#4 Differential effects of sheep and cow milk on gastrointestinal physiology in a rat model

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Sheep milk is a rich source of vitamins, minerals and energy, with up to 50% more milk solids than cow milk. Anecdotally, sheep milk is also thought to be better tolerated than cow milk. However, controlled scientific studies examining the health benefits of sheep milk are lacking. To understand how sheep milk can affect growth and gastrointestinal physiology, we fed raw sheep milk, pasteurised sheep milk, or raw cow milk to newly weaned Sprague-Dawley rats as model for human nutrition. There were no significant differences in mean body weight after 28 days of milk feeding. However, milk and solid food consumption differed between the groups. Rats fed the raw cow’s milk consumed more solid food than rats that were fed raw sheep milk; however, there was no difference between intake of raw sheep or raw cow milk. In contrast, rats consumed more pasteurised sheep milk compared to raw sheep milk, but there was no difference in solid food intake between these groups. Microarray analysis of caecal tissue gene expression showed differences in expression of pathways involved in tissue organisation and development between rats fed raw sheep and raw cow milk. In contrast, caecal tissue pathways that differed between rats fed pasteurised or raw sheep milk were primarily involved in nutrient metabolism and transport. Raw sheep milk had relatively minor effects on the caecal microbial community composition compared to cow milk. However, pasteurised sheep milk significantly decreased the relative abundance of Porphyromonadaceae in the caecum compared to rats fed raw sheep milk (21.6% vs 15.8%). Our results show that sheep and cow milk cause different effects on gastrointestinal physiology, and pasteurisation can modify these effects. The observation that the rats fed sheep milk required less solid food than rats given raw cow milk to maintain the same level of growth supports the view that sheep milk is an excellent source of nutrition.