



## Feline constipation can be managed through a psyllium-enriched extruded diet

The efficacy of Royal Canin Veterinary Diet Fibre Response Feline in the management of recurrent feline constipation, obstipation and megacolon, was assessed on 40 client-owned cats from clinics across Canada.

Constipation can be defined as infrequent, difficult or absent defecation associated with faecal retention in the colon and rectum. The dietary management of constipation, obstipation and megacolon in cats is either based on a high fibre diet (total dietary fibre >20% on an as fed basis) or on highly digestible, low fibre diets supplemented with various soluble fibre sources, including psyllium or canned pumpkin.

Physical and chemical properties of dietary fibre can vary considerably. High levels of insoluble fibres, such as cellulose, might not be as efficient in chronic feline constipation and could exacerbate the clinical signs.

Forty neutered cats with a history of chronic constipation, obstipation or megacolon completed the trial. Cases had been on a variety of diets and treatments including lactulose (for 77.5% cats) and cisapride (for 63% cats). All of the cats underwent a complete clinical examination and did not have an impacted colon prior to introduction of the trial diet.

The diet was a moderate fibre, psyllium enriched, dry extruded diet (Royal Canin Fibre Response Feline). Faecal scores and body weights were recorded at the beginning, mid-point and end of the 2 months -study. Faecal quality was assessed with a 5-point scale: a score of 1 represented hard dry faeces and a score of 5 represented liquid faeces\*.

The mean age was 8.38 +/- 4.3 years. All cats showed improvement in faecal scores: Mean faecal score at the beginning of the trial was 1.23 +/- 0.55 (with a median score of 1) and mean faecal score at the end of the trial was 2.6 +/- 0.55 (with a median score of 3). Body weight remained stable, and none of the cats showed episodes of constipation over the study period. By the end of the trial, 14 cats were off lactulose and 11 were off cisapride; in addition, 4 and 3 of the remaining cats had a reduction in the dosage of lactulose and cisapride respectively.

*The psyllium-enriched extruded dry diet used in this clinical study proved to be very effective in the management of constipation, obstipation and even megacolon. Decreased need for medications, surgery and euthanasia was also noted.*

### Effect of Fibre Response diet on faecal score

	T0	After 2 months
Mean faecal score* (range)	1.23 (0.68-1.78)	2.6 (2.05-3.15)
Median faecal score*	1	3

\*: This faecal scale is inversed compared to the faecal score generally used in Royal Canin research and development center. Score 1 means constipation, score 5 means liquid diarrhoea.

Freiche VG, Houston D, Weese H, Evason M, Deswarte G, Ettinger G, Soulard Y, Biourge V, German AJ. Uncontrolled study assessing the impact of a psyllium-enriched extruded dry diet on faecal consistency in cats with constipation. J of Feline Medicine & Surgery 2011, in press



## Intro

### Science and Observation!

Does innovation belong to a small team of strange scientists who work in a dark office where nobody can have access except them? Not in Royal Canin! This is not our way of thinking. Actually, it is in the blood of all the people of the company and in yours as well! Thanks to the network built by the people of Royal Canin included your sales representative, we catch everyday numerous feedback from our partners. Our daily contacts are the main source of information which help us to develop breakthroughs in dog and cat nutrition.

This new issue of News From Royal Canin Research perfectly illustrates our sources of innovation: Science and Observation. You will find some scientific discoveries linked purely with the world of Science as the article on hyperuricosuria in dogs. Another linked with Observation with first results coming from the amazing job done by Aurélien Grellet and the team at UMES (Breeding and Sport Medicine Unit – Vet University of Maisons-Alfort) on weaning diarrhoea in puppies.

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## Intestinal

### Faecal score in puppies depends on age and breed

A poor faecal score for a Westie can be normal for a Labrador. A new scoring system allows to assess puppy faecal scores while taking into account the age and breed size.

In puppies, age and body size are physiological factors susceptible to affect quality of stools. Significantly higher faecal moisture, without effect on faecal score, was described in puppies after the weaning period compared to adult dogs<sup>1</sup> and a lower faecal quality before the weaning period was observed in toy breed dogs.

Large breeds, such as German Shepherd or Great Danes have higher faecal moisture, an increased frequency of soft stools and an increased number of defecations compared to small breeds.

Gastrointestinal viruses and parasites will also have an impact on puppy faeces quality. The effect of pathogens (canine parvovirus, canine coronavirus, intestinal parasites) can be masked or possibly overestimated if the physiological factors influencing faeces quality are not evaluated simultaneously.

This study was designed to evaluate the effects of faeces quality on puppies' average daily gain. Quality of stools was assessed in 177 small and large growing dogs aged from 5 to 8 weeks through a 13 points faecal scale. A poor faecal score was defined as the highest faecal score associated with a significant reduction in average daily gain.

As expected, faecal score of small breed puppies increased with age whereas no effect was observed in large breed puppies. During the weaning period (6-8 weeks), small breeds had higher faecal score than large breeds.

#### Determination of a poor faecal score, depending on the breed size and the age of the dog

	4-5 weeks	6-8 weeks
Small breed puppies (adult body weight < 25 kg)	≤ 6	≤ 7
Large breed puppies (adult body weight > 25 kg)	≤ 5	≤ 5

For large breed dogs a faecal score ≤ 5 was defined as poor. A faecal score ≤ 6 and ≤ 7 was defined as poor in small breed puppies at respectively 4 to 5 and 6 to 8 weeks of age. This study shows for the first time an objective definition of a poor faecal score based on an impairment of the average daily gain.

*This faecal scoring system could be a new indicator to compare the effect of intestinal pathogens on faecal quality, whatever the age and breed size of puppies.*



Grellet A, Feugier A, Grandjean D. Development of a new faecal scoring system in puppies. Proc of the 21th ECVIM-CA Congress. Sevilla, September 2011:p234-235.  
1: Weber M, Martin L, Biourge V, et al. Influence of age and body size on the digestibility of a dry expanded diet in dogs. J Anim Physiol Anim Nutr (Berl) 2003;87:21-31.

## Renal

# Validation of the efficacy of Royal Canin Renal Special Feline through a field trial

To assess the acceptability and the efficacy of Royal Canin Veterinary Diet Renal Special Feline, a study was conducted by Prof. Jonhatan Elliott in the Renal Research Clinic at the Royal Veterinary College, London, UK.

Twenty seven cats were recruited, showing:

- A history and clinical signs compatible with a diagnosis of CKD;
- Two creatininemia measured 2 weeks apart that would correspond to stages II or III on IRIS\* classification;
- A systolic blood pressure < 170 mm Hg, either without treatment or following stabilization on amlodipine treatment.

The cats were followed over a 4 to 6 months period. They were maintained in their home environment, and owners were instructed to feed Royal Canin Renal Special Feline. Response to treatment was assessed periodically through measures of creatininemia, urea and plasma phosphate, total and ionised calcium, systolic blood pressure, parathormone (PTH), as well as urine protein to creatinine ratios.

On the 27 cats recruited, 13 proved to be compliant over the duration of the study. After 4 to 6 weeks treatment, 100 % of those cats had reached the targeted phosphatemia (<1.45 mmol/l). Azotemia was also significantly reduced when compared to pre-treatment value.

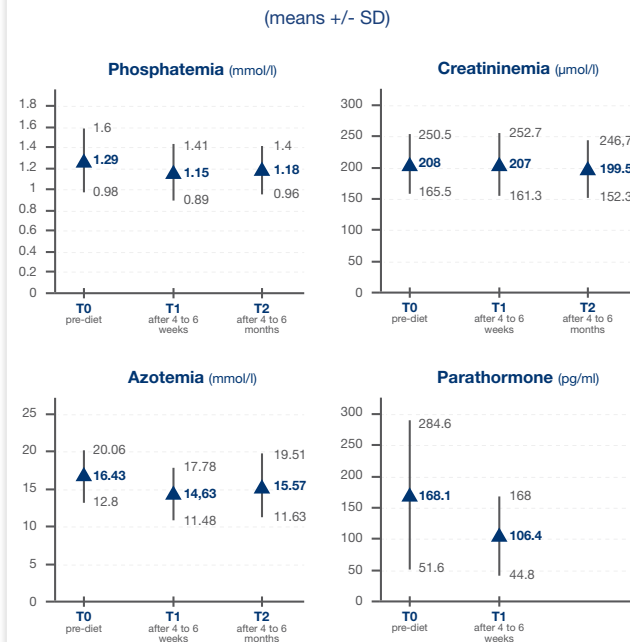
*These data confirm previous results<sup>1</sup> on dietary management of chronic renal failure and suggest that control of creatininemia, plasma phosphate and plasma PTH can be achieved by feeding Royal Canin Renal Special Feline.*

**Royal Canin Veterinary Diet Renal Special Feline composition:**

### KEY VALUES (on an as fed basis)

Protein	26 %
Fat	17 %
Carbohydrate	33.3 %
Dietary fibre	10.2 %
Minerals	6.1 %
Omega 3	0.79 %
Omega 6	3.21 %
EPA + DHA	<b>0.42 %</b>
Calcium	0.6 %
Phosphorus	<b>0.44 %</b>
Sodium	0.3 %
Measured energy	3 998 kcal/kg

### Effect of Renal Special diet on objective parameters: (means +/- SD)



\* IRIS: International Renal Interest Society

1: Elliott J et al. Survival of cats with naturally occurring chronic renal failure: effect of dietary management. J Small Anim Pract 2000; 41:235-242



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## Urinary

# Do Dalmatians have the exclusivity of hyperuricosuria?

Mutant allele frequencies were assessed on 127 breeds, including the 20 most common breeds registered by the American Kennel Club.

Hyperuricosuria consists in the excessive excretion of uric acid in the urine. This condition predisposes dogs to urate urolithiasis. The mutation that causes canine hyperuricosuria was previously identified in three unrelated dog breeds (the Dalmatian, Bulldog, and Black Russian Terrier) but the occurrence of the mutation in additional breeds was not determined.

The aim of this study was to identify additional breeds that have the hyperuricosuria mutation and to estimate the mutant allele frequency in those breeds.

A total of 3530 dogs from 127 different breeds were screened for the hyperuricosuria mutation.

Mutant allele frequencies that range from 0.001 to 0.15 were identified in the American Staffordshire Terrier, Australian Shepherd, German Shepherd Dog, Giant Schnauzer, Parson (Jack) Russell Terrier, Labrador Retriever, Large Munsterlander, Pomeranian, South African Boerboel, and Weimaraner breeds.

*The mutant allele frequencies vary among breeds and can be used to determine an appropriate breeding plan for each breed. A DNA test is available and may be used by breeders to decrease the mutant allele frequency in breeds that carry the mutation. Veterinarians may also use the test as a diagnostic tool to identify the cause of urate urolithiasis.*



On 76 Weimaraner tested, 12 were carriers and 5 were affected. Estimated carriers in population was 25.41%.

Karmi N, Brown EA, Hughes SS, McLaughlin B, Mellersh CS, Biourge V, Bannasch DL. Estimated frequency of the canine hyperuricosuria mutation in different dog breeds. J Vet Inter Med 2010; 24 : 1337-1342

For more information on tests developed to help breeders eliminate inherited diseases: <http://faculty.vetmed.ucdavis.edu/faculty/dlbannasch/lab/projects.htm>

## Obesity

# Weight loss diets should be enriched in nutrients

There is high variability in the degree of caloric restriction required to achieve successful weight loss or to maintain optimal weight in dogs with low energy requirements. Depending on the diet selected and the degree of caloric restriction, dogs may be at risk of nutritional deficiency.

The purpose of this study was to determine nutrients at risk of deficiency during caloric restriction in commercially available canine diets with varying caloric density. Five canine diets (two therapeutic weight loss diets and three over-the-counter diets), were chosen to represent a range of caloric density (from 3000 to 4240 kcal/kg). Caloric density and typical nutrient analysis for protein, amino acids, fat, minerals, and vitamins were obtained from manufacturers and used to calculate nutrient intake for a hypothetical dog fed at varying levels of energy restriction:

- 40 % resting energy requirement (28 kcal/kg<sup>0.75</sup>) (considering the dog's current weight)
- 60 % resting energy requirement (42 kcal/kg<sup>0.75</sup>)
- 80 % resting energy requirement (56 kcal/kg<sup>0.75</sup>)
- 100 % resting energy requirement (70 kcal/kg<sup>0.75</sup>)

These amounts were compared to National Research Council

(NRC) recommended nutrient allowances. The five diets evaluated varied widely in terms of which nutrients were below NRC recommended levels and the degree of restriction required for them to be at risk of deficiency. Four of the five diets had at least one essential nutrient fall below NRC recommended amounts at 100% RER\* and all diets had multiple nutrients below the recommended amounts at 60% RER.

Choline was among the nutrients most affected by caloric restriction in the diets evaluated, but others, such as methionine, tryptophan, and magnesium also were low in some diets with minimal caloric restriction.

*These results suggest that caloric restriction could lead to potential nutrient deficiencies. Therefore, specially formulated, nutrient-dense diets may be needed in animals during weight loss or in animals with low energy requirements.*

Further testing is however needed to determine actual nutrient requirements in dogs that are energy restricted, and whether clinical nutrient deficiencies actually arise in vivo.

Source: Linder DE, Freeman LM, Morris PJ, German AJ, Biourge V, Heinze CR. Evaluation of risk for nutritional deficiency with caloric restriction. Proc of 11th Annual Clinical Nutrition and Research Symposium, Denver, June 2011: 15

RER = Resting Energy Requirements  
NRC = National Research Council

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