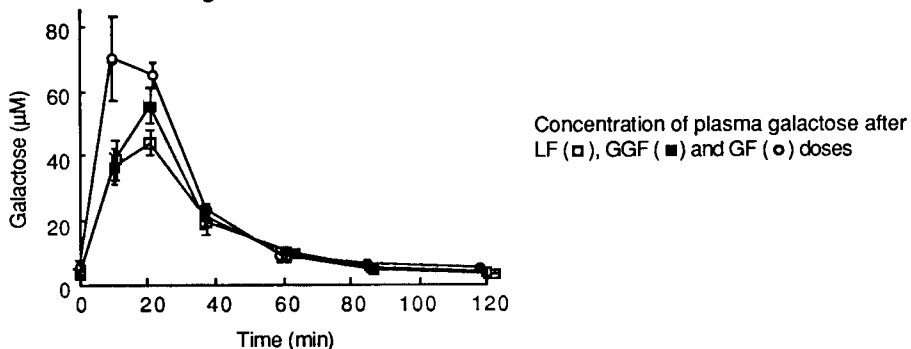


THE EFFECTS OF PHYSIOLOGICAL DOSES OF DIFFERENT SUGARS ON PLASMA MONOSACCHARIDES IN MAN

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Previous studies, in man, have shown an increase in the concentration of plasma glucose after a galactose dose, no change in plasma galactose after increasing glucose doses and a reduction in the response of the plasma galactose concentration to a galactose dose when it was given simultaneously with glucose (Williams et al. 1983). However the doses used in these studies were not typical of normal carbohydrate consumption by man. The influence of different combinations of ingested monosaccharides on the plasma concentrations of galactose, fructose and glucose in man was investigated in this study.

Adult males (4) and females (3), with no history of lactose intolerance, fasted for at least 8 hours and then ingested a carbohydrate dose. Three different doses; 10g lactose + 10g fructose (LF), 5g galactose + 5g glucose + 10g fructose (GGF) and 5g galactose + 10g fructose (GF), in 250 ml water, were ingested at least 7 days apart. Finger-prick blood samples were then collected at 0, 10, 20, 30, 40, 60, 90 and 120 min after the dose. The plasma concentrations of galactose, fructose and glucose were assayed. The galactose results are presented in the graph below as mean \pm standard error (n=7). The area under the curve (AUC) for the concentration of plasma galactose and fructose against time also were calculated.



There was a significant difference ($P < 0.05$) in the galactose AUC between GF (2.5 ± 0.5) and both the LF (1.7 ± 0.3) and GGF (1.9 ± 0.6) doses. After the GF dose the peak plasma concentration of galactose was significantly higher than after either the LF or GGF doses. No significant difference was observed in the plasma galactose concentration after the LF and GGF doses. The profiles for plasma concentration of fructose against time and the AUCs were not significantly different between each of the doses. There was no significant difference in the change in plasma glucose concentration after each of the doses.

These results extend the findings by Williams et al. (1983) to physiological doses. The presence of glucose with a physiological dose of galactose resulted in a lower concentration of galactose in plasma over the first 20 min. Elevated plasma galactose can be toxic and the action of glucose may be to enhance galactose metabolism and hence avoid galactosaemia with its associated complications. The increase in the concentration of glucose in plasma was 20-fold greater than the increase in the concentration of plasma galactose. Hence the role of lactose as the main carbohydrate in milk may be related to galactose rapidly replenishing the liver glycogen while the glucose replenishes the glycogen in muscle and maintains blood sugar homeostasis.

WILLIAMS, C.A., PHILIPS, T. and MacDONALD, I. (1983). *Metabolism*, 32: 250.