

Frog oocytes: A living test tube for studies on metabolic regulation

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This review is intended to illustrate how live frog oocytes may be advantageously used to address the study of some problems of in vivo glucose metabolism. Glucose microinjected into the cells is preferentially committed to glycogen synthesis. We present evidence showing that both the direct and indirect pathways for polysaccharide deposition are operative in oocytes. A small amount of the injected glucose (<5%) is released as labeled CO₂ mainly through the pentose-P pathway.

Coinjection of NADP⁺ and glucose significantly stimulates ¹⁴CO₂ production, half-maximal stimulation being obtained at 0.13 mM. Finally, we show the use of frog oocytes to measure in vivo the control coefficient of hexokinase on glycogen synthesis and the pentose-P pathway. A value of 0.7 was found for the control coefficient of hexokinase on glycogen synthesis, while the enzyme has no control at all over the pentose-P pathway. Therefore, the frog oocyte may be used as a living test tube for the study of almost an