ABSTRACT

A homogeneous preparation of a decarboxylase enzyme from rat liver, active on α-keto isocaproate and α-keto-β-methyl valerate has been achieved. In its active form, it is a multimeric protein of molecular weight 460,000. On dilution it dissociates into 16 inactive identical protomers each of molecular weight 28,500.

In vitro, its activity is most sensitive to calcium which is stimulating. It is also very sensitive to dilution, which leads to rapid inactivation. No apparent phosphorylation/dephosphorylation regulation was observed. Optimal conditions for activity are pH 6-6.5, T25°C.

The isolation of this thiamine containing decarboxylase lends indirect support to a model of the branched chain α-keto acid dehydrogenase complex in which there are the constituent enzymes decarboxylase, lipoate reductase transacylase and lipoamide oxidoreductase. (Fig. 4)

The results of this project support the two-enzyme hypothesis [8-11] for metabolic degradation of the branched chain α-keto acids from valine, leucine and isoleucine.

The relationship between this decarboxylase and the decarboxylase component of the α-keto acid dehydrogenase complex will be most readily elucidated when isolation of a homogeneous branched chain α-keto acid dehydrogenase complex has been achieved.