Development of enzyme activity in the gut of the grey kangaroo *(Macropus giganteus)*

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Unlike eutherian mammals, marsupials undergo most of their 'foetal' development in the pouch. Immediately upon entering the pouch the young fasten to a teat and begin drinking milk at an age equivalent to a 4 week human foetus. The digestive tract is obviously fully functional, but very little is known of its physiology.

We investigated the activity of the disaccharidase enzymes in various segments of the gut of 19 grey kangaroo pouch young and their mothers. Ages of the pouch young were determined by measuring hind foot length (Kirkpatrick 1965) and the activities of lactase, maltase and sucrase were determined in both tissue and contents from the saccular and glandular stomachs, the duodenum, ileum and colon. Data for the duodenal tissue and duodenal contents are shown in Table 1.

The major finding was that the activity of sucrase was significantly higher in the 0–50 day age group than all other age groups for all the gut sites tested. There was no appreciable activity of lactase in the adult gut.

During early lactation the milk of Tammar wallabies is high in carbohydrate. It is mostly in the form of oligosaccharide composed of a single glucose unit linked to varying numbers of galactose molecules. As the lactation progresses the content of carbohydrate declines and becomes present largely as free monosaccharides (Green and Merchant 1988). The high levels of sucrase activity in the very young animals in the present study may be a response to the presence of sucrose–like compounds in the early lactation milk of the grey kangaroo. It also suggests that sucrose could be substituted for more expensive sugars in artificial rearing formulae for very young animals.

Green, B. and Merchant, J.C. (1988). The composition of marsupial milk. In: *The Developing Marsupial*, pp. 41–54 (eds. C.H. Tyndale–Biscoe and P.A. Janssens), Springer–Verlag, Heidelberg.

Kirkpatrick, T.H. (1965). Studies of *Macropodida*e in Queensland 2. Age estimation in the grey kangaroo, the red kangaroo, the eastern wallaroo and the red–necked wallaby, with notes on dental abnormalities. *Queensland Journal of Agricultural and Animal Sciences* 22, 301–317.

Table 1 Disaccharidase activities in the duodenum and duodenal contents of pouch young and adult grey kangaroos.

Age (days)	Maltase activity (µmol/min/g protein)		Sucrase activity (µmol/min/g protein)		Lactase activity (µmol/min/g protein)	
	Tissue	Contents	Tissue	Contents	Tissue	Contents
0–50	10.3 ± 6.5	32.5 ± 28.0	302.6 ± 169.3^{a}	411.3 ± 259.0^{a}	22.5 ± 10.1^{a}	105.0 ± 52.1^{a}
50–100	23.2 ± 17.2	21.2 ± 11.3	34.5 ± 11.3^{b}	83.6 ± 35.8^{b}	42.3 ± 20.3^{a}	50.8 ± 16.3^{a}
101–150	10.8 ± 1.3	14.1 ± 3.9	5.0 ± 4.6^{b}	21.5 ± 6.4^{b}	10.7 ± 3.0^{a}	45.7 ± 15.1^{a}
151–200	6.4 ± 2.1	20.9 ± 8.5	22.8 ± 13.3^{b}	10.2 ± 3.3^{b}	15.8 ± 3.1^{a}	51.6 ± 6.6^{a}
Adult	14.5 ± 2.5	64.6 ± 6.6	52.7 ± 16.7^{ab}	20.9 ± 7.6^{b}	0.1 ± 0.1^{b}	0.2 ± 0.1^{b}

Means with different superscripts are significantly different (P<0.05)