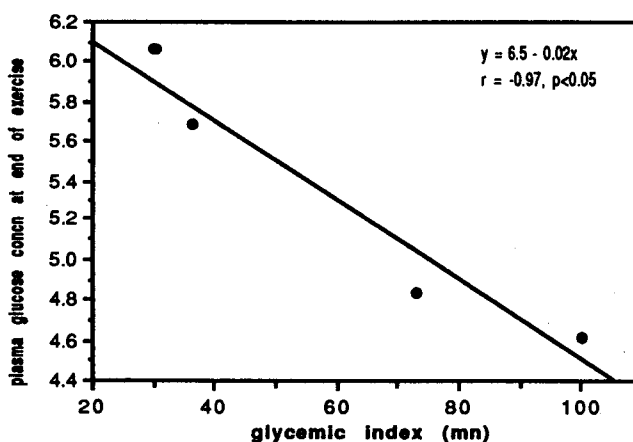


PLASMA GLUCOSE LEVELS AFTER PROLONGED STRENUOUS EXERCISE:  
RELATIONSHIP TO GLYCEMIC INDEX OF FOOD

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Plasma glucose and free fatty acids provide substrates for exercising muscles in addition to the glycogen stored in the working muscle and the liver. Higher plasma glucose levels are associated with delayed fatigue in prolonged strenuous exercise and free fatty acids can be employed as fuel in proportion to their plasma concentration. We have shown that low glycemic index (GI) foods when eaten prior to prolonged exercise may extend endurance (Thomas et al.). The aim of this study was to determine whether the magnitude of the glycemic response to different foods affected the plasma fuel substrate levels towards the end of exercise in a dose-related way. Six trained cyclists pedalled on a cycle ergometer at 65-70 %  $\text{VO}_2$  max 60 min after ingestion of one of four test meals: a low or a high GI powdered food, and two breakfast cereals - one high GI and one low GI - all providing 1 g of available carbohydrate per kg of body mass.

Plasma glucose levels after 100 min of exercise were found to correlate negatively with the observed GI of the food ( $r=-0.97$ ,  $P<0.05$ , see figure). Free fatty acid levels during the last hour of exercise also correlated negatively with the GI ( $r=-0.95$ ,  $P<0.05$ ). These correlations were apparent on individual values as well as mean values.



Relationship of GI to plasma glucose concentration at end of exercise

The findings support our hypothesis that slowly digested carbohydrate foods supply optimum levels of muscle fuel substrates during prolonged strenuous exercise. They slowly release glucose to the blood without stimulating insulin and inhibiting free fatty acid production.

THOMAS, D.E., BROTHERHOOD, J.R. and BRAND, J.C. (1991). *Int. J. Sports Med.* **12**(2):180.