

Frog oocyte glycogen synthase: Enzyme regulation under in vitro and in vivo conditions

Báez, Mauricio

Preller, Ana

Ureta, Tito

Frog oocyte glycogen synthase properties differ significantly under in vitro or in vivo conditions. The K_{mapp} for UDP-glucose in vivo was 1.4mM (in the presence or absence of glucose-6-P). The in vitro value was 6mM and was reduced by glucose-6-P to 0.8mM. Under both conditions (in vitro and in vivo) V_{max} was 0.2mUnits per oocyte in the absence of glucose-6-P. V_{max} in vivo was stimulated 2-fold by glucose-6-P, whereas, in vitro, a 10-fold increase was obtained. Glucose-6-P required for 50% activation in vivo was 15 μ M and, depending on substrate concentrations, 50-100 μ M in vitro. The prevailing enzyme obtained in vitro was the glucose-6-P-dependent form, which may be converted to the independent species by dephosphorylation. This transformation could not be observed in vivo. We suggest that enzyme activation by glucose-6-P in vivo is due to allosteric effects rather than to dephosphorylation of the enzyme. Regulatory mechanisms other than allosteric activation and covalent phosphorylati