

EFFECT OF CAFFEINE ON GLUCOSE ABSORPTION

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Caffeine has a range of pharmacological effects on the gut, including stimulation of intestinal secretion of electrolytes and water (Wagner 1978), and relaxation of intestinal smooth muscle (Pfaffman 1971). The aim of this study was to determine whether caffeine in moderate concentration, affects the rate of absorption of glucose from the gut.

The effect of caffeine on glucose uptake was studied by use of a single-pass perfusion technique allowing determination of the rate of uptake under steady-state conditions. Canulated duodenal segments (8 cm length) in fasted Sprague Dawley rats were used under pentobarbitone anaesthesia. The perfusion solutions contained glucose (5 mM or 20mM), sodium chloride to adjust to iso-osmolarity, and phenol sulphophthalein to allow correction for net water movement. The solutions were perfused (0.125 mL/min) first without caffeine for 30 min and then with caffeine (0.77 or 3.1 mM) for 30 min. Uptake rates, calculated from the rate of disappearance of glucose from the perfusion solution, are shown in the table below.

Perfusion solution	GLUCOSE UPTAKE	
	$\mu\text{mol}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}$ tissue dry wt.	(+ SEM)
Glucose (5 mM)	3.76 \pm 0.15	
Glucose (5 mM)+ caffeine (0.77 mM)	3.86 \pm 0.21	(n=3)
Glucose (20 mM)	13.56 \pm 1.97	
Glucose (20 mM)+ caffeine (3.1 mM)	12.66 \pm 1.77	(n=4)

The results showed that there was no significant change in the rate of uptake of glucose when caffeine was added to the solution perfusing the duodenum. The lower concentration of caffeine was approximately that which would be present in the gut after drinking brewed coffee. The conclusion is that the level of caffeine that might normally be consumed does not affect the rate of glucose absorption.

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