coenzyme *A*.

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Meaning of 'Turnover' in Biochemistry

IN a recent communication, Kleiber[1] has discussed two different definitions of the term 'turnover-rate'. Some workers, particularly those associated with Chaikoff, regard the turnover-rate as the rate at which a substance is replaced in the tissue cells (definition 1). This is essentially the concentration of the substance in the tissue divided by the turnover-time. Others, including Kleiber, consider it to be the rate at which the whole 'pool' of the substance, however large or small, is replaced in the tissue, given by the reciprocal of the turnover-time (definition 2). Both groups agree that the turnover-time is the biological 'average life', given by 1·44 × biological half-life.

These concepts are each valuable; but the turnover-rate as defined by Kleiber tells no more about physiological events than does the turnover-time. Two tissues could have the same turnover-time and yet contain very different concentrations of the substance under consideration. They would have the same turnover-rate according to Kleiber, yet unit weight of the one tissue would metabolize the substance much more rapidly than unit weight of the other.

The dorsolateral prostate of the rat contains more than ten times as much zinc as the ventral prostate[2] per unit weight. The results of turnover experiments with these tissues, using zinc-65, are given in Table 1. The data are taken from a paper which is being prepared in collaboration with Miss M. I. Fischer and Dr. B. E. Riedel. The turnover-rate of zinc in the dorsolateral prostate is nearly ten times as great as in the ventral prostate according to definition 1; but by definition 2 the turnover-rate of the ventral prostate is actually greater than that of the dorsolateral prostate.

Table 1. TURNOVER OF ZINC IN THE PROSTATE GLANDS OF THE RAT

	Ventral prostate	Dorsolateral prostate
Mean zinc content (μgm./gm.)	13·5	168
Biological half-life ($T_{1/2}$) (days)	7·6	9·9
Turnover-time ($T_{1/2}$ × 1·44) (days)	10·9	14·3
Turnover-rate (1)* (μgm. Zn/gm./day)	1·24	11·8
Turnover-rate (2)* (fraction of pool/day)	0·092	0·064

* Turnover-rate (1) = μgm. Zn/gm. tissue divided by turnover-time. Turnover-rate (2) = reciprocal of turnover-time.

Many tracer experiments are done without estimation of the concentration of the substance under investigation, and this applies particularly to work with trace elements, especially those which do not occur naturally in the body in measurable amounts. It may partly be for this reason that most workers have defined turnover-rate as the reciprocal of turnover-time. However, the Chaikoff concept of turnover-rate is of such physiological significance that it should have a name. In Table 1, turnover-rate (1) could be described as the zinc turnover-rate, and (2) as the zinc pool turnover-rate; but these terms are sufficiently similar to lead to confusion. It is suggested that the Chaikoff turnover-rate (1) should be called the flux-rate, retaining 'turnover-rate' for the definition favoured by Kleiber. The word 'flux' has been used in a similar sense by Reiner[3] in a theoretical discussion of the implications of turnover-rate calculations.

Zilversmit[4] has suggested that 'turnover-rate' should continue to apply to definition 1, and has proposed an alternative term for definition 2. I believe that this would be a mistake. An extensive review of the literature has shown that 'turnover-rate' is defined according to definition 2 in the great majority of cases and any alteration would add to the confusion which we all wish to avoid.

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