On Sub mitochondrial Particles with High DPNH-oxidase * and Low Succinic Oxidase Activity

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*Abbreviations: DPN, diphenolphosphoryl nucleotide; DPNH, reduced diphenolphosphoryl nucleotide; TPNH, reduced triphosphopyridine nucleotide; ATP, adenosine triphosphate; ADP, adenosine diphosphate; AMP, adenosine monophosphate; ITP, inosine triphosphate; EDTA, ethylenediaminetetraacetate; M, moles per liter.

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determined on deoxycholate extracts by di-thionite reduction) is diminished by about 30%.
It is generally considered that the endoplasmic reticulum of the cytoplasm is the main origin of the microsomal material. Since RNA is concentrated to the nucleoprotein granules, which are attached to the delicate membranes of this network, while the enzymes and cytochrome b₆ apparently are associated with the membranes, the experiments suggest a richer attachment of nucleoprotein granules to the membranes during liver regeneration. Apparently however, the composition of the membranes may become modified at the same time.


2 mM amyotal inhibits practically all the DPNH-oxidase activity in the absence of added cytochrome c, which eliminates the possibility that a significant part of this respiration is due to microsomal contamination.

The sub mitochondrial particles have a high DPNH-oxidase activity compared to their succinic oxidase activity 1. Also, the DPNH-cytochrome c reductase activity is much higher than the succinate-cytochrome c reductase activity. The ratio for five different prepara tions varied between 7.7 and 17, mean value 10 (I gave somewhat higher ratios than II). In the heavier structural fragments the ratio is much lower. The almost complete separation obtained, of the system responsible for the oxidation of DPNH from that responsible for the oxidation of succinate is thus possibly due to tighter binding of the latter to these fragments.

The rate of oxidation of DPNH is stimulated by Na₂HPO₄, EDTA and ATP, active where ADP and AMP are not. ITP also stimulates this respiration, but only in higher concentration and to a lesser degree than ATP. These stimulations are inhibited by amyotal.

The TPNH-oxidase and the TPNH-cytochrome c reductase activities of the particles are low compared to the corresponding DPNH-activities, but are several fold increased by addition of DPN.

The particles have ATPase activity. It is increased up to 100-fold by added Mg²⁺ whereas 2,4-dinitrophenol only has a slight (about 2-fold) stimulating effect.


Activity of Amino Acid Activating Enzyme Systems during Liver Regeneration

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