ADVANCE VETERINARY DIETS

Clinical reports

A CLINICAL REPORT
FOR THE VETERINARIAN
FROM AFFINITY PETCARE

GASTROINTESTINAL STUDIES
ADVANCE VETERINARY DIETS

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This clinical report contains two clinical studies designed to evaluate the efficacy of Advance Veterinary Diets (AVET) in the management of gastrointestinal disorders in dogs.

- The first study looks at the efficacy of the new AVET Gastroenteric for the treatment of acute diarrhoea in dogs.
- The second study assesses the use of the AVET Hypoallergenic diet in the management of chronic inflammatory enteropathies in dogs.

INTRODUCTION

FIGURE 1. Process of intestinal dysbiosis

1 INTESTINAL "PREDYSBIOSIS"

Certain gastrointestinal processes or an inadequate diet can lead to an increase in bile acid secretion, the appearance of undesirable metabolites (ammonia, branched chain fatty acids) and an increase in intestinal pH.

Ammonia Branched chain fatty acids

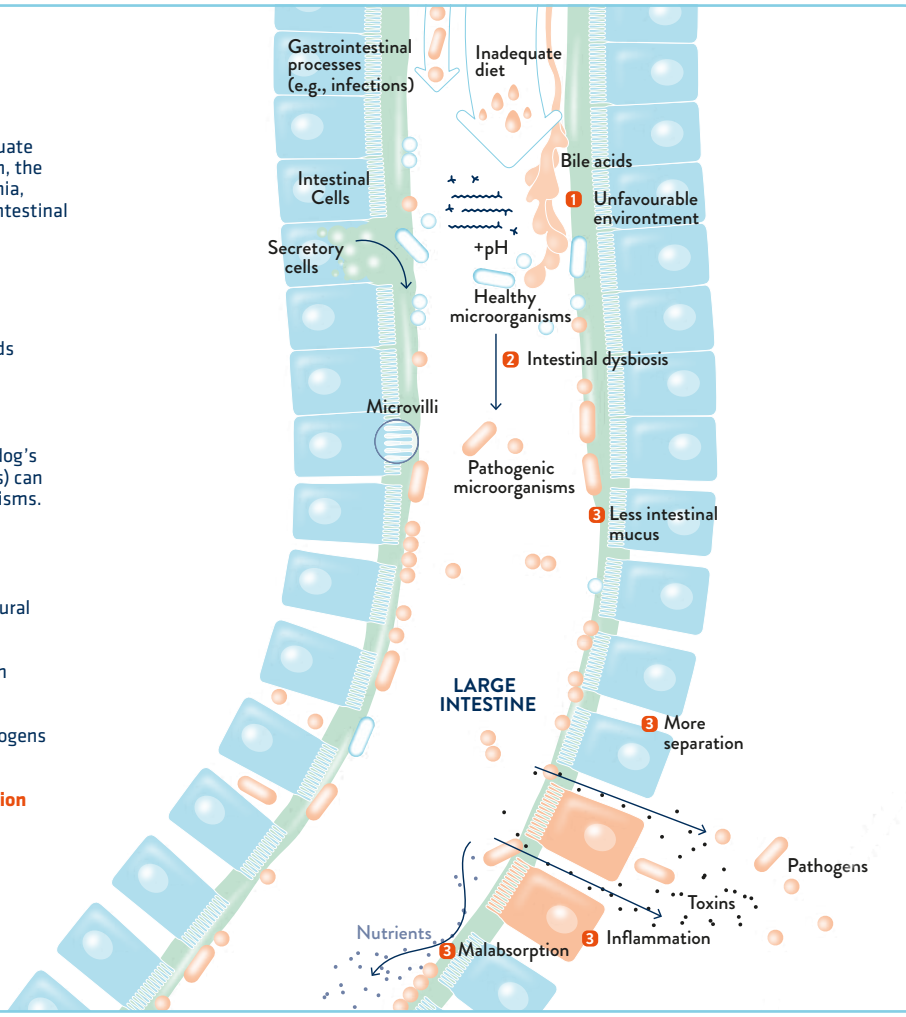
2 INTESTINAL DYSBIOSIS

An unfavourable environment (as well as each dog's lifestyle, characteristics and digestive processes) can reduce the richness and diversity of microorganisms.

3 CONSEQUENCES OF INTESTINAL DYSBIOSIS

All of the above can damage the intestine's natural defensive barriers leading to:

- Reduced production of **intestinal mucus** which weakens the protective barrier.
- Increased intercellular **separation** allows pathogens and toxins to enter and cause inflammation.
- Intestinal inflammation produces **malabsorption of essential nutrients.**



Gastrointestinal disorders are one of the main reasons for veterinary consultations. Studies estimate that 10 to 20% of dogs taken to a primary veterinary clinic are for a gastrointestinal disorder (1–3). The most common symptoms are nonspecific, such as vomiting or diarrhoea. In most cases, these symptoms resolve following appropriate treatment, but in some cases, the underlying causes can be life-threatening. Acute gastrointestinal disorders are usually of a sudden onset and persist for less than 7 days, whereas chronic conditions produce continuous or intermittent symptoms for at least 7 days, usually for more than 3 weeks.

ACUTE GASTROINTESTINAL DISORDERS

There are multiple causes of acute diarrhoea (AD), including dietary indiscretion, abrupt dietary changes, dietary intolerance and hypersensitivities, stress, medications, such as nonsteroidal anti-inflammatory drugs, and gastrointestinal infections caused by pathogenic bacterial overgrowth (e.g. *Clostridium difficile* or *Escherichia coli*) (4,5). Cases of AD are generally mild, but they can sometimes be more serious, leading to dehydration and gastrointestinal infections (e.g., acute haemorrhagic diarrhoea syndrome) (6)

Vets often recommend food deprivation for a duration that depends on the patient's age, the severity of the symptoms and whether or not there is vomiting, but it is usually for 24 to 36 hours (up to 12 hours for puppies). This period of fasting helps reduce the amount of nutrients that can cause osmotic diarrhoea, minimise fluid losses and decrease the frequency of vomiting. After fasting, normal food should be reintroduced divided across 3-4 meals a day. Prolonged fasting can cause intestinal atrophy, increased gut permeability and other conditions such as dysbiosis (7,8). A highly digestible diet with a low-to-moderate fat content is therefore recommended in order to minimise the secretory effect of malabsorbed fatty acids and bile acids (9).

Some authors have reported an increase in intestinal dysbiosis **(illustrated in Figure 1)** in dogs with AD (10,11). Intestinal dysbiosis is defined as an imbalance in bacterial composition, bacterial metabolic activity and/or bacterial distribution within the gut, which is in turn associated with a diseased state (12). It is commonly measured using

the Dysbiosis Index (DI), where a DI < 0 corresponds to no shift in the overall microbiota diversity and a DI > 0 implies intestinal dysbiosis (0-2 is moderate; > 2 is considered severe) (13,14). Suchodolsky et al. (2012) (10) observed more significant alterations in the microbiome of dogs suffering from AD than those with inflammatory bowel disease (IBD). This increase in the DI can be attributed to the use of antibiotics, as described by several authors (5,14–18). As such, the combination and/or replacement of antibiotics with other approaches designed to restore the gut microbiota, such as probiotics or prebiotics, has developed into a modern therapy for consideration in dogs with acute gastrointestinal disorders, but also in chronic enteropathies (5,19,20).

CHRONIC INFLAMMATORY ENTEROPATHIES

Chronic inflammatory enteropathies (CIEs) are a common and frustrating problem for dogs, pet parents and veterinary surgeons. They are a group of diseases that course with chronic (usually lasting for more than 3 weeks), continuous or intermittent gastrointestinal clinical signs, such as diarrhoea and vomiting. CIEs are usually diagnosed after ruling out any extra-digestive disorders, intestinal parasitosis and digestive neoplasms and infectious diseases (21).

A recent review by Dupouy-Manescau et al., (2024) (20) proposes an evolution of CIEs classification, which are currently classified according to clinical response to treatment; namely, **food-responsive enteropathies (FREs), antibiotic-responsive enteropathies (AREs), immunosuppressant-responsive enteropathies (IREs) and nonresponsive or refractory enteropathies (NREs).** Protein-losing enteropathies (PLEs), i.e., all chronic enteropathies that produce hypoalbuminaemia, were recently included as another group of CIEs, and can be used as a marker of clinical severity. However, a recent review by Dupouy-Manescau et al. (2024) (20) further developed and updated the classification based on three principles (**Figure 2**):

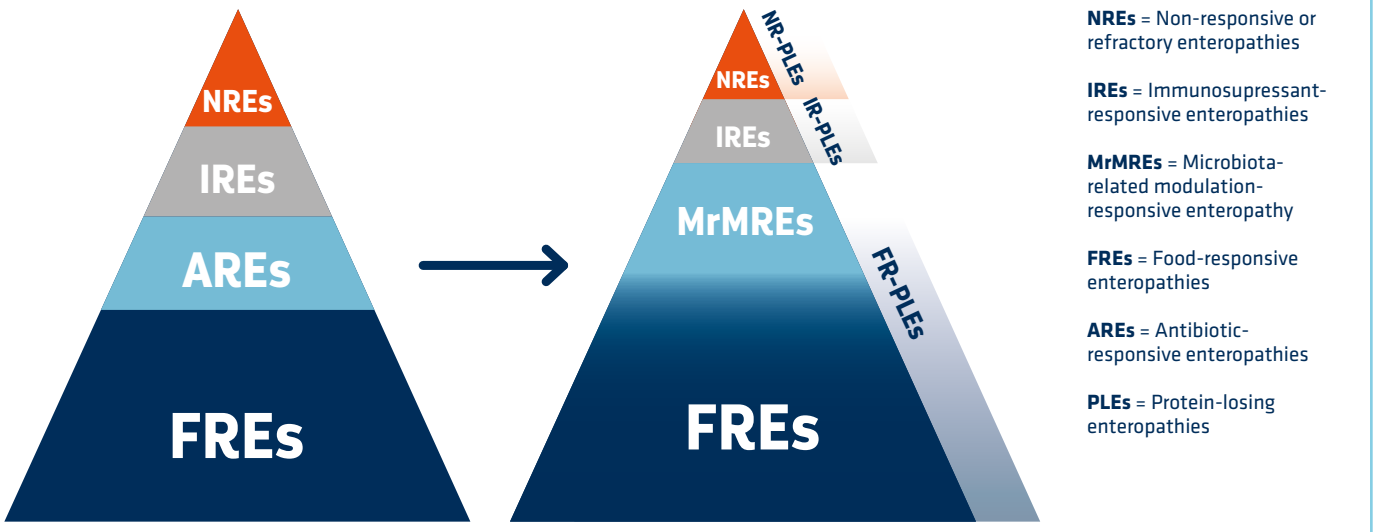
1) **Strengthen the positioning of FREs.** Several studies have shown that a proportion of NREs or IREs are in fact misclassified FREs which means FREs are underestimated (22–25). The studies reinforce the need to perform a dietary evaluation on these patients, e.g., using a hydrolysed and/or low fat and highly digestible veterinary diet, before diagnosing a treatment-refractory chronic enteropathy and as an alternative to further immunosuppressive or anti-inflammatory therapy.

2) **Replacing AREs with microbiota-related modulation-responsive enteropathies (MrMREs).** As described for AD, the use of antibiotics should be gradually decreased or replaced with other approaches focused on the treatment of intestinal dysbiosis. This new category of GI disorders (i.e., MrMREs) includes enteropathies that respond to prebiotics and probiotics, among others. In this scenario, FREs partially overlap with MrMREs (**Figure 2**), as any clinical improvement derived from a dietary change could be attributed to the modulation of the microbiota or another immune or nonimmune mechanism.

3) **Reduction of IREs and NREs.** The ever-increasing proportion of dogs diagnosed with an FRE or MrMRE implies that IREs and NREs actually constitute a minority of CIEs. Moreover, the emergence of new nutritional treatments, e.g., specific pre-, pro- or postbiotics or bile salt sequestrants aimed at restoring the functional microbiota, will reduce the number of dogs diagnosed with an IRE or NRE in the future.

Several strategies have shown some benefits in the nutritional management of dogs with CIEs, such as probiotic (26,27) or synbiotic (28) supplementation; however, the use of diets based on hydrolysed protein, and preferably low in fat, is the most interesting nutritional strategy, at the time of writing, for the long-term management of dogs with CIEs (25,29,30).

FIGURE 2. Development of the classification of chronic inflammatory enteropathies in dogs. Adapted from Dupouy-Manescau, N. *et al.* Updating the Classification of Chronic Inflammatory Enteropathies in Dogs. *Animals* 14, 681 (2024) used under CC by 4.0.



STUDY 1

CLINICAL EVALUATION OF THE NEW ADVANCE VETERINARY DIET GASTROENTERIC AS ADJUVANT DIETARY TREATMENT IN DOGS WITH ACUTE DIARRHOEA

OBJECTIVE

Acute diarrhoea is a common reason why owners seek veterinary care for their dogs. The aim of this randomised, double-blind, placebo-controlled clinical trial was to evaluate the clinical efficacy of a adjuvant dietary treatment (the new AVET Gastroenteric) for the treatment of acute diarrhoea in dogs compared to a highly digestible placebo.

MATERIALS AND METHOD

Dogs (n=113) were recruited from five veterinary practices between November 2023 and February 2024 for inclusion in a randomised, double-blind, placebo-controlled clinical trial.

Eligibility criteria evaluated by the attending vet included acute (<7 days) signs of diarrhoea, with or without concurrent vomiting, a body weight of 4–45 kg, more than 8 months old and the absence of any clinically relevant comorbidities that could be expected to cause secondary diarrhoea (endocrine disorders, organ dysfunction, immune-mediated diseases, suspected pancreatitis based on severe abdominal pain, etc.). Eligibility and complementary examinations were performed at the discretion of the attending vet at the time of presentation and pet parents were informed of the study design and had to sign a consent form to participate in the study. Exclusion criteria were the administration of antibiotics and/or omeprazole and/or glucocorticoids and/or nutritional supplement in the last 4 weeks. Subjects received both the diet and the veterinary examination free of charge. To participate, the owners agreed to answer a questionnaire at the time of presentation and at follow-up, to complete the symptoms diary (mainly observation of all defaecation events), to take part in visits at the beginning and end of the treatment and to provide a faecal sample from their dog at the enrolment visit and after resolution of the symptoms (or after 7 to 9 days in case of no resolution). Owners were contacted by phone 2 days after starting the treatment to check they understood and agree with it and to confirm that their dog's condition had not deteriorated. The vet responsible for recruiting the cases was available at all times by phone if needed.

Dogs were withdrawn from the study if owners did not adhere to the treatment, if any abnormalities were noted, or in light of any post-enrolment laboratory or PCR test results that supported a diagnosis other than uncomplicated diarrhoea.

Based on previous publications, it was estimated that a sample size of between 40 and 110 dogs was necessary to show a difference of 2 days of diarrhoea between the two groups (31,32).

The test diet was the new AVET Gastroenteric, a veterinary diet with a moderate fat content and formulated with:

- **Highly digestible ingredients**: coconut oil (33), hydrolyzed soy (34) yeast (35,36) and plasma immunoglobulins increase the formula's digestibility, favouring rapid nutrient absorption.

- **Fish oil.** Fish oil contains omega-3 long chain polyunsaturated fatty acids which may have a beneficial effect on controlling inflammation in bowel disorders in dogs (37).

- **Prebiotics -fructo-oligosaccharides (FOS)-**. FOS is a type of fibre with beneficial effects for dogs. FOS stimulates the growth of beneficial intestinal bacteria, such as bifidobacteria and lactobacilli, improves gut health and reduces the concentration of putrefaction compounds in faeces and therefore its smell (38,39).

- **Probiotics *-Bacillus velezensis-.*** *Bacillus velezensis*is a live probiotic approved by the EFSA and which has shown different benefits in previous studies in dogs, such as an increase in faecal consistency, gut bacterial diversity and IgA in faeces, and a decrease in ammonia content and C-reactive protein in serum (40–42).

- **Plasma immunoglobulins.** It has been shown that when immunoglobulins from spray-dried porcine plasma are administered orally to dogs they remain active all the way along the digestive system. So it is believed that immunoglobulins transfer passive immunity to the dog's intestine, contributing to their natural defences (43). This is also supported by *in vitro* evidence that immunoglobulins from spray-dried porcine plasma improve gut immunity. One study using canine intestinal cells (44) reported a decrease in the adherence and invasion of enteropathogens following the ingestion of immunoglobulins from spray-dried porcine plasma, which suggests a protective gut effect in dogs.

- **Cellulose and sepiolite.** Thanks to the water-binding capacity of adsorbent additives (e.g., sepiolite) and insoluble fibre (e.g., cellulose) they can help maintain adequate faecal scores, thus improving faecal characteristics and reducing its odour (45,46).

The placebo diet (i.e., control) was a highly digestible super-premium diet, based on chicken and rice, with a higher fat content than the new AVET Gastroenteric diet. None of the above ingredients were included in or added to the placebo diet.

After enrolment (T0), dogs were randomly allocated to placebo (diet A) or the new AVET Gastroenteric diet (diet B). A faecal sample was obtained to assess dysbiosis (via qPCR) at enrolment before starting the diet, T0, and after the resolution of symptoms (13). If the symptoms did not resolve, a faecal sample was taken 7 to 9 days after starting treatment. Similarly, if symptoms and/or dysbiosis were still present after 7-9 days, then dog pet parents were offered the chance to switch their dog's diet to a clearly identified gastrointestinal diet (when possible).

The data were analysed statistically using a t-test (diet effect) and a paired t-test (time effect). A mixed model for repeated measures (diet, time, diet x time) was used to reassess the data for faecal characteristics (frequency, consistency and odour) during the first 9 days.

RESULTS AND DISCUSSION

Both diets had good digestibility. The digestibility of the new AVET Gastroenteric diet complies with EU regulation 2020/354 (Directive 2008/38/EC) for the reduction of intestinal absorptive disorders and compensation for maldigestion.

113 dogs were recruited during the enrolment period and randomised in a double-blind, placebo-controlled trial, with 56 dogs in the placebo group (diet A) and 57 dogs given the new AVET Gastroenteric diet (diet B). There were no differences between the two groups in terms of mean age, body weight (BW) or body condition score (BCS) (diet A: mean age 5 ± 3 y, mean body weight 15 ± 10 kg, mean body condition score 3 ± 0.6; diet B, mean age 5 ± 3 y, mean body weight 15 ± 10 kg, mean body condition score 3 ± 0.3, see Table 1).

Table 1. Number of dogs randomised to each group and response to dietary treatment.

	Diet A	Diet B	p-value (diet effect)
Number of dogs	56	57	
% dogs that improve in < 10 days	89	98	NS
Number of days with symptoms	6.3 ± 1.1	3.6 ± 0.9	0.0001
Mean dysbiosis at T0	-0.38 ± 3.4	-0.49 ± 3.4	NS
Mean dysbiosis after resolution of symptoms or after 7-9 days	0.65 ± 3.1	-1.0 ± 3.0	0.004

Diet A, placebo; Diet B, new AVET Gastroenteric; NS, not significant.

Most dogs (89% on diet A, 98% on diet B) showed improved symptoms (faecal consistency <2) in less than 10 days, **but dogs on diet B had symptoms for significantly fewer days than diet A** (3.6 ± 0.9 vs 6.3 ± 1.1, P<0.0001); corresponding to 2.7 or approximately 50% fewer days with symptoms when using diet B (**Table 1**). In addition, by the time of the follow-up visit, **faecal consistency had improved** more with diet B compared to diet A (0.2 ± 0.5 vs. 1.4 ± 0.8, P<0.0001).

Although it was not a statistically significant difference, the percentage of dogs whose clinical symptoms resolved within 10 days was higher with diet B than diet A. It is possible that more chronic cases were randomised to diet A or that a small percentage of dogs with chronic disease responded better to diet B than diet A, as the formulation and functional ingredients in diet B are intended for dogs with chronic enteropathies (e.g., highly digestible ingredients and/or moderate fat content and/or probiotics and prebiotics).

Dogs fed **AVET Gastroenteric** had symptoms for approximately 50% fewer days

At the follow-up visit, the number of defaecations and faecal consistency as reported by owners (n=113) were better with diet B than with diet A. Looking at the first 9 days of the pet owner - reported clinical symptoms (day 0 to 8), the scores for diet B were better than diet A at all time points (**Figures 3 and 4**; P<0.001). With respect to faecal consistency, a significant clinical improvement was observed after just 24 h for both diets, but it was greater with diet B than diet A. Diet B improved faecal consistency in 24 h, with restoration of formed faeces (faecal consistency <2) within 48 h on average (vs 5 days with diet A) (**Figure 3**). As for faecal frequency, diet B also improved faecal frequency (score = 1) in 48 hours on average (vs 6 days with diet A), with normalisation in 3 days on average (score < 1; **Figure 4**). Symptoms were fully resolved within 3.6 ± 0.9 days on average in dogs given diet B. A score < 1 was only observed with diet A after day 7, so 4 days later than with diet B (average best score with diet A, 0.8 ± 0.6).

Overall, vets and pet parents were more satisfied with diet B than diet A, with a satisfaction score of very good for diet B (Tables 2 and 3).

FIGURE 3. Evolution of faecal consistency

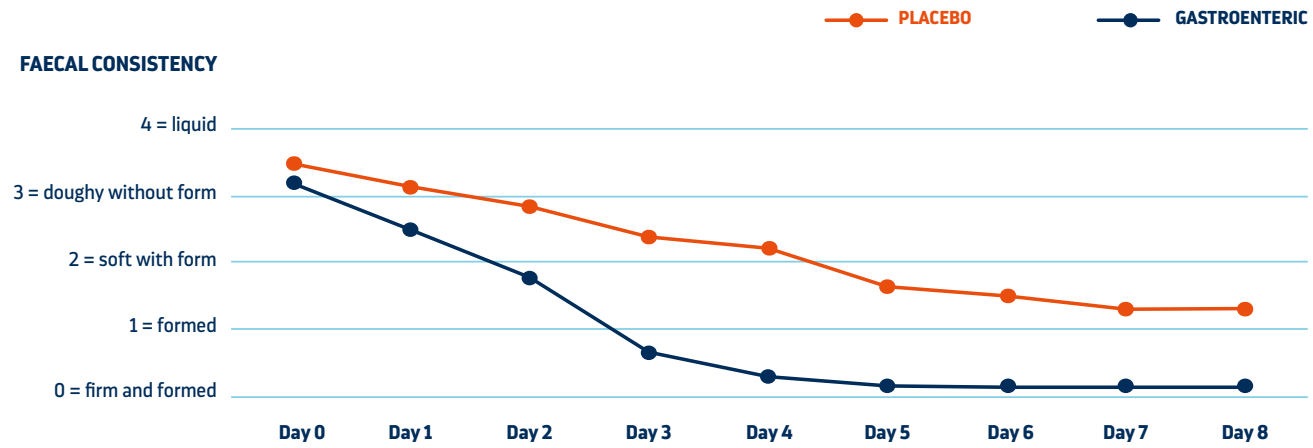


FIGURE 4. Evolution of number of defaecations

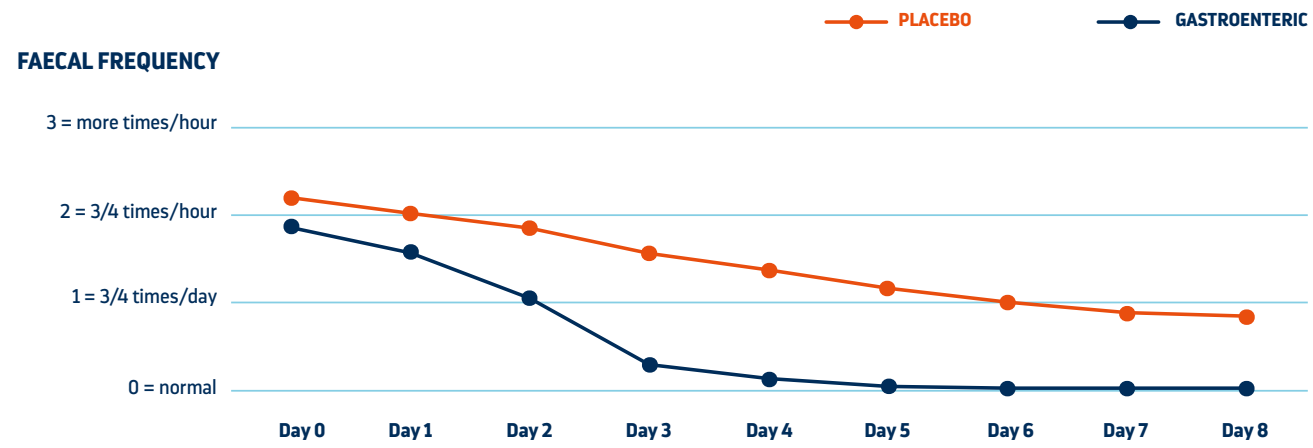


Table 2. Pet parents' satisfaction score for diets A and B.

Diet	Product palatability	Product choice in the future	Satisfaction score
Diet A PLACEBO	7.3 ± 1.20	0.3 ± 0.46	6.3 ± 1.20
Diet B AVET Gastroenteric	8.7 ± 0.70	1.0 ± 0.00	9.1 ± 0.40
p-value	<0.0001	<0.0001	<0.0001

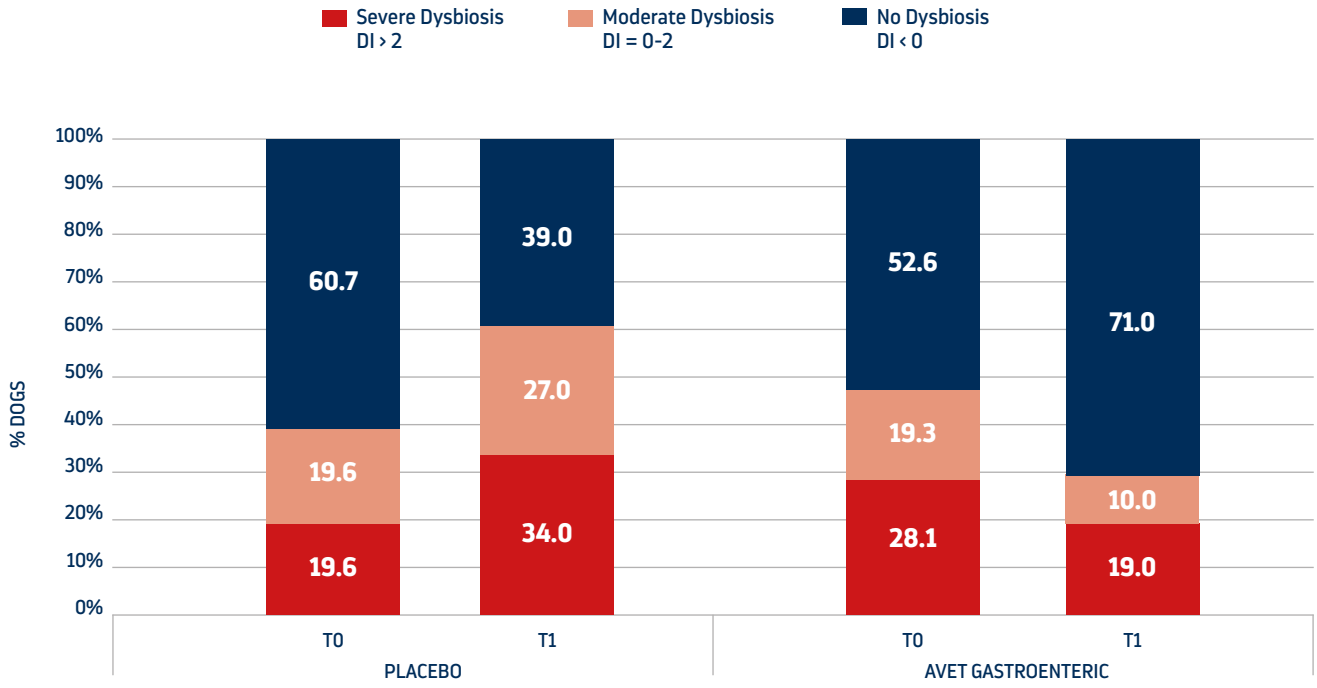
Diet A, placebo; Diet B, new Advance Veterinary Diets Gastroenteric. Product palatability (1-10): 1 = dislike, 10 = like a lot; Product choice for future diarrhoea problems: 0 = no, 1 = yes; Satisfaction score: 1 = dislike, 10 = like a lot.

Table 3. Vets' satisfaction score for diets A and B.

Diet	Product satisfaction	First choice for future diarrhoea problems	Overall effectiveness score
Diet A PLACEBO	0.5 ± 0.50	0.4 ± 0.49	6.1 ± 1.26
Diet B AVET Gastroenteric	1.0 ± 0.00	1.0 ± 0.00	9.1 ± 0.50
p-value	<0.0001	<0.0001	<0.0001

Diet A, placebo; Diet B, new Advance Veterinary Diets Gastroenteric; NS, not significant. Product satisfaction: 0 = no, 1 = yes; First choice for future diarrhoea problems: 0 = no, 1 = yes; Overall effectiveness score (1-10): 1 = dislike, 10 = like a lot.

FIGURE 5. Dysbiosis index (DI) at T0 and T1 (follow-up visit).



At T0, 40% of dogs in group A and 47% in group B had some degree of dysbiosis (Figure 5, Table 1).

By the follow-up visit (T1), the number of dogs with dysbiosis had increased with diet A (61% at T1 vs. 40% at T0) and decreased with diet B (29% at T1 vs. 47% at T0). That means that dogs given diet B had halve the relative risk (p=0.002) and were 3.6 less likely (p=0.0012) to have dysbiosis than with diet A at follow-up (Table 1, Figure 5). At T1, after being fed with diet B, the relative risk and odds of having dysbiosis were 1.6 (p=0.06) and 2.1 (p=0.056) times less compared to T0. **Thus, dogs fed with AVET Gastroenteric had halve the risk of intestinal dysbiosis compared to the control group.**

The use of antibiotics in dogs with gastrointestinal disorders is controversial, especially considering antibiotic resistance and its negative effect on the intestinal microbiome. On top of that, the scientific literature **does not reveal any clinically relevant effects derived from the use of antibiotics in dogs with acute diarrhoea**(17). Therefore, the inclusion of prebiotics and probiotics might be promising alternatives to antibiotics, as reported by several authors (5,32,47). Moreover, the whole formulation of the new AVET Gastroenteric canine diet is the key to the quick recovery of dogs given this diet. **Dogs fed AVET Gastroenteric improve faecal consistency within just 24 h, restoring formed faeces (improve diarrhoea) in 48 h. This means a reduction to half the number of days with diarrhoea, 2.7 days fewer, compared to the placebo diet. In addition, dogs fed with AVET Gastroenteric achieve considerably fewer defaecations in 48 h and recover a normal frequency in 72 h.**

The consequences of the symptoms associated with acute gastrointestinal problems are hard to manage and very frustrating for both dogs and pet parents. Dogs with acute uncomplicated diarrhoea fed with AVET Gastrointestinal will quickly recover their regular intestinal transit and the pet parent will notice the difference in a few days.

In the present study, the inclusion of prebiotics and probiotics (i.e., FOS and live *Bacillus velezensis*) helped balance the gut microbiota of dogs.

This study shows that AVET Gastroenteric:

- Improves faecal consistency within 24 h
- Restores formed faeces in 48 h
- Recovers normal faecal frequency in 72 h
- Halves the number of days with diarrhoea

STUDY 2

DIETARY MANAGEMENT OF DOGS WITH CHRONIC INFLAMMATORY ENTEROPATHIES USING A HIGHLY DIGESTIBLE OR A HYDROLYSED HYPOALLERGENIC LOW FAT DIET

This study is part of Dr Andrea Lynch's PhD titled, "A study of dietary modulation in canine inflammatory enteropathies", carried out at the Small Animal Hospital at the School of Veterinary Science, University of Bristol (United Kingdom).

OBJECTIVE

Dogs are often brought to small animal practices with signs of diarrhoea, vomiting and abdominal discomfort or pain. For many of these dogs the symptoms are long-standing, and their management is frequently frustrating for patients, pet parents and clinicians alike. The aim of this study was to assess the use of a hydrolysed hypoallergenic low fat diet – Advance Veterinary Diets (AVET) Hypoallergenic (HA) – or a highly digestible diet (HD) in the management of chronic, inflammatory enteropathy in dogs.

MATERIALS AND METHOD

All dogs referred to the Small Animal Hospital at the School of Veterinary Science, University of Bristol, for study and treatment of chronic gastrointestinal disease (of at least 3 weeks and up to 2 years duration) were considered for inclusion in the clinical trial after other structural and metabolic causes of disease were excluded. Selection criteria included the presence of chronic diarrhoea, defined as diarrhoea of at least 3 weeks duration, with any combination of vomiting, anorexia, weight loss, poor growth, nausea, borborygmi and abdominal pain. Exclusion criteria were concurrent metabolic or neoplastic diseases and the dog's refusal to eat dry food.

The veterinary team used one of two diets to treat the dogs with chronic gastrointestinal disease:

- A diet based on hydrolysed soy protein with an average molecular weight of <13 kDa and maize starch with no protein residues (AVET Hypoallergenic, HA); and
- A highly digestible (HD) diet.

All cases were assessed at the initial visit (T0) and again at follow-up (T1), which was carried out once the clinical signs had resolved and the body weight and body condition score (BCS) had plateaued for 2–4 weeks and never sooner than 6 weeks after the initial presentation. A questionnaire was developed and used to assess all cases at both visits. At these visits, the subjects' body weight and BCS (Body Condition Score) were recorded and they were photographed from lateral and dorsal views where possible (see an example of one dog's evolution in **Figure 6**). While participating in the trial, owners were asked to monitor their dogs closely and keep daily diaries of faecal patterns and scores, demeanour and behaviour, pruritus, appetite, amount of food eaten, any adverse clinical signs and weight measurements. In most cases, a biopsy was performed at T0 to assess the degree of inflammation in intestinal mucosal samples.

FIGURE 6. Evolution of Lewi before (A) and after 7 months (B) on the Advance Veterinary Diets Hypoallergenic in combination with fenbendazole.

A

B

RESULTS

Of 71 dogs referred to the clinic, 42 met the chronic enteropathy inclusion criteria. All subjects were initially treated with fenbendazole to eliminate parasites; dogs who had not been fed an exclusion diet before were given the HA diet, while those who had previously failed to show clinical improvement with a hydrolysed protein diet were given the HD diet.

Of the 42 dogs with chronic diarrhoea who underwent a biopsy for diagnosis:

- **Seven dogs showed no signs of inflammation (17%):**
  Five received the HA diet with or without antibiotics and/or fenbendazole. All responded positively to the treatment (12% of all subjects). Two dogs received the HD diet, one of whom was also given antibiotics and fenbendazole. They responded positively to the HD diet, but the second subject developed severe myasthenia gravis and was withdrawn from the study.

- **Thirty dogs showed mild-to-severe inflammation (71%):**
  Twenty of whom received the HA diet alone or associated with fenbendazole and/or antibiotics and/or prednisolone. All responded positively to the HA diet, but one was lost to follow-up, one left due to orthopaedic problems and one was withdrawn from the study because of an underlying cardiac problem.
  Ten dogs received the HD diet either with or without fenbendazole and/or antibiotics and/or immunosuppressants. One with suspected pancreatitis was withdrawn from the study and two left the trial without improvement. The other seven dogs responded positively to the treatment.

- **Five dogs had lymphangiectasia (12%):**
  Three responded positively to the HA diet and fenbendazole and immunosuppressive therapy.

Of the 42 dogs initially enrolled, 33 completed the study (25 dogs fed the HA diet and 8 given the HD diet):

- 19 dogs (59%) were considered truly food-responsive.
- 9 dogs (27%) were considered food-responsive with a positive outcome when treatment was associated with gastroprotectants and analgesics (n=4, 12%) or with one shot of metronidazole (n=5, 15%).
  These two groups represented almost 85% of the cases – 23 dogs on the HA diet (92% of all dogs on the HA diet) and 5 dogs with the HD diet (62.5% of all dogs given the HD diet).
- 4 dogs (12% of all subjects) were considered as non-food-responsive and needed antibiotics and/or steroids.
- 1 dog did not respond to any treatment.

On average, the subjects experienced a 12% gain in body weight.

POST-TREATMENT BIOPSIES

Twelve dogs (n=12, 7 receiving the HA diet and 5 on the HD diet) were considered for further assessment through pre- and post-treatment duodenal biopsies, the canine chronic enteropathy clinical activity index (CCECAI) and histopathology scores, and following World Small Animal Veterinary Association (WSAVA) protocols.

On the one hand, the WSAVA protocols consist of a numerical score (0 = normal, 1 = mild, 2 = moderate, 3 = severe) assigned to each architectural change and inflammatory cell infiltrate found in each biopsy sample. Hence, a cumulative numerical score can be ascribed to the degree of inflammation observed in intestinal mucosal samples, with total scores of 1–8 considered mild, 9–16 moderate and 17–24 severe (48). On the other hand, the CCECAI is used to measure each dog's attitude/activity, appetite, vomiting, stool consistency, stool frequency, weight loss, albumin level, the presence of ascites or peripheral oedema and pruritus. For the CCECAI, a total score of 0–3 again represents insignificant disease, whilst a score of ≥12 corresponds to very severe disease

The average WSAVA score fell from 3.08 pre-treatment to 1.75 post-treatment, although this difference was not statistically significant when analysed with Student's t-test (p=0.1121; **Figure 7**). There were no significant differences between the pre- and post-treatment biopsy samples either in the HA diet group (p=0.7970) or in the GE diet group (p=0.0887). For these 12 dogs, there was a significant difference between pre- and post-treatment CCECAI scores (p=0.0002). All owners of these patients reported at least a 90% improvement in CCECAI within 12 weeks (range: 2 days–12 weeks). These subjective findings were associated with an improvement in faecal score, body condition score and biochemical analysis. There was a significant difference between the pre- and post-treatment CCECAI scores for the seven dogs fed the HA diet (p=0.0002). Similarly, there was a significant difference in the pre- and post-treatment CCECAI scores for the five dogs given the HD diet (p=0.0054; **Figures 8A** and **8B**).

FIGURE 7. Change in WSAVA duodenal scores pre- and post-treatment for 12 dogs.

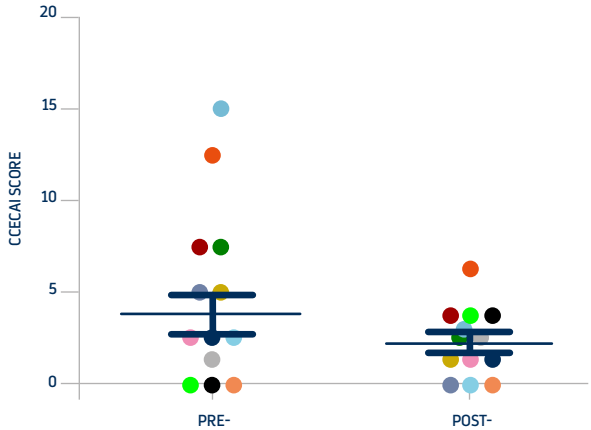
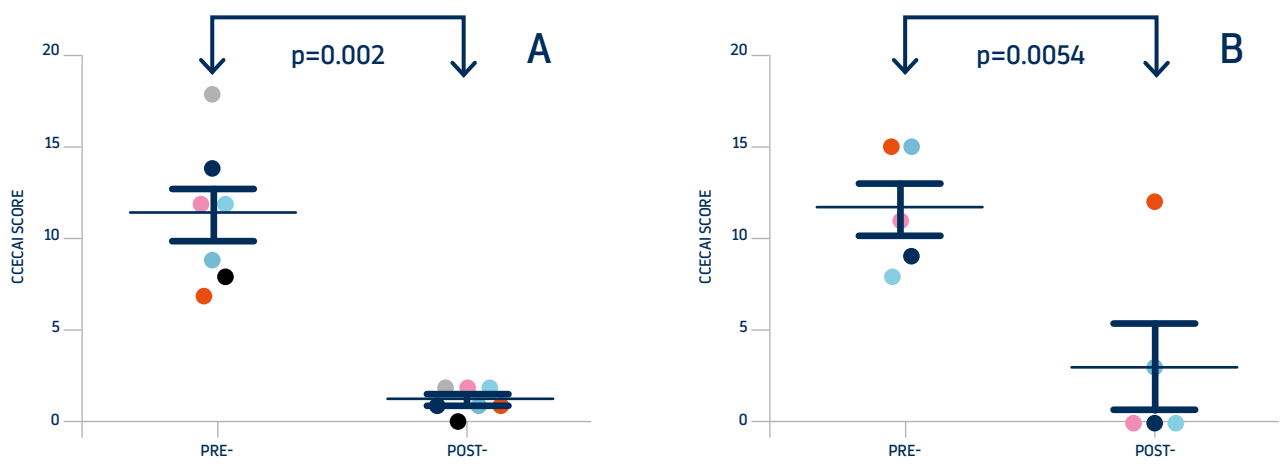


FIGURE 8. Pre- and post-treatment CCECAI scores for 7 dogs fed with theHA (A, Advance Veterinary Diets Hypoallergenic) and HD DIETS (B, Highly Digestible Diet).



HA Diet = A = AVET Hypoallergenic

HD diet =B = Highly digestible diet

From the results, **the authors concluded that the use of hydrolysed diets with a low fat content can be highly effective for the long-term management of chronic enteropathies in dogs.** A possible explanation for this outcome is the lower immunogenicity of the HD diet, in addition to its high digestibility (50). Alternatively, the diet's relatively low content of dietary fat content could also improve the signs of secretory or osmotic diarrhoea in dogs with inflammatory enteropathies and secondary lymphangiectasia (22). Last but not least, hydrolysed protein diets are also associated with an improved microbiota structure in dogs with chronic inflammatory enteropathies (51).

AVET Hypoallergenic is highly effective for the long-term management of chronic enteropathies in dogs thanks to the inclusion of hydrolysed proteins and its low fat content.

TAKE-HOME MESSAGES (CONCLUSIONS OF STUDIES 1 AND 2)

This clinical report presents an updated approach to enteropathies in dogs. Our recent study shows that **AVET Gastroenteric** is a first-choice solution for the treatment of diarrhoea. If the clinical signs do not remit completely within 3 weeks, we recommend switching to the **AVET Hypoallergenic** diet, which our study has shown to be effective in 92% of cases.

A dietary intervention should be attempted before beginning any antibiotic or immunosuppressant therapy. Moreover, new treatments intended to restore a functional microbiota, such as specific pre-, pro- or postbiotics, are emerging as options to reduce the number of dogs who require immunosuppression or who do not respond to any treatment.

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