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Effects of feeding frequency on fasting and postprandial endocrine response in domestic cats

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Obesity is now the most common metabolic disease and a key health problem in cats[(1)]. The effects of diet composition and feeding patterns on appetite control and their contributions to obesity development are poorly understood in cats. The objective of this study was to investigate the effects of feeding frequency on appetite-regulating hormone release.

Twelve healthy adult neutered male domestic shorthair cats (4.74±0.16 kg BW; 4.5–5.5 BCS on 9-point scale) were used in a randomized, crossover study consisting of 32 d (two 16-d periods). In each period, cats were randomly allotted to one of two treatments. Six cats were fed the same diet in either two meals (8 am and 8 pm) or four meals daily (8 am, 12 pm, 4 pm, and 8 pm) at amounts to maintain BW and BCS. A 15-d adaptation phase was followed by a blood sampling phase on d16. A blood sample was taken before the 8:00 AM meal and then every 2 hr for 24 hr. Glucose, insulin, total ghrelin, and leptin concentrations were measured. Data were analyzed by comparing changes at baseline and postprandial incremental area under the curve (IAUC) among treatments.

Item	2 meals	4 meals	SEM	*P* value
Baseline concentration				
Glucose (mg/dL)	83.52	80.25	2.39	0.203
Leptin (ng/mL)	5.69	5.43	0.19	0.210
Ghrelin (ng/mL)	7.24	7.21	1.00	0.980
Insulin (ng/L)	468.37	385.38	105.64	0.450
Incremental AUC_{0-24h}				
Glucose (mg/dL)	173.76	111.12	36.14	0.119
Leptin (ng/mL)	5.49[a]	10.83[b]	2.09	0.028
Ghrelin (ng/mL)	21.60	17.07	11.74	0.707
Insulin (ng/L)	4639.25	2775.50	1099.58	0.119

Mean in a row with superscripts without a common letter differ, $p<0.05$.

Cats fed 4 meals daily had greater ($P = 0.028$) leptin $IAUC_{0-24\,h}$ as compared to cats fed twice daily. However, the baseline concentrations of leptin were not affected by the feeding frequency. Baseline concentrations and $IAUC_{0-24\,h}$ values of glucose, insulin, and ghrelin were not different between treatments. In conclusion, feeding frequency may affect postprandial leptin secretion over the course of a day, but does not appear to change fasting leptin concentrations.

1. Lund EM, Armstrong PJ, Kirk CA *et al.* (2005) *Intern J Appl Res Vet Med* **3**, 88–96.