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Topic Overview

Adverse food reactions (AFRs) in dogs and cats typically manifest with cutaneous or gastrointestinal clinical signs. Although AFRs can be managed with an appropriate diet, choosing an appropriate diet to use in a diagnostic diet trial can be complicated. This article provides an overview of hydrolyzed and amino acid–based diets and a guide to options for diagnostic diet trials and long-term management of AFRs.

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NUTRITION

Hydrolyzed Protein and Amino Acid–Based Diets for Management of Adverse Cutaneous or Gastrointestinal Food Reactions

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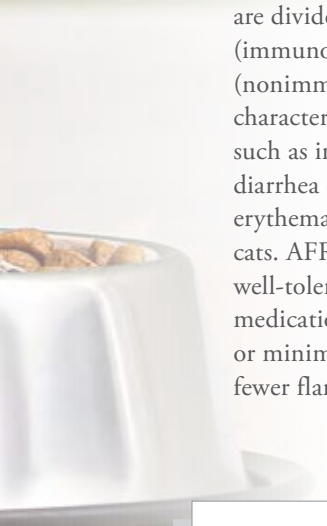
The Pets Table



"Let food be thy medicine and medicine be thy food." This saying, attributed to Hippocrates, could also be the answer to managing patients with adverse food reactions (AFRs). AFRs, which are divided into food allergy or hypersensitivity (immunologic) or food intolerance (nonimmunologic) reactions, are typically characterized by either gastrointestinal (GI) signs such as inappetence, vomiting, bloating, and diarrhea or cutaneous signs such as pruritus, erythema, and altered hair growth in dogs and cats. AFRs can be clinically managed with a well-tolerated diet, often resulting in fewer medications needed to treat secondary infections or minimize clinical signs and, hopefully, in fewer flares and negative outcomes.

Diagnosis of an AFR requires a strict elimination diet trial using an appropriate diet. Such diets typically fall into 3 broad categories: veterinary therapeutic hydrolyzed protein diets, veterinary therapeutic limited-ingredient diets, and complete and balanced home-cooked diets. Each type of diet has benefits and drawbacks; the latter 2 categories require a very thorough diet history to ensure a novel protein and/or novel carbohydrate is used. Complete and balanced home-cooked diets also require a board-certified veterinary nutritionist to formulate the diet to ensure appropriateness for the patient, as well as strict client adherence to the recipe provided (**BOX 1**).

Learning Objectives

- Hydrolyzed and amino acid–based diets are important tools for diagnosing and managing adverse food reactions in dogs and cats.
- Appropriate diet choice depends on clinical signs and individual patient factors.
- A strict elimination diet trial for diagnostic purposes typically requires between 4 and 12 weeks.
- Diet factors and individual factors affect success.
- Practical factors such as cost, availability, and palatability also impact long-term adherence to specialized diets.

BOX 1 Recommended Resources

- European College of Veterinary and Comparative Nutrition
  ecvcn.org
- Schmid SM, Galloni AM. Hold that steroid! Diet trials for chronic enteropathy. *Todays Vet Pract*. 2022;12(3):26-31.
- Veterinary specialists (including board-certified veterinary nutritionists)
  vetspecialists.com
- Wilson S, Datz C. Performing a diet trial to identify food allergies in dogs and cats. *Todays Vet Pract*. 2020;10(6):20-24.

Given that completely accurate diet histories are not always possible, that successfully identifying truly novel protein and carbohydrate diets can be difficult, and that clients may not adhere to home-cooked recipes ("diet drift"),[1] veterinary therapeutic hydrolyzed protein diets can be excellent tools in the clinician's diagnostic and treatment toolbox.

HYDROLYZED PROTEIN DIETS

The main goal of hydrolyzing a protein is to break it down to a size that removes existing allergens, thereby avoiding recognition by patients sensitized to the intact protein.[2] Briefly, hydrolysis is a reasonably reliable way to reduce antigenicity of a protein molecule by using proteolytic enzymes to cleave peptide bonds. The degree to which the resultant hydrolysate stimulates a response depends on the site of action within the peptide chain. In a hydrolyzed protein diet, all intact proteins and larger polypeptides are ideally processed into small peptides, typically < 13 kDa (low–molecular-weight proteins). **TABLES 1 AND 2** list currently available commercial veterinary therapeutic hydrolyzed protein diets for dogs and cats, respectively.

While some protein sources are obvious (i.e., animal proteins), carbohydrate sources also contain protein (**TABLE 3**), and protein allergens from 67 to 145 kDA have even been detected in refined vegetable oils.[3] Thus, the fat and carbohydrate sources in hydrolyzed protein diets may also contribute allergens, and all the ingredients in any diet should be considered when assessing clinical response. Some hydrolyzed diets are extensively hydrolyzed with the goal of ensuring fewer allergens and reduced clinical signs.[4,5] However, even these diets may retain allergens that cause AFRs in some individuals, at which point a trial using a different diet, often with a different protein source, is recommended.

In selecting an elimination trial diet, carbohydrate sources should also be considered. The most commonly reported sources of food allergies in dogs and cats include animal proteins and some carbohydrates (**TABLE 4**)[6]; therefore, it is worth noting that some hydrolyzed diets offer only the carbohydrate portion of the carbohydrate source (e.g., corn starch, tapioca starch, potato starch, rice starch). Even so, in human nutrition studies, maize zeins—proteins of 20 to 23 kDa—have been detected in an extensively hydrolyzed casein hydrolysate infant formula that used corn starch as the carbohydrate source.[7]

When selecting a hydrolyzed diet, the author prefers diets that use only hydrolyzed proteins (ideally single source) and either isolated carbohydrate sources or rice, as this limits potential confounding factors in the diagnostic process. Some hydrolyzed formulas include plant proteins, but these proteins should still be hydrolyzed to limit antigenicity; thus, some diet formulations that provide hydrolyzed animal protein sources and isolated (but not hydrolyzed) plant protein sources are less preferred by the author.

AMINO ACID–BASED DIETS

In an effort to further minimize antigenicity, some diets provide protein in the form of individual amino acids rather than the small polypeptides in hydrolyzed diets (oligomeric) or intact proteins (polymeric) in other diets. The advent of these elemental (monomeric) diets in veterinary medicine stems from elemental diet use in human medicine.

Elemental diets have been used in human nutrition for more than 50 years to manage several disease processes, including eosinophilic esophagitis, eosinophilic gastroenteritis, inflammatory bowel disease, small intestinal bacterial overgrowth, intestinal methanogen overgrowth, chemoradiotherapy-associated mucositis, and celiac disease.[8] In veterinary nutrition, elemental diets have been used to improve clinical signs in chronic enteropathy and cutaneous AFRs and as prophylaxis for dogs undergoing pelvic radiation therapy.[9-11] However, elemental diets have been associated with palatability issues in both human and veterinary patients.

While human liquid elemental diets may be used in veterinary patients in short-term clinical settings, they are not complete and balanced for dogs and cats, and significant essential nutrient deficiencies could lead to poor and potentially fatal outcomes even with short-term use, depending on the human formulation. Supplementation of human products with at least taurine, arginine, and B vitamins is necessary when used longer term.

Use of a complete and balanced elemental diet appropriate for dogs and cats could help particularly sensitive patients that do not respond to hydrolyzed diets. However, only 1 amino acid–based complete and balanced veterinary diet currently exists on the market (Pro Plan Veterinary Diets EL Elemental dry dog food; Purina, proplanvetdirect.com), and there have been difficulties with its distribution and access.

CLINICAL STRATEGIES FOR DIET SELECTION

Trial and error is often required to identify the cause of AFRs in patients with GI or cutaneous signs, and owners must be clearly informed that multiple attempts may be necessary to determine the best diet option. However, diagnosis and treatment can go hand in hand if diet selection is successful. In a successful diet trial, GI signs typically improve within 2 to 3 weeks, while cutaneous signs usually improve within 4 to 12 weeks.[12]

The following sections outline clinical strategies for selecting diets for patients with various conditions.

Cutaneous Adverse Food Reactions

Diet history can help guide hydrolyzed protein choice, as many clinicians prefer to choose proteins that are both novel and hydrolyzed (if possible) for elimination diet trials and long-term management. Patients with cutaneous AFRs may benefit from recipes with higher eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) content (all other factors and comorbidities considered), as these omega-3 fatty acids provide anti-inflammatory support for skin health.

Clients should expect diet trials for patients with cutaneous AFRs to run at least 4 weeks and up to 8 to 12 weeks.[12] These patients typically take longer to respond even when the ideal trial diet is selected; thus, clients should be counseled to be consistent and follow through to at least 4 weeks. If no improvement in clinical signs is seen and secondary infection/inflammation has been addressed, an alternative diet should be trialed.

Gastrointestinal Adverse Food Reactions (Small Bowel)

Hydrolyzed or elemental diets with low total dietary fiber (TDF) content (8 to 20 g/1000 kcal) make good first-line trial options for patients with small bowel GI AFRs. If a diet history is available, a hydrolyzed formula of a protein known to be novel or tolerated should be considered. Some patients may respond to higher fiber content, and higher-fiber options can be tried gradually if low-residue recipes are unsuccessful.

Gastrointestinal Adverse Food Reactions (Large Bowel)

Hydrolyzed diets with high TDF content (> 25 g/1000 kcal) are good first-line trial options for patients with large bowel GI AFRs. Only 1 currently available commercial diet has very high fiber content (Canine Satiety + Hydrolyzed Protein; Royal Canin, royalcanin.com [110 g TDF/1000 kcal]). If a diet history is available, a hydrolyzed formula of a protein known to be novel or tolerated should be considered.

If a hydrolyzed diet is adequately tolerated but stool quality remains poor, additional supplementation of fiber (e.g., psyllium husk) may be beneficial (**BOX 2**). Fiber supplements should be introduced gradually, mixing 1 part fiber with at least 3 parts water. Fresh water should be available to the patient at all times. While specific dosing has not been established, varied

BOX 2 Fiber Supplementation Options

- **Low-level inclusion:** ~0.2 g psyllium/kg/day[13]
- **Mid-level inclusion:** ~1.3 g psyllium fiber/kg/day[14]
- **High-level inclusion:** ~4 g psyllium husk/kg/day[15]
- **Psyllium husk fiber powder:** 1–2 tsp per 9 kg (20 lb) PO q12–24h[16]
- **Powdered cellulose[16]:**
  - **Small dogs:** 1–2 g PO q12–24h
  - **Medium to large dogs:** 3–4 g PO q12–24h

TABLE 1 Veterinary Therapeutic Hydrolyzed Protein and Amino Acid–Based Diets and Treats for Dogs

DIET	NUTRIENT ME, G/1000 KCAL (% ME)[a]		
	PROTEIN	FAT	CHO
BLUE Natural Veterinary Diet HF Hydrolyzed for Food Intolerance, dry[b]	72 (26%)	37 (33%)	123 (41%)
BLUE Natural Veterinary Diet HF Hydrolyzed for Food Intolerance, canned[b]	104 (41%)	25 (24%)	122 (36%)
Hill's Prescription Diet z/d, dry[b]	51 (18%)	37 (32%)	144 (50%)
Hill's Prescription Diet z/d Small Bites, dry[b]	51 (18%)	38 (32%)	143 (50%)
Hill's Prescription Diet z/d, canned[b]	50 (18%)	39 (33%)	140 (49%)
Hill's Prescription Diet z/d Low Fat, dry[b]	77 (27%)	21 (18%)	158 (55%)
Hill's Prescription Diet z/d Low Fat, canned[b]	81 (28%)	25 (22%)	143 (50%)
Hill's Prescription Diet Hypo Treats	47 (17%)	31 (26%)	164 (57%)
Purina Pro Plan Veterinary Diets EL Elemental, dry[c]	69 (22%)	27 (24%)	154 (54%)
Purina Pro Plan Veterinary Diets HA Hydrolyzed (Vegetarian), dry[b]	57 (20%)	28 (24%)	159 (56%)
Purina Pro Plan Veterinary Diets HA Hydrolyzed (Chicken Flavor), dry[b]	56 (20%)	33 (28%)	148 (52%)
Purina Pro Plan Veterinary Diets HA Hydrolyzed (Chicken Flavor), canned[c]	77 (27%)	36 (31%)	121 (42%)
Purina Pro Plan Veterinary Diets HA Hydrolyzed (Salmon Flavor), dry[c]	66 (23%)	33 (28%)	138 (49%)
Royal Canin Veterinary Diet Ultamino, dry[b]	46 (17%)	42 (37%)	125 (46%)
Royal Canin Veterinary Diet Hydrolyzed Protein HP, dry[b]	52 (20%)	47 (43%)	106 (37%)
Royal Canin Veterinary Diet Hydrolyzed Protein, loaf[b]	83 (23%)	41 (34%)	111 (43%)
Royal Canin Veterinary Diet Hydrolyzed Protein PS, dry[b]	56 (21%)	32 (29%)	135 (50%)
Royal Canin Veterinary Diet Hydrolyzed Protein Moderate Calorie, dry[b]	62 (23%)	32 (29%)	127 (48%)
Royal Canin Veterinary Diet Hydrolyzed Protein Small Dog, dry[b]	62 (23%)	41 (37%)	106 (40%)
Royal Canin Veterinary Diet Hydrolyzed Protein Treats	62 (23%)	41 (37%)	106 (40%)
Royal Canin Veterinary Health Nutrition Hydrolyzed Protein Puppy, dry[c]	57 (21%)	47 (42%)	99 (37%)
Royal Canin Veterinary Diet Urinary SO + Hydrolyzed Protein, dry[b]	53 (20%)	40 (35%)	122 (45%)
Royal Canin Veterinary Diet Satiety + Hydrolyzed Protein, dry[b]	120 (37%)	38 (29%)	110 (34%)
Royal Canin Veterinary Diet Renal Support + Hydrolyzed Protein, dry	34 (13%)	47 (41%)	127 (46%)
Royal Canin Veterinary Diet Gastrointestinal Low Fat + Hydrolyzed Protein, dry[b]	71 (27%)	20 (18%)	146 (55%)

CHO = carbohydrate; DHA = docosahexaenoic acid; EPA = eicosapentaenoic acid; ME = metabolizable energy; n/a = not available; TDF = total dietary fiber.
[a] Values provided from historical Blue Buffalo (bluebuffalo.com), Hill's (hillspet.com), Purina (purina.com), and Royal Canin (royalcanin.com) product guides. Diets are subject to change; thus, it is recommended that clinicians verify nutrient content of current products with the manufacturer.
[b] Diet is for maintenance of adult dogs.
[c] Diet is for growth of dogs (including growth of large-breed dogs).

NUTRIENT, G/1000 KCAL[a]		INGREDIENT SOURCES	
EPA AND DHA	TDF	PROTEIN	CARBOHYDRATE
1.2	25	Hydrolyzed salmon, pea protein	Pea starch, potatoes, potato starch
1.8	12	Hydrolyzed salmon	Potato starch
n/a	17	Hydrolyzed chicken, hydrolyzed chicken liver	Corn starch
n/a	17	Hydrolyzed chicken, hydrolyzed chicken liver	Corn starch
n/a	27	Hydrolyzed chicken liver	Corn starch
n/a	26	Hydrolyzed soy protein	Corn starch
n/a	27	Hydrolyzed soy protein	Corn starch
n/a	19	Hydrolyzed chicken liver	Corn starch
0.5	5.8	Elemental diet (individual amino acids)	Corn starch, tapioca starch
0	12	Hydrolyzed soy protein	Corn starch
0	11	Hydrolyzed soy protein, hydrolyzed chicken, hydrolyzed chicken liver	Corn starch
0.4	48	Hydrolyzed soy protein, hydrolyzed chicken liver	Pea starch
0.3	10	Hydrolyzed soy protein, hydrolyzed salmon	Corn starch
0.6	15	Hydrolyzed poultry byproducts aggregate (feathers)	Corn starch
0.8	15	Hydrolyzed soy protein	Rice
1.3	57	Hydrolyzed chicken liver, hydrolyzed soy protein	Pea starch
1.1	20	Hydrolyzed soy protein, potato protein	Potato
0.8	12	Hydrolyzed soy protein	Rice
0.8	11	Hydrolyzed soy protein	Rice
0.9	11	Hydrolyzed soy protein	Rice
0.8	12	Hydrolyzed soy protein	Rice
1	18	Hydrolyzed soy protein	Rice
1.6	112	Hydrolyzed soy protein	Rice
1.2	16	Hydrolyzed soy protein	Rice
0.4	17	Hydrolyzed soy protein	Rice

TABLE 2 Veterinary Therapeutic Hydrolyzed Protein Diets and Treats for Cats

	NUTRIENT ME, G/1000 KCAL (% ME)[a]			NUTRIENT, G/1000 KCAL[a]		INGREDIENT SOURCES	
DIET	PROTEIN	FAT	CHO	EPA AND DHA	TDF	PROTEIN	CARBOHYDRATE
BLUE Natural Veterinary Diet HF Hydrolyzed for Food Intolerance, dry[b]	93 (34%)	41 (37%)	99 (28%)	1.2	18	Hydrolyzed salmon, pea protein	Peas, potatoes, pea starch
BLUE Natural Veterinary Diet HF Hydrolyzed for Food Intolerance, canned[b]	116 (45%)	26 (25%)	107 (31%)	2.5	12	Hydrolyzed salmon	Potato starch
Hill's Prescription Diet z/d Original Flavor, dry[b]	87 (30%)	41 (35%)	99 (35%)	n/a	11	Hydrolyzed chicken liver, rice protein concentrate	Rice
Hill's Prescription Diet z/d Original Flavor, canned[b]	83 (29%)	43 (37%)	98 (34%)	n/a	7	Hydrolyzed chicken liver	Corn starch
Purina Pro Plan Veterinary Diets HA Hydrolyzed, dry[c]	103 (37%)	33 (28%)	100 (35%)	0.8	16	Hydrolyzed soy protein, hydrolyzed chicken liver	Rice starch
Royal Canin Veterinary Diet Ultamino, dry[b]	63 (23%)	43 (38%)	107 (39%)	0.9	20	Hydrolyzed poultry by-products aggregate (feathers)	Corn starch
Royal Canin Veterinary Diet Gastrointestinal Hydrolyzed Protein, dry[b]	77 (23%)	50 (43%)	77 (34%)	1	26	Hydrolyzed soy protein	Rice
Royal Canin Veterinary Diet Hydrolyzed Protein HP, dry[b]	63 (23%)	50 (43%)	94 (34%)	0.8	20	Hydrolyzed soy protein	Rice
Royal Canin Veterinary Diet Hydrolyzed Protein Treats	63 (23%)	49 (43%)	94 (34%)	0.8	20	Hydrolyzed soy protein	Rice
Royal Canin Veterinary Diet Urinary SO + Hydrolyzed Protein, dry[b]	71 (26%)	42 (38%)	100 (36%)	1	26	Hydrolyzed soy protein	Rice
Royal Canin Veterinary Diet Satiety + Hydrolyzed Protein, dry[b]	107 (39%)	30 (27%)	92 (34%)	0.6	75	Hydrolyzed soy protein	Rice
Royal Canin Veterinary Diet Renal Support + Hydrolyzed Protein, dry	63 (23%)	49 (43%)	94 (34%)	1	23	Hydrolyzed soy protein	Rice

CHO = carbohydrate; DHA = docosahexaenoic acid; EPA = eicosapentaenoic acid; ME = metabolizable energy; n/a = not available; TDF = total dietary fiber.
[a]Values provided from historical Blue Buffalo (bluebuffalo.com), Hill's (hillspet.com), Purina (purina.com), and Royal Canin (royalcanin.com) product guides. Diets are subject to change; thus, it is recommended that clinicians verify nutrient content of current products with the manufacturer.
[b]Diet is for maintenance of adult cats.
[c]Diet is for growth of cats.

TABLE 3 Common Carbohydrate Ingredients in Hydrolyzed Pet Foods

INGREDIENT	% ME PROTEIN	% ME FAT	% ME CARBOHYDRATE
Tapioca, pearl, cooked	0.14	0.05	99.81
Sweet potato, baked	6.19	1.39	92.42
White potato, baked	6.34	1.36	92.29
Barley, pearled, cooked	6.51	2.99	90.5
Brown rice, cooked	7.93	6.79	85.28
White rice, cooked	7.92	1.81	90.27
Corn, cooked	8.69	13.11	78.2
Peas, cooked	23.34	6.11	70.55

ME = metabolizable energy

TABLE 4 Reported Sources of Food Allergies in Dogs and Cats[6]

SPECIES	COMMON INGREDIENTS	UNCOMMON INGREDIENTS
Dog	Beef, dairy, chicken, wheat, soy	Fish, lamb, pork, rabbit
Cat	Beef, fish, chicken	Barley, egg, lamb, pork, rabbit, wheat

inclusion rates have been found to be beneficial. In addition, not all fiber is created equally. Solubility, fermentability, and amount all affect each individual differently; thus, trial and error may be necessary and alternate fiber sources (e.g., insoluble fibers such as cellulose) may be considered as well. It is vital to communicate to clients that gradually increasing fiber supplementation to evaluate tolerance will allow for a more successful outcome. Mixing the fiber supplement into a small amount of unsweetened, unflavored applesauce can help with palatability and further increase moisture intake.

Fat Intolerance

For patients with pancreatitis, hyperlipidemia, or lymphangiectasia, formulas that are lower in fat compared with current diet/intake should be used. The best low-fat diet options have fat contents < 35 g/1000 kcal for cats and < 25 g/1000 kcal for dogs (although cats are less susceptible to fat content than dogs). Lower-fat hydrolyzed formulas are available in dry and canned formats. The available elemental diet is fat controlled but may not be adequately fat restricted.

Patients with lymphangiectasia usually require lower-fat recipes than are currently available in hydrolyzed or elemental diets and may benefit from a consultation with a board-certified veterinary nutritionist and an ultra–low-fat home-cooked diet (< 20 g/1000 kcal fat).

Chronic Kidney Disease

Specialized formulas designed to help with management of kidney disease have appropriate phosphorus restriction and controlled protein content. They also have additional renal-supportive nutrients, such as higher levels of anti-inflammatory omega-3 fatty acids (EPA and DHA). Currently, only dry hydrolyzed renal-appropriate diet formulas exist (e.g., Canine/Feline Renal Support + Hydrolyzed Protein; Royal Canin, royalcanin.com).

Struvite or Calcium Oxalate Urolithiasis

For patients with a history of struvite or calcium oxalate urolithiasis, formulas designed to reduce risk of stone recurrence should be considered. Feeding higher-moisture diets (moist, canned foods) and/or promoting water intake should be encouraged to achieve a urine specific gravity below 1.020 in dogs and 1.030 in cats.

Current formulas appropriate for dogs and cats with urolithiasis and AFRs include:

- **Dogs:** Royal Canin Veterinary Diet Urinary SO + Hydrolyzed Protein dry, Royal Canin Veterinary Diet Hydrolyzed Protein Small Dog dry, Hill's Prescription Diet z/d dry and canned, Hill's Prescription Diet z/d Low Fat dry and canned
- **Cats:** Royal Canin Veterinary Diet Feline Ultamino dry, Royal Canin Veterinary Diet Feline Hydrolyzed Protein HP dry, Royal Canin Veterinary Diet Feline Urinary SO + Hydrolyzed Protein dry, Royal Canin Veterinary Diet Feline Satiety + Hydrolyzed Protein dry, Purina Pro Plan Veterinary Diets HA Hydrolyzed Feline Formula dry, Hill's Prescription Diet z/d dry and canned

Protein Intolerance

Patients with liver disease with hepatic encephalopathy (HE) or urate stones may benefit from plant-based recipes (e.g., hydrolyzed soy protein isolate) as well as those that are lower in protein (or purine, if indicated). Diets containing < 50 g protein/1000 kcal for dogs and < 70 g protein/1000 kcal for cats can be used as first-line options. Providing the most protein the patient can tolerate without clinical signs (HE or urate stone formation) is important; therefore, the lowest-protein diet available may not be necessary.

Mixing the fiber supplement into a small amount of unsweetened, unflavored applesauce can help with palatability and further increase moisture intake.

Canned options for hydrolyzed diets are limited, as the manufacturing process makes the canned texture difficult to achieve, and those that exist may have variable palatability.

Obesity

Plans for active weight loss in pets require a diet that is appropriately fortified with nutrients and avoids essential nutrient deficiencies during caloric restriction. The goal should be to achieve 1% to 2% body weight loss (kg) per week for dogs, and 0.5% to 2% body weight loss (kg) per week for cats. Cats usually fall on the lower end of the weight-loss rate, and patients with comorbidities may benefit from a more conservative rate of weight loss of 0.5% to 1% body weight (kg) maximum per week.

Current formulas appropriate for active weight loss in dogs and cats with AFRs include:

- **Dogs:** Royal Canin Veterinary Diet Canine Satiety + Hydrolyzed Protein dry
- **Cats:** Royal Canin Veterinary Diet Feline Satiety + Hydrolyzed Protein dry

Puppies and Kittens

Formulations change with time; therefore, it is important to verify with the manufacturer that any current formula is appropriate for growth, particularly if the patient is a large-breed puppy (> 31.8 kg [70 lb] as an adult).

Current formulas appropriate for growth for puppies and kittens with AFRs include:

- **Dogs:** Royal Canin Veterinary Diet Hydrolyzed Protein Puppy dry, Purina Pro Plan Veterinary Diets EL Elemental dry, Purina Pro Plan Veterinary Diets HA Hydrolyzed Protein Chicken canned, Purina Pro Plan Veterinary Diets HA Hydrolyzed Protein Salmon dry
- **Cats:** Purina Pro Plan Veterinary Diets HA Hydrolyzed Feline Formula dry

ADDITIONAL CONSIDERATIONS

Distribution and accessibility of specialized diets can influence successful management of AFRs. A diet that helps resolve clinical signs has limited therapeutic benefit if it is on backorder or unavailable, requiring alternative diets to be sourced in the meantime. Hydrolyzed diets are also typically considered more expensive and less palatable than veterinary therapeutic limited-ingredient novel protein diets; however, their cost and palatability are similar or preferable to those of the single currently available amino acid–based diet. Canned options for hydrolyzed diets are limited, as the manufacturing process makes the canned texture difficult to achieve, and those that exist may have variable palatability.

SUMMARY

Tailored dietary strategies are crucial for managing patients with AFR, and many issues should be considered to determine which options are appropriate for each patient. Further research into amino acid–based diets may help better determine specific cases that might benefit from this therapeutic strategy and create a larger pool of therapeutic choices in the future. TVP

References

1. Johnson LN, Linder DE, Heinze CR, Kehs RL, Freeman LM. Evaluation of owner experiences and adherence to home-cooked diet recipes for dogs. *J Small Anim Pract.* 2016;57(1):23-27. doi:10.1111/jsap.12412
2. Cave NJ. Hydrolyzed protein diets for dogs and cats. *Vet Clin North Am Small Anim Pract.* 2006;36(6):1251-1268, vi. doi:10.1016/j.cvsm.2006.08.008
3. Zitouni N, Errahali Y, Metche M, et al. Influence of refining steps on trace allergenic protein content in sunflower oil. *J Allergy Clin Immunol.* 2000;106(5):962-967. doi:10.1067/mai.2000.110229
4. Lesponne I, Fossati L, Laxalde J, Biourge V. Efficacy of an extensively hydrolyzed protein-based diet designed for food allergic small dogs: a pilot study. Presented at: Southern European Veterinary Conference; October 20-22, 2022; Seville, Spain. Accessed May 28, 2025. https://vetacademy.royalcanin.es/wp-content/uploads/2022/12/2022-SEVC-Congress-Anallergenic-Small-Dog-Abstract.pdf
5. Olivry T, Bexley J, Mougeot I. Extensive protein hydrolyzation is indispensable to prevent IgE-mediated poultry allergen recognition in dogs and cats. *BMC Vet Res.* 2017;13(1):251. https://doi.org/10.1186/s12917-017-1183-4
6. Mueller RS, Olivry T, Prélaud P. Critically appraised topic on adverse food reactions of companion animals (2): common food allergen sources in dogs and cats. *BMC Vet Res.* 2016;12:9. https://doi.org/10.1186/s12917-016-0633-8
7. Frisner H, Rosendal A, Barkholt V. Identification of immunogenic maize proteins in a casein hydrolysate formula. *Pediatr Allergy Immunol.* 2000;11(2):106-110. doi:10.1034/j.1399-3038.2000.00041.x
8. Nasser J, Mehravar S, Pimentel M, et al. Elemental diet as a therapeutic modality: a comprehensive review. *Dig Dis Sci.* 2024;69(9):3344-3360. doi:10.1007/s10620-024-08543-1
9. Manchester AC, Dow S, Chow L, Gagne J, Lappin MR. Efficacy of an elemental diet in achieving clinical remission in dogs with chronic enteropathy. *J Vet Intern Med.* 2023;37(6):2322-2333. doi:10.1111/jvim.16846

10. Tinsley J, Griffin C, Sheinberg G, et al. An open-label clinical trial to evaluate the efficacy of an elemental diet for the diagnosis of adverse food reactions in dogs. *Vet Dermatol.* 2024;35(1):40-50. doi:10.1111/vde.13198
11. McArdle AH. Protection from radiation injury by elemental diet: does added glutamine change the effect? *Gut.* 1994;35(suppl 1):S60-S64. doi:10.1136/gut.35.1_suppl.s60
12. Olivry T, Mueller RS, Prélaud P. Critically appraised topic on adverse food reactions of companion animals (1): duration of elimination diets. *BMC Vet Res.* 2015;11;225. doi:10.1186/s12917-015-0541-3
13. Mackei M, Talabér R, Müller L, et al. Altered intestinal production of volatile fatty acids in dogs triggered by lactulose and psyllium treatment. *Vet Sci.* 2022;9(5):206. doi:10.3390/vetsci9050206
14. Lecoindre P, Gaschen FP. Chronic idiopathic large bowel diarrhea in the dog. *Vet Clin North Am Small Anim Pract.* 2011;41(2):447-456. doi:10.1016/j.cvsm.2011.02.004
15. Alves JC, Santos A, Jorge P, Pitães A. The use of soluble fibre for the management of chronic idiopathic large-bowel diarrhoea in police working dogs. *BMC Vet Res.* 2021;17(1):100. doi:10.1186/s12917-021-02809-w
16. Gaylord L, Raditic D. Managing chronic enteropathies: beyond antimicrobials. *Todays Vet Pract.* 2024;14(6):34-40.

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- Tests are valid for 2 years from the date of approval.

CE QUIZ QUESTIONS

1. **Which of the following statements is true of human elemental (monomeric) diet use in dogs and cats?**
   a. They can be used short-term but may need to be supplemented with essential nutrients, particularly if being used longer-term.
   b. They can be used for any duration as long as chocolate-flavored products are avoided.
   c. They are more readily available than canine or feline elemental diets and so can be used interchangeably.
   d. They should be used intermittently mixed with a hydrolyzed canned food to make the combination complete and balanced.

2. **How long should a feeding trial with a hydrolyzed diet last in dogs and cats with adverse food reactions before it is decided that the diet is unsuccessful?**
   a. At least 10 weeks in pets with gastrointestinal (GI) signs
   b. At least 2 weeks in pets with cutaneous signs
   c. At least 2 to 3 weeks in pets with GI signs and at least 4 weeks in pets with cutaneous signs
   d. At least 2 weeks in pets with cutaneous or GI signs

3. **Why might carbohydrate choice play a role in diet selection for patients with adverse food reactions?**
   a. Diets containing many carbohydrate sources are more affordable and palatable.
   b. Carbohydrates do not elicit an immune response.
   c. Carbohydrates have potential allergenicity because they can contain protein.
   d. Some carbohydrates are better at minimizing immune response to other ingested proteins.

4. **A patient with previously established calcium oxalate urolithiasis presents for signs of adverse food reaction. Which of the following statements is true?**
   a. Nutritional prioritization of the preexisting urolithiasis is more important.
   b. As long as a canned hydrolyzed formula is fed, both diseases will be addressed.
   c. Feeding a hydrolyzed diet will eliminate the calcium oxalate urolithiasis risk due to the reduced allergenicity of the therapeutic diet.
   d. Multiple therapeutic options that address both comorbidities exist.

5. **Which of the following statements is true regarding a puppy or kitten presenting for an adverse food reaction?**
   a. They should never be fed hydrolyzed protein diets.
   b. They should be fed a complete and balanced diet appropriate for growth.
   c. They should be fed a complete and balanced diet appropriate for adult maintenance.
   d. They should undergo at least 2 different diet trials with hydrolyzed diets appropriate for adult maintenance.