

Nutritional effects on mitochondrial bioenergetics. Alterations in calcium uptake by rat liver mitochondria.

Ferreira,

Gil,

The uptake of Ca^{2+} by energized liver mitochondria was compared in normal fed as well as in protein-energy malnourished rats. In the presence of phosphate, mitochondria obtained from both groups were able to accumulate Ca^{2+} from the suspending medium and eject H^{+} during oxidation of common substrates which activate different segments of the respiratory chain. The rate of Ca^{2+} uptake was significantly lower in mitochondria from protein-energy malnourished rats. The rates of oxygen consumption and H^{+} ejection were decreased by 20-30% during oxidation of substrates at the three coupling sites. Similarly, mitochondria from protein-energy malnourished rats exhibit a 34% decrease in the maximal rate of Ca^{2+} uptake and a 25% lower capacity for Ca^{2+} load. The stoichiometric relationship of $\text{Ca}^{2+}/2\text{e}^{-}$ remained unaffected. In steady state, with succinate as a substrate in the presence of rotenone and N-ethylmaleimide, mitochondria from normal fed and protein-energy malnourished rats showed a simil