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THE EFFECT OF DIETARY CADMIUM ON KIDNEY FUNCTION IN CATS

A thesis presented in partial fulfilment of the requirements for the degree of

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Abstract

Due to the requirement for meat in feline diets, this study aimed to investigate the potential effects on kidney function in cats of cadmium accumulation in meat products due to pasture management practices. Cadmium may be a causal factor in feline Chronic Kidney Disease (CKD). Twenty-seven domestic short hair cats were randomly selected from the colony population of the Feline Nutrition Unit of Massey University and assigned to three experimental groups (n=9), which were balanced for age and sex. Each group received one of the three experimental diets designed to represent the full range of potential cadmium concentrations that cats may be exposed to on wet diets in New Zealand. Diets were fed ad libitum for a 6-month period. Kidney function was examined at baseline and after 3 and 6 months by measuring glomerular filtration rate (GFR) using iohexol clearance analysed by high performance liquid chromatography (HPLC). Blood and urine analyses were also conducted on a monthly basis. While GFR fluctuated over the study period no significant differences were found either between groups at the end, or within each group when compared at the beginning and end of the study. Although overall no evidence of CKD was observed, an unexplained trend of weight loss was observed in females receiving the two diets containing the highest cadmium levels, which may simply have reflected reduced dietary palatability. The results of the study showed no detectable effects of feeding the three diets for 6 months; however, an extended trial period may be required to fully investigate the longer term effects of cadmium levels and other dietary factors on the development of CKD. In particular, more work is needed to explore the potential for genetic and/or functional differences in mechanisms which are involved in the transport, and/or deposition of cadmium, or are protective against cadmium toxicity in cats and to further define normal parameters and standard approaches in measuring GFR in cats.
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List of Abbreviations

BW    Body Weight
CBC   Complete Blood Count
Cd    Cadmium
CKD   Chronic Kidney Disease
DM    Dry Matter
GFR   Glomerular Filtration Rate
HPLC  High Performance Liquid Chromatography
HR    Heart Rate
IRIS  International Renal Interest Society
MT    Metallothionein
PTWI  Provisional Tolerable Weekly Intake
SBP   Systolic Blood Pressure
USG   Urine Specific Gravity
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