Protein Biosynthesis in Magnesium-Deficient Rats

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Symptoms such as diminished growth, neuromuscular and central-nervous-system changes and electrocardiographic changes have been reported in magnesium deficiency. Energy production was also impaired in terms of lowered P/O ratios in the tissues of experimental animals in which dietary magnesium deficiency had been produced. The object of the present work was to elucidate the possible role of magnesium in protein biosynthesis *in vivo*.

Magnesium deficiency in weanling albino rats was produced by feeding the animals on a low-magnesium (2–4mg/100g) synthetic diet and quadruple-glass-distilled water.

One month after the onset of deficiency the animals were injected with [1-^{14}C]valine and after 2h the extent of incorporation into the proteins of homogenates and mitochondria from heart, brain, kidney, muscle and liver was determined in magnesium-deficient and -supplemented rats.

In homogenate protein synthesis was decreased to 40–60% of that of controls after 1 month of deficiency production. Mitochondrial protein synthesis was decreased to 60–80% of the control value. The adverse effect on protein synthesis was dependent on the extent of magnesium deficiency: the longer the animals were on the magnesium-deficient diet the less was the extent of incorporation of precursor amino acid into proteins.

Supplementation of the diet with Mg^{2+} for 3 weeks partially reversed the inhibition of protein synthesis.