

Quantification of Lymphoid Tissue in the Rat and Mouse Gastrointestinal Tract

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Purpose.

The quantity of lymphoid tissue in the mouse and rat colon, relative to the Peyer's Patches in the small intestine, has not been established. This investigation aims to quantify the lymphoid follicles and patches in these animal models to establish suitability for colonic vaccination.

Methods.

The stomach, small intestine, caecum and colon of female Wistar rats and Balbc mice (killed by CO₂ asphyxiation) were removed and placed into vials containing 20 ml of 10% v/v aqueous acetic acid and incubated overnight (5°C). Acetic acid enhanced the visualisation of the lymphoid tissue along the gastrointestinal tract. The gastrointestinal tract sections were opened lengthways, blotted dry and photographed, and the numbers of individual lymphoid follicles and patches (collections of follicles) were counted.

Results.

The number of lymphoid follicles and patches in the colon was established, and the presence of Peyer's Patches in the small intestine was confirmed (Table 1). Peyer's Patches were distributed randomly along the small intestine in both animals, with no predilection for a particular area ($p > 0.05$). Similarly, there was no difference between the number of patches per cm in the proximal and distal colon ($p > 0.05$). In mice, there were similar numbers of patches in the small intestine and colon, with slightly higher number of follicles in the former. In the rat, there were significantly higher numbers of follicles in the small intestine, with few patches being seen in the colon. However, once the length of the intestinal tract is accounted for differences between the small and large intestine become less pronounced. We report, for the first time, the presence of lymphoid follicles in the mouse and rat caecum (data not shown). No lymphoid tissue was observed in the stomach, as expected.

Table 1 Lymphoid Tissue in the Gastrointestinal Tract of Wistar Rats and Balbc Mice

	Mouse (n=15)		Rat (n=10)	
	Small Intestine	Colon	Small Intestine	Colon
Length (range)	34.5 (29-39)	11.5 (9-14)	82.8 (70-97)	13.9 (12-18)
No. Patches (range)	10.1 (3.0-15)	11.6 (7-15)	9.4 (7-15)	3.8 (2-11)
No. Patches/cm	0.3	0.8	33	0.3
No. Follicles (range)	57.5 (22-80)	39.4 (18-54)	207.5 (142-273)	38.6 (16-83)
Follicles /patch	5.7	3.4	30.6	28.5
Follicles /cm	1.6	0.8	2.1	3.4

Conclusions.

The presence of lymphoid tissue in the mouse and rat colon shows that the both animals may be used as models in investigations on colonic vaccination; the mouse model, with higher levels of tissue, may be more appropriate.