

## CHARACTERISTICS OF MALTOSE ABSORPTION IN THE RAT

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Maltose, the major end-product of starch digestion, is hydrolysed by brush-border maltase activity and absorbed as glucose. It has been suggested that glucose from maltose may have a kinetic advantage in uptake over free intraluminal glucose (Ramaswamy et al. 1974). This hypothesis was tested in rats by measuring the rates of uptake of glucose from glucose and from maltose solutions under steady state conditions.

Male Sprague-Dawley rats were fasted for 18-22 hours, anaesthetized with pentobarbitone and cannulated segments of approximately 10 cm length established in either the upper duodenum, upper jejunum or lower ileum. The segments were perfused (0.125 mL/min) with iso-osmotic solutions containing either glucose (10 mM) or maltose (5 mM), together with sodium chloride and phenol sulphophthalein to allow correction for net water movement. The sugar solutions were perfused first without and then with phlorizin (1 mM), an inhibitor of active transport of glucose. The rate of active transport of glucose was determined by subtracting the rate of phlorizin-resistant transport (diffusion) from total transport.

The rates of glucose uptake are shown in the table below.

Substrate Perfused	GLUCOSE UPTAKE		
	(mmol. min <sup>-1</sup> . kg <sup>-1</sup> dry tissue ± SEM)		
	Duodenum	Jejunum	Ileum
Maltose (total uptake)	5.36 ± 0.35	3.60 ± 0.39	2.12 ± 0.19
Maltose + phlorizin (diffusion)	0.53 ± 0.14 <sup>a</sup>	1.43 ± 0.31 <sup>b</sup>	0.85 ± 0.19
Difference: (active uptake)	4.83 ± 0.38 <sup>c</sup>	2.17 ± 0.25 <sup>d</sup>	1.27 ± 0.15 <sup>e</sup>
	(n = 6)	(n = 6)	(n = 11)
Glucose (total uptake)	6.66 ± 0.50	3.84 ± 0.46	1.77 ± 0.16
Glucose + phlorizin (diffusion)	0.94 ± 0.16 <sup>f</sup>	1.51 ± 0.25 <sup>g</sup>	0.66 ± 0.14 <sup>h</sup>
Difference: (active uptake)	5.72 ± 0.56 <sup>i</sup>	2.33 ± 0.57 <sup>j</sup>	1.10 ± 0.13 <sup>k</sup>
	(n = 6)	(n = 6)	(n = 12)
Significant differences:	c > d, d > e, g > h, i > j at P < 0.005.		
	b > a, g > f, j > k, f > a at P < 0.05,		

The rate of active transport of glucose from both maltose and glucose solutions was reduced with distance distal to the duodenum. There was no significant difference between the rate of active uptake of glucose from the maltose solution as compared to glucose and therefore no evidence for a kinetic advantage in the uptake of glucose from maltose. The rate of uptake of glucose by diffusion was greater in the jejunum than in either the duodenum or ileum, and the rate of uptake of glucose by diffusion from the 10 mM glucose solution was greater than that from the 5 mM maltose solution.

RAMASWAMY, I.C., MALATHI, P., CASPARY, W.F. and CRANE, R.K. (1974).

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