

**ROLE OF GLUCOSE AND INSULIN IN REGULATING GLYCOGEN SYNTHASE
AND PHOSPHORYLASE ACTIVITIES IN RAINBOW TROUT HEPATOCYTES**

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Our study, using ^{13}C nuclear magnetic resonance spectroscopy (NMR), showed C1 enrichment of glycogen from ^{13}C glucose indicating that the direct pathway of glycogen synthesis from glucose is active in rainbow trout (*Oncorhynchus mykiss*) hepatocytes. The activities of total glycogen synthase (GSase), total glycogen phosphorylase (GPase) and GPase *a* showed a direct relationship with hepatocyte glycogen content, whereas glycogen content showed a inverse relationship with % GSase *a* and GSase *a*/GPase *a* ratio. Glucose in the incubation medium (3 or 10 mM) did not modify either GSase or GPase activities in trout hepatocytes. Insulin (10^{-8}M) in the medium significantly decreased total GPase and GPase *a* activities, but had no significant effect on GSase activities when compared to the controls (absence of insulin). In the presence of 10 mM glucose, insulin increased % GSase *a* and decreased % GPase *a* activities in trout hepatocytes. The effect of insulin on the activities of % GSase *a* and GSase *a* to GPase *a* ratio was more pronounced at low hepatocyte glycogen content than at high glycogen content. These results indicate that in trout

hepatocytes both the glycogen synthetic and breakdown pathways are active concurrently and any subtle alterations in the phosphorylase to synthase ratio may determine the level of hepatic glycogen content. Insulin plays an important role in regulating glycogen metabolism in rainbow trout hepatocytes. This effect of insulin may be under the control of several factors including plasma glucose concentration and hepatocyte glycogen content.