

S U M M A R Y

In rat brain, mitochondria are found to be the richest source of glutaminase. Mitochondrial glutaminase is almost inactive in the absence of phosphate or carboxylic acid. Mitochondrial swelling agents can activate glutaminase to different extent in presence of suboptimum concentration of phosphate or carboxylic acids. Swelling agents, themselves, have got no effect on glutaminase activity where phosphate or carboxylic acids are absent in incubation mixture. The activation process has been supposed to be due to enhanced permeation of phosphate and substrate through mitochondrial membrane, induced by those agents.

The chaotropic agents which are known to destabilize the mitochondrial structure produce inhibitory effects on native mitochondrial glutaminase activity but produce little inhibition on mitochondria preincubated with phosphate. Various mitochondrial swelling agents like L-thyroxine, Ca^{++} , GSH, saturated and unsaturated long chain fatty acids, which are known to increase permeation of mitochondrial membrane, stimulate glutaminase activity.

Bovine Serum Albumin (BSA) has been shown to counteract the L-thyroxine and Ca^{++} induced activation of glutaminase whereas GSH induced activation is not affected by BSA. Though L-thyroxine and 2:4 DNP are uncoupler of oxidative phosphorylation, yet L-thyroxine is an activator of glutaminase but 2:4 DNP inhibits it.

Fatty acids like oleic, palmitic and myristic, can distinguish between young and adult rat brain mitochondria by their differential effect produced at the level of glutaminase activity. Oleic acid is very effective even at a low concentration like 10 μ M. In vitro aging of mitochondria at 4°C in 0.32 M sucrose leads to the diminution of sensitivity towards oleic acid induced activation of glutaminase.

The ratio of glutaminase activity in presence of a particular carboxylic acid and that in presence of phosphate, shows marked difference between young and adult rat brain mitochondria but the ratio remains almost same in case of guinea pig brain mitochondria.
