

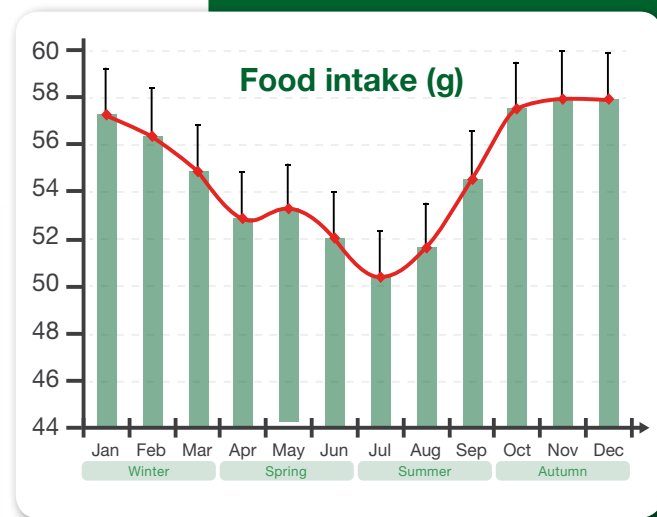
If a seasonal effect on food consumption is well known in livestock, little is known about such an effect in dogs and cats. This retrospective study assessed the consequences of season and month on food intake in 38 adult cats over a 6-year period.

The study was performed in the South of France (Mediterranean climate) between 2004 and 2009.

38 adult cats were included in the study. Among these 38 cats, 17 were male (15 neutered) and 21 were female (10 neutered), with 32 pure bred and 6 Domestic Shorthair cats. These cats were involved in palatability studies and, therefore, the whole group was fed a different dry diet every day. Cats were fed ad libitum and individual food intake was recorded on a daily basis using electronic weight scales.

Housing and management protocols adhered to European regulatory rules for animal welfare. Cats were housed in closed indoor/outdoor runs. Thirty of them had unlimited outdoor access, and the remaining 8 lived exclusively indoor. Depending on season, the temperature inside the cattery varied between 18°C and 24°C, and artificial light was provided between 7:30 am and 5:00 pm if natural light was considered insufficient by animal handlers.

Month effect on average food intake over the 6-year retrospective study



The analysis of recorded food consumption over the 6-year period showed that whatever the year, a seasonal effect was evident ($p < 0.001$), with food intake during spring and summer being inferior to food intake during autumn and winter. Further, irrespective of year, a monthly effect was identified ($p < 0.001$) with food intake being:

- The greatest in January, February, October, November and December;
- Intermediate in March, April, May and September;
- The least in June, July and August

Whatever the year, average food intake in July was 11% lower than food intake in December. This variation of food intake could be the result of variation of outside temperatures, differences in daylight duration, and/or haircoat changes. This seasonal effect in food intake should be properly considered when estimating daily maintenance energy requirements in cats.

Serisier S, Feugier A, venet C, Soulard Y, Biourge V, German AJ. Season and month effect on food intake in adult colony cats. Proc.of the 2012 ACVIM forum, New Orleans, Louisiana.



Intro

Continuing professional development: the strength of the vet profession!

Although this is not a requirement in all countries in the world, post-graduate training belongs to the roots of the veterinary profession. To be convinced, just observe the strong craze for veterinary congresses, symposiums or webinars! Royal Canin is part of this dynamic by initiating strong partnerships with associations delivering postgraduate training or by spreading

scientific knowledge directly through editions, but also by supporting local initiatives from Royal Canin associates in all the subsidiaries. Spreading knowledge to the vet community is the essence of "News from research". In this new issue you will find new perspectives in the approach of canine Adverse Food Reactions and new insights in the management of excessive licking behaviour. We had to share it with you!

Marie-Anne Hours (Scientific Support Manager - R&D) & Gregory Casseleux (Scientific Communication Manager - Europe)

Dermatology

Immune responses in dogs with cutaneous adverse food reactions

A PhD thesis supported by Royal Canin and conducted at Utrecht University (The Netherlands) helped clarify some aspects of the pathogenesis of cutaneous Adverse Food Reaction (AFR) in dogs.

AFR enters in the differential diagnosis for pruritic dogs, and can be defined as unwanted and unpredictable effects caused by dietary allergens. It is unclear whether the adverse reactions to food antigens are the result of undesired immune responsiveness or intolerance to food. Therefore the generic term "Adverse Food Reactions" is used rather than food allergy. Despite the entry of food allergens via the intestinal tract, they do not systematically generate clinical symptoms at that location and the majority of dogs only express dermatological signs.

The aim of this PhD thesis was to investigate the immune response in the duodenum, in the skin and in the peripheral blood mononuclear cells of dogs with cutaneous AFR. Here are the main conclusions of this 4-year work:

T cell populations in dogs with cutaneous AFR differ from canine Atopic Dermatitis.

Assuming that the clinical manifestations in canine atopic dermatitis and in cutaneous AFR are comparable, the similarity in T cell phenotypes in these 2 pathologies was investigated¹. The results suggest that in the lesional skin of AFR dogs CD8+ T cell influx was predominant, whereas in canine atopic dermatitis it is characterized by an influx of both CD4+ and CD8+ T cells.

No immunological relationship between intestine, blood and skin was found in dogs with cutaneous AFR.

Another study² was conducted to evaluate the duodenal gene expression levels of T helper cells (Th₁ and Th₂) and T regulatory cells (T_{reg}) cytokines in dogs with cutaneous AFR and healthy control dogs before and after a provocation and elimination diet. The results did not reveal any change in T cell presence, or a clear Th₁, Th₂, or T_{reg} profile after dietary provocation, and this profile did not change after administration of the elimination diet. This suggests that the intestinal mucosa is not the primary site of T cell activation that leads to cutaneous AFR.

A last protocol investigated the cytokine profile in Peripheral Blood Mononuclear Cells (PBMC) after dietary provocation in cutaneous AFR dogs and healthy dogs. Th₁ gene responses were found to be lower in PBMC of dogs with cutaneous AFR after feeding the causative diet compared with healthy dogs. This reduced Th₁ response possibly altered the reactivity of T cells and may have resulted in allergy.



1. Veenhof EZ et al. characterization of T cell phenotypes, cytokines and transcription factors in the skin of dogs with cutaneous adverse food reactions. Vet Journal 2011; 187:320-324
 2. Veenhof EZ et al. Evaluation of cell activation in the duodenum of dogs with cutaneous adverse food reactions. AJVR 2010; 71:441-446

Eveline Veenhof. Immune responses in dogs with cutaneous adverse food reactions. Defended 26th April 2012, Utrecht University (the Netherlands). Supervisors: Prof. T Willemsse and Prof. V.P. Rutten.

Patch testing in sensitised dogs using predigested proteins

While the reference method to diagnose Adverse Food Reactions (AFR) in dogs is an elimination diet and a subsequent challenge with the previous food, patch testing has been shown to be a helpful and non-invasive tool to choose ingredients for an elimination diet in dogs with suspected AFR¹.

This study aimed at investigating the allergenic capacities of predigested proteins using patch testing.

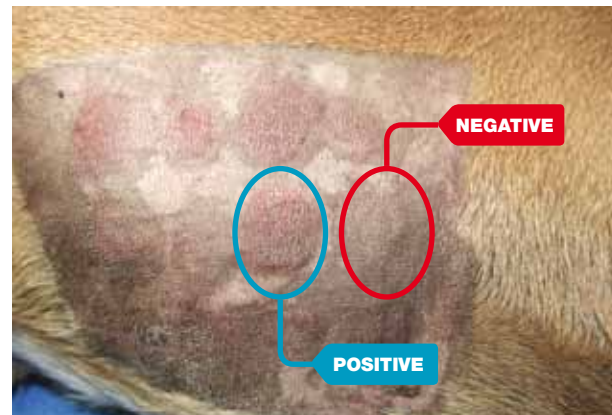
Hydrolysed protein veterinary diets have been introduced for the diagnosis of canine AFR. During hydrolysis, protein sources are enzymatically broken down into polypeptides, changing and reducing the allergenic properties of the molecules. The aim of this study was to investigate the allergenic capacities of predigested proteins (beef, pork and salmon) using patch testing. Three types of in vitro digestion were chosen, using modified Boisen method with various duration of pancreatic digestion:

- Pepsin digestion, without pancreatin, where the molecular weight of the majority of proteins were comprised between 800 and 6000 Daltons;
- Pepsin and light pancreatic digestion (2 hours), where the molecular weight of the majority of proteins were comprised between 200 and 800 Daltons;
- Complete digestion with pepsin and pancreatin (18 hours), where the molecular weight of the majority of proteins were comprised between 200 and 800 Daltons.

Four dogs with adverse reactions to beef (n=2), pork (n=1) and salmon (n=1) confirmed with elimination diets and subsequent individual provocation were included. In these dogs a patch test with relevant allergens (cooked, raw and predigested in the 3 ways described above) was conducted on the lateral chest 48 hours

after clipping with and without tape stripping the epidermis 10 times. The negative control was petroleum jelly. Reactions were interpreted as positive when an erythematous wheal occurred after 48 h.

Reaction was positive when an erythematous wheal was observed within 48 hours



C. Johansen

All dogs were positive on the patch test for their relevant raw or cooked proteins. No positive reactions were observed with predigested beef and pork, but the salmon-allergic dog was positive to pepsin-digested salmon. No difference was found between results from tape stripped and non-tape stripped skin.

Predigested proteins (<800 Daltons) did not induce positive reactions in 3 cases out of 4. These results are consistent with the use of hydrolysed proteins in the dietary management of adverse food reactions in dogs.

Johansen C, Mariani C, Mueller RS. Patch testing with predigested proteins in sensitized dogs. Proc. of the 7th World Congress of veterinary dermatology, July 2012, Vancouver, Canada

1. Bethlehem S, Bexley J, Mueller RS. Patch testing and allergen-specific serum IgE and IgG antibodies in the diagnosis of canine adverse food reaction. Vet Immunol Immunopathol. 2012 Feb 15; 145(3-4):582-9

Conduction of the patch test on the lateral chest



C. Johansen

Excessive licking of surfaces: a link with gastrointestinal disorders?

A study supported by Royal Canin Canada performed a complete gastrointestinal evaluation of "licking dogs" and assessed the outcome of this behaviour after appropriate treatment of any identified underlying disorder.

Excessive licking of surfaces (ELS) refers to repetitive licking of objects and surfaces (floors, carpets, walls, furniture...) in excess of duration, frequency or intensity as compared with that required for exploration. Some authors attribute this behaviour to obsessive-compulsive disorders, but the exact aetiology is currently unknown. The authors of this study hypothesised that the majority of dogs presented with ELS were affected by an underlying gastrointestinal (GI) disorder.

Dogs were recruited between February 2007 and May 2008 at the Veterinary Teaching Hospital of the University of Montreal. Nineteen licking dogs were included in the test groups, while 10 healthy dogs, without any history of ELS or remarkable physical, behavioural or neurological examinations were assigned to the control group. All dogs underwent a complete GI evaluation, a complete blood count, a serum biochemistry profile, serum bile acid measurement pre and post prandial, canine specific pancreatic lipase activity, faecal examination, abdominal ultrasonography, and a gastrointestinal endoscopy.

The prevalence of GI abnormalities was significantly higher in licking dogs compared to control dogs (p=0.046); GI disorders were found in 74% of them (14 of 19) as compared with 30% (3 of 10) of the control dogs. These abnormalities included eosinophilic and/or lymphoplasmacytic infiltration of the GI tract (n=8), delayed gastric emptying (n=7), irritable bowel syndrome (n=1), chronic pancreatitis (n=1), gastric foreign body (n=1) and giardiasis (n=1). Treatment was recommended on the basis of diagnostic findings. If no specific GI disorder was diagnosed, a nonspecific treatment was recommended, such as a commercial elimination diet*, and the use of antacid and/or antiemetic, nausea being considered as a potential cause of ELS.

From the onset of the treatment, dogs were monitored for 90 days during which their licking behavior was recorded. Final data were obtained for 17 dogs, as one dog was excluded for noncompliance and another was lost to follow-up. A significant improvement in both frequency and duration of the basal licking behaviour was observed in 59% of dogs (10 of 17). At day 90, 9 of 17 dogs (53%) had stopped licking.

The majority of ELS dogs (74%) have concomitant gastrointestinal abnormalities. A significant improvement occurs in most of the dogs when this GI disorder is identified and properly treated, with resolution in 53% of ELS dogs. In light of these findings, GI disorders should be thoroughly considered in the differential diagnosis of canine ELS.

*Elimination diet was Royal Canin Medi-Cal Hypoallergenic formula, Canada

Bécuwe-Bonnet V, Bélanger MC, Frank D, Parent J, Hélie P. Gastrointestinal disorders in dogs with excessive licking of surfaces. Journal of Veterinary Behavior. Vol 7, Issue 4:194-204; July 2012

GI signs, GI diagnosis and outcome for the 14 licking dogs diagnosed with GI disorder

	GI signs	Diagnosis	Outcome of licking behaviour
1	Vomiting, ptyalism, abdominal pain	Mild eosinophilic enteritis	Resolution
2	Vomiting, abdominal pain, borborygmus, small bowel diarrhoea	Mild eosinophilic enteritis Delayed gastric emptying	Resolution
3	Ptyalism, changing in appetite, depression	Severe eosinophilic gastritis Mild eosinophilic enteritis Delayed gastric emptying	Resolution
4	Vomiting, regurgitation	Mild eosinophilic gastritis Moderate eosinophilic enteritis	Negative outcome
5	Vomiting, ptyalism, borborygmus, soft stools	Gastric foreign body	Resolution
6	Vomiting, abdominal pain	Moderate lymphoplasmacytic gastritis. Delayed gastric emptying	Negative outcome
7	Vomiting, borborygmus, small bowel diarrhoea	Moderate eosinophilic gastritis Mild eosinophilic enteritis	Resolution
8	Difficult defecation, soft stools	Irritable bowel syndrome	Resolution
9	Vomiting, flatulence, pica	Giardiasis	Resolution
10	None	Delayed gastric emptying	Resolution
11	None	Delayed gastric emptying	Negative outcome
12	None	Delayed gastric emptying	Negative outcome
13	None	Mild lymphoplasmacytic gastritis	Negative outcome
14	None	Mild lymphoplasmacytic gastritis Delayed gastric emptying	Negative outcome