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Interference of the sulphonylurea antidiabeticum gliquidone with mitochondrial bioenergetics in the rat under *in vitro* conditions[1]

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The hypoglycaemic sulphonylurea gliquidone and glibenclamide exerted a partial uncoupling effect on mitochondrial respiration of liver under *in vitro* conditions using various citrate cycle intermediates as substrates. Besides the uncoupling effect, gliquidone and glibenclamide caused a direct inhibition of ATP – as well as DNP – stimulated oxigen consumption. Both phenomena proved to be dose dependent. Respiratory control ratio decreased progressively with increasing concentrations of sulphonylureas mainly through the inhibition of ADP-stimulated respiration. Basal and DNP-stimulated ATP-ase activity of isolated mitochondria changed similarly to the respiratory parameters. Changes in membrane permeability of mitochondria and the inhibition of substrate uptake further support the assumption of structural and functional alteration of mitochondria by the hypoglycaemic compounds tested.

Keywords: sulphonylurea antidiabetica, gliquidone, glibenclamide, mitochondrial bioenergetics, respiration, ATP-ase, mitochondrial swelling, substrate uptake

In the last decades several sulphonylurea antidiabetic drugs have been synthetized which effectively lowered the level of blood glucose, inhibited the hepatic gluconeogenesis and influenced the peripheral glucose utilization [6, 9, 10, 14, 15, 27, 34–36].

[1] This paper is dedicated to the memory of Professor Tibor Kovács (1929–1994)

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