

Influence of glycogen content on the effect of 2,4-dinitrophenol on the oxygen uptake by rat liver slices

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When liver glycogen was reduced by fasting of the rats or by glyco-genolysis in vitro, 10^{-4} M DNP had an inhibitory effect on basal oxygen consumption which was proportional to the glycogen content. With initial glycogen of 2 % or more, the rate of oxidation was enhanced. The action of variable doses of DNP (10^{-5} to 0.5×10^{-3} M) depended also on tissue glycogen content. With low glycogen, only the inhibitory effect may be observed at all DNP levels. With high glycogen, DNP stimulated oxygen uptake; and with intermediate glycogen content, the effect of DNP was inhibitory or stimulating according to the dose employed. The inhibitory effect on respiration produced by DNP on slices with low glycogen content practically disappeared, or even a stimulating effect was observed, when fructose 1,6-diphosphate, pyruvate, citrate, α -ketoglutarate, succinate, malate, l(+)-glutamate, l(+)-aspartate, or l(+)-alanine were added. If glucose, fructose, acetate, butyrate, or hexanoate was added, the inh