The Effect of Parathyroid Extract on Oxidative Phosphorylation

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In a previous communication the *in vivo* effect of a parathyroid extract was studied on the incorporation of ^{32}P labelled phosphate into different phosphorus compounds in rat kidney and liver [1]. Additional experiments have been made with kidney slices and liver mitochondria *in vitro*. The kidney slices were incubated in a medium containing different ions (Ca^{++} 2.5 mM) and glucose as a substrate. In this system parathormone (Lilly) in a concentration of 0.2 U. S. P. units per ml partly inhibited the incorporation of labelled phosphate into some nucleotides and phosphorylthreonine isolated from phosphoprotein. The effect on oxidative phosphorylation has been tested in a system of liver mitochondria similar to that of Dawson and Jones [2] by working on the assumption that although kidney and bone are the main target organs, the action of the hormone must be demonstrable in most cells. The mitochondrial suspension was obtained after homogenization in 0.25 M sucrose containing 0.001 M EDTA followed by centrifugations; the final two washings were performed in sucrose without EDTA. The result of a typical experiment is shown in Table 1.

Table 1. Effect of parathormone on oxidative phosphorylation in rat liver mitochondria. Each sample contained mitochondria from 0.5 g wet weight liver, 40 μmoles potassium orthophosphate, 5 μmoles ATP, 17 μmoles $MgCl_2$, 30 μmoles pyruvate, 0.04 μmoles cytochrome c, 295 μmoles sucrose, 60 μmoles glucose and hexokinase, pH 7.4. About 0.1 mC ^{32}P per flask. Final volume 3.0 ml. Incubation in open vessels with shaking at 30°C.

Hormone concentration units per ml	Ca^{++} concentration mM	Organic phosphate formed % of total labelled phosphate 7 min	18 min
0	0	42	98
0	0.33	40	98
0.025	0.33	32	77
0.05	0.33	31	72
0.10	0.33	30	69
0.20	0.33	30	55

The effect is obtained only when Ca^{++} is present in a concentration of about 3×10^{-4} M. The necessary presence of calcium ions seems to indicate that the hormone exerts its effect *via* these ions. Their inhibitory effect on oxidative phosphorylation in different mitochondrial systems is well-known[3]. Experiments with $^{45}Ca^{++}$, however, did not reveal any significant effect of the extract on the distribution of calcium ions between intra- and extramitochondrial space.

1. de Verdier, C.-H. *Acta Physiol. Scand.* **39** (1957) 1.
2. Dawson, J. and Jones, E. A. *International Congress on Clinical Chemistry*, Stockholm 1957. Summaries and Abstracts p. 86.
3. Mc Murray, W. C., Maley, G. F. and Lardy, H. A. *J. Biol. Chem.* **230** (1958) 219.

On the Use of Gas Chromatography and Mass Spectrometry in the Analysis of the Fatty Acids Found in Butter and Margarine

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Under standardized operational conditions in gas chromatography the retention volume or retention time is characteristic of a certain component. When investigating mixtures of several components it is, however, necessary to use additional identification methods. In analysing mixtures of esters of fatty acids we have submitted them to both gas chromatography and mass spectrometry. If the gas chromatograms and the mass spectra of the mixtures are compared it is sometimes possible to identify the components. The mass spectrum of a mixture of many components will, however, become too complex. We have then collected fractions coming out from the gas chromatography column and identified the components of the fractions by a mass spectrometer run.

Using these methods we have analysed the complex mixtures of fatty acids present in butter and margarine.