

Two different approaches towards the study of protein turnover in skeletal muscle were made.

The first approach involved the injection of ^{75}Se Selenomethionine into rats and the subsequent measurement of the whole body decay rate of the ^{75}Se activity in a 4 pi liquid scintillation counter. By this means it was hoped that the whole-body decay curve could be analysed into exponentials representative of 'fast' (visceral protein) and 'slow' (muscle protein) pools. This proved not to be feasible. The special difficulties resulting from the use of ^{75}Se -labelled amino acids are discussed.

As a second approach a search was made for a technique for labelling muscle proteins so that radioactivity decay rates could be used directly to calculate rates of synthesis and catabolism without the usual errors arising from isotope reutilisation. ^{75}Se selenomethionine, ^{14}C -6 arginine, ^{14}C - Na_2CO_3 and ^{14}C - L glutamate were investigated. ^{14}C - Na_2CO_3 proved to be suitable especially if the decay rates of aspartate and glutamate isolated from muscle proteins labelled with ^{14}C Na_2CO_3 are measured. The lack of reutilisation of label is discussed in terms of the metabolic activity of the carboxyl groups of these dicarboxylic amino acids.

The effect of acute deprivation of calories and protein on synthesis and catabolism of muscle and liver protein was measured in rats, using the ^{14}C - Na_2CO_3 labelling method. The synthesis rates for muscle proteins, 0.25 and 0.097 days $^{-1}$ for sarcoplasmic and myofibrillar proteins respectively are the fastest reported in the literature. The total protein synthesised and catabolised in muscle sarcoplasmic and myofibrillar fractions was calculated and compared

with liver. The protein free diet caused a reduction in synthesis rates in liver and muscle protein with no change in the distribution pattern between the tissues. The starved rats showed a shift in the distribution pattern of synthesis towards liver and a concomitant shift towards muscle in catabolism.

The results are discussed in terms of the mobility and therefore importance of muscle protein metabolism in the economy of the whole animal.

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