

7. Spectrophotometric in vivo determination of local mitochondrial metabolism by use of a tetrazolium salt.

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The Erlangen micro-lightguide spectrophotometer (EMPHO) was used to determine local mitochondrial activity. The measurement was based on a commercially available test (WST1, Boehringer Mannheim, Germany). A tetrazolium salt is cleaved to formazan by the 'succinate-tetrazolium reductase' system which belongs to the respiratory chain of the mitochondria and is active only in viable cells. 50 microliters of the reagent is placed in a recess at the tip of the lightguide. The tip of the lightguide is then placed at the tissue surface. The reagent diffuses into the cells and is cleaved to formazan. The absorption change is measured and analysed. This method was used in early chick embryos to determine the metabolic activity of the area vasculosa during the first 6 d of normoxic incubation. During this period of time the absorption change measured after 30 min increased from 0.001 units on day 2 to 0.262 units on day 6. This indicates an increase in local metabolic activity which may be due to an increase in metabolic activity of individual cells and/or an increase in the number of cells in the area under investigation. The results show that it is possible to determine local metabolic activity under in vivo conditions.

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