TECHNICAL REPORT
for USE by VETERINARIANS ONLY

HOW TO PREPARE HOME MADE DIETS FOR DOGS AND CATS

"You are what you eat" may be more than just a catchy phrase. Our daily nutrient intake provides the building blocks for maintenance of health, tissue repair and energy. It is well documented in the literature that the processing of foods, both human and pet, creates by-products that have a pro-inflammatory, insulin dysregulating effect and generates excessive reactive oxidative species (free radicals). These side-effects from eating processed foods are at the root of many degenerative health conditions. In human integrative medicine inflammation and insulin dysregulation are known collectively as "Metabolic Syndrome" or "Syndrome X".

The diet of wild canids and felids, as detailed in numerous studies published in the field of Wildlife Biology, is typically higher in unprocessed animal protein than the protein that is found in commercially formulated and manufactured dog and cat foods. Carbohydrate levels are less in these wild diets, and usually do not contain significant amounts of cultivated grains. Fresh greens are a part of the diet of wild dogs and cats, either through directly grazing plants, or from eating the stomach contents of their prey.

The digestive juices of prey animals also contains naturally-occurring digestive enzymes and probiotic bacteria. The greens provide omega 3 fatty acids to the diets of dogs and cats, either through directly consuming the greens, or by eating the meat of animals that have been grazing on omega 3-rich forage. Numerous studies have confirmed that nutrients as found in wholesome minimally to unprocessed foods are more bioavailable, and are rich in naturally occurring antioxidants and micronutrients all of which help to promote optimal health.

In the wild, canids and felids receive their calcium from eating the bones of their prey as well as by foraging on green leafy plants. Interestingly, these wild carnivores also receive their nutritional intake of glycosaminoglycans for joint health by eating the metaphyses of the bones of their prey, which includes articular cartilage, rich in glycosaminoglycans.

These wholesome and diverse diets, modeled after their food intake in the wild, amply supplies the multiple and complex nutrient needs of dogs and cats, whether in the wild or in the home. Commercial pet food is a synthetic food, modeled after reductionist nutritional studies isolating individual ingredients and then measuring nutrient amounts sufficient to prevent deficiency nutritional disease. Wholesome, whole food, unprocessed diets when properly formulated, provide the dog and cat with complete and balanced food that promotes optimal health based on the panoply of antioxidants, macrominerals, microminerals, food-bound nutraceuticals and phytonutrients.

The feeding of homemade diets and unprocessed foods can help to reverse the chronic adverse effects of long term ingestion of the by-products of food processing. Kibble and canned foods both contain these potentially toxic by-products. When carbohydrates and protein are heated at high temperatures, and when they are also exposed concurrently to high pressures, a chemical reaction occurs called the: "Maillard Reaction". Bread crust forms as the result of this Maillard reaction, also known as the "Bronzing Effect". The chemical name for these new compounds that are created by food processing

is: Advanced Glycosolated End products, which is given the acronym: “AGE’s”. Studies have shown that these AGEs contribute to pro-inflammatory processes in the body, and to the aging process as well. (1)

There are other problems associated with processed commercial foods. Food storage mites can create a substantial impact on atopic dogs. (2) Reactive oxidative species (ROS) are also created by food processing (6), and many degenerative conditions are the result of tissue damage secondary to these free radicals’ impact on delicate living tissue. (7) Chemical preservatives may have an adverse effect due to their long term usage, even if the amounts ingested at each meal have been measured to be not toxic. (3) Aflatoxins and other mycotoxins are commonly found on grains (especially corn and wheat) that have been stored for a while, which is usually the case in the manufacture of commercial kibble. (10) Appropriate levels of essential or necessary nutrients may not be present in commercial diets. One example of this is a report of cardiomyopathy in Newfoundland dogs secondary to taurine deficiency when fed a commercial dog kibble. (5)

Food processing destroys delicate micronutrients, and creates oxidative stress in the tissues through the production of free radicals secondary to the high temperatures and pressures that develop during food processing. (6) Home preparation of foods prepared at moderate kitchen-cooked temperatures retains much of the micronutrient food value. Uncooked, raw foods retain the full delicate micronutrient and antioxidant value of the food. (8) In a study of Scottish Terriers who have a high genetic risk of developing transitional cell carcinoma of the bladder, it was found that adding three servings per week of raw vegetables, significantly reduced their risk of developing bladder cancer. (9)

Home prepared diets for companion animals can also provide other benefits to companion animals other than improved nutritional intake. There is so much talk these days in Veterinary medicine about the “bond-centered” practice. Preparing food at home for one’s pet is one of the most bonding experiences you can imagine. For patients with terminal diseases, this is an opportunity for the pet’s guardian to minister to their beloved critter in their last days, weeks, or months on earth. Many pets with chronic or terminal diseases will become fussier about their diets. Many times its not the brand or the meat type that is in the commercially processed kibble, but it is the kibble itself that these animals will not eat. Switching them to a homemade diet can have very positive effects.

In recommending a homemade diet, especially one that contains raw meat, it takes consultation time for the veterinarian to educate the client to ensure that the food preparation will be nutritionally adequate and safe. In the marketplace there are now fresh frozen raw diets, including one that has passed AAFCO feeding trials. Veterinarians can sell these diets in their clinics, thus providing an additional income stream, similar to income generated by the sale of kibble and canned diets.

Information on home made diet recipes can be found in a number of published books. (10) (12) There are several websites designed to help with diet formulation. (13) This author has developed a methodical process for understanding the principles and practices that underlie homemade diet preparation. This author has been applying these principles and practices of food formulation and preparation for well over 22 years. This 22 year+ feeding trial has resulted in the creation of optimal health in 95% of his patients who have receive home prepared meals during this time period.

Home Made Diet: Principles And Practices

Instructing clients in the preparation of safe and nutritious home made food takes time. This author spends a significant amount of time in an exam room setting or in a group class to explain the details involved in diet preparation. Home made diets are not for every client. Many clients are unable to prepare wholesome meals for themselves. It is unreasonable to expect that these clients can follow through consistently and accurately with home diet preparation for their pets. During the food preparation discussion, attempts are made to have an interactive dialog during which clients can express their concerns regarding the use of raw meat, bones, specific types of foods, and amounts of macronutrients such as protein, and the use of grains as a carbohydrate source.

Clients are becoming increasingly more knowledgeable and informed about these food preparation considerations, although in many cases their source of information may be based on half-truths and emotional bias. The internet has been a source for information that many clients are accessing. Unfortunately it is not always a reliable source of information. The information is often tainted by mercenary motivations or adherence to a position. Many individuals interested in improving their animals health go to these sources of information, or receive anecdotal information from an acquaintance about something that they may have heard about, or which may have worked in one case for their pets, and they generalize this case to be true for all animals. Many people have a cult-like adherence to these ideas, some of which could be harmful to their animals.

Some examples of the misinformation that clients may be bringing into a veterinarian's office include the notions that all animals, regardless of their age, weight or health status need to eat high protein diets, consisting solely of raw meat. Another commonly held misbelieve or "Urban Myth" is that carbohydrates, and particularly grains are the cause of many diseases, including cancer, Cushings disease and thyroid disease.

This author spends a substantial amount of time in the exam room explaining the truth that these myths mis-represent. These clients are potentially terrific clients for a veterinarian. They want to improve their pets' health, they are willing to go to a great deal of effort and expense to do so. They are simply "misinformed," and thus, "misguided." By taking extra time with them, and kindly and gently explaining to them why these ideas they hold are not true for all critters, and might even be harmful to some, including their own, these people usually come around. People inherently respect the authority position of a veterinarian or physician as a resource of truthful information, and it is not hard to redirect them to a more balanced and evidence-based approach to natural pet health with effective client education and clear communication.

This author has tried to make the meal preparation as simple as possible, in order to facilitate compliance. Following this advice, the author asks clients to return to the office in 30-60 days for a recheck visit to discuss the trials, tribulations and successes with home prepared diet preparation. At that time, the patient is reweighed and re-examined. If deemed appropriate, blood tests such as creatinine, BUN, hematocrit and serum albumen are performed, and fecal examinations may also be conducted to check for nutritional sufficiency, parasites and food-borne pathogens, respectively.

Feeding Guidelines: The "Circle Of Nutrition"

How much to feed, and what proportions of macronutrients to recommend will need to be individualized for a specific patient. Does the patient need more protein to address protein loss through the bowel or kidneys, obesity, diabetes or cancer, growth, wound healing or performance? Does the patient need less protein due to azotemia or other

concerns? How about the amount of calcium that needs to be supplemented? It certainly would be different for a giant breed versus a toy breed. More calcium may be needed when we are dealing with fracture repair and nutritional Hyperphosphatemia, and less when we are dealing with hypercalcemia due to a paraneoplastic syndrome or hyperparathyroidism (primary or secondary). How about the amount of carbohydrate to feed? And what type of carbohydrate? If the patient is diabetic, then the glycemic index of the carbohydrate may have a bearing on insulin demand. If the patient has gluten intolerance or food allergies or grain intolerances that are not gluten-based, then avoiding grain sources of carbohydrates is recommended.

The American College of Veterinary Nutrition recommends using the "Circle of Nutrition" approach when formulating a diet for a patient. The "Circle of Nutrition" describes an iterative process, whereby the patient's health status and nutritional needs are first assessed, and from that assessment a patient-specific nutritional "prescription" is written. A diet is then formulated or a ready-made diet is chosen to match that initial prescription, and is fed according to that patient's energy needs and lifestyle considerations. The diet is fed for a given amount of time, which could vary based on the critical nature of that patient's condition, and at the end of that initial feeding period, the patient is then reassessed.

The reassessment could be as simple as a cursory physical exam and weigh-in, or involve diagnostic tests such as creatinine and BUN to assess the safety to an azotemic or potentially azotemic patient of the amount of protein in that initial diet prescription. If this first assessment indicates that the diet is working well in this patient, then that diet formulation is continued. If that assessment indicates that this diet is not working, then, based on this second assessment the diet is changed accordingly. The iterative process continues until the prescribing veterinary nutritionist is comfortable with the patient's response to the diet formulation or packaged diet prescription.

As part of the effort to simplify the food preparation process, this author recommends that clients use volumetric cup measurement, which is easiest for day-to-day food preparation. The food portion measurements are more accurate if the vegetables are chopped up fine, the meat is ground or chopped into small cubes, and the starches are well cooked to a porridge-like consistency. This way there will be no air in the cup measurements, and since the food density is fairly uniform (a little light for the veggies and a little heavy for the meat, especially fatty meat), volume is approximately equal to weight. Weight measurement of the food is more accurate for precise nutritional calculations, but can be more of a "chore" for some clients.

Canine Cuisine: How Much to Feed?

Feeding dogs ~1.5-2.0 cups of this diet for every 25 pounds (approx 10 kg) of ideal body weight per day supplies ~700 kcal and ~35 g protein/day as recommended daily for a 10 kg (22.2 lb) neutered adult dog.(6) As a rule of thumb, this is approximately 1.5 -2 times the volume of dry food to get the same caloric density. Variables that need to be accounted for include the caloric content of the individual foods in the recipe, the actual proportions of each of the food categories (Carbohydrate, Protein and Vegetable), the protein density per 100 kcal food, and the metabolism and activity level of the animal. Puppies will have increased caloric needs of up to 3-4 cups/25 pounds of weight, during their rapid growth phase. Remember that empirical adjustments need to be made for any patient on any diet, commercial or home made, based on individual metabolism, the presence of disease, and

moment-to-moment energy expenditures and needs. In general, adult dogs require about 1 gram of protein per pound of body weight per day. Resting energy requirements (RER) are defined by the equation:

$$\mathbf{RER\ (kcal/day) = 70\ (BW_{kg})^{0.75}}$$

or

30 X (BW_{kg}) + 70 if the BW > 2 kg (4.4 pounds) or >45 kg (100 pounds) (6)

Feline Fare: How Much to Feed?

For cats, feed about 0.75-1 cup of the home prepared diet for each 8-10 pounds of ideal body weight per day to provide ~260 kcal and 23 g protein/day for a neutered adult cat.(6) In general, a healthy adult cat needs about 2 grams of protein for each pound of body weight. Feline energy requirements are computed by using the same formula quoted above for canine energy requirements. Cats can be more unpredictable as far as amounts to feed, based on whether they are indoor, or outdoor cats, and their age. Indoor cats do not receive enough exercise, generally, and thus need to be fed 25-50% less to start. Increased amounts of food can be fed later, if the initial amounts are not sufficient to supply a feline patient's needs. It's a lot easier to put weight on a cat then to take it off!

Computer Programs to Analyze the Caloric and Protein Content of Diets

There are computer programs that can be used to compute the nutritional analysis of a diet for pets. Many of these are commercial in nature and designed with the professional nutritionist in mind, and thus can be quite costly. There is a veterinary website designed by a veterinary nutritionist that veterinarians can use online to determine the nutrient content of foods. www.Balanceit.com The USDA food composition database is free and is used by all of the other programs for their computations. This database, found at this URL: http://www.nal.usda.gov/fnic/foodcomp/search/ can be used to determine the precise nutrient content of each individual ingredient in the diet. Software developed by the University of Illinois for humans can be found at the following website: http://www.nat.uiuc.edu/mainnat.html. This last program was used to compute the nutrient values for diets in this paper.

RECIPES:

Specific recipes are adapted to the individual medical needs and caloric requirements of each patient. The proportions that are used are based upon the scientifically established nutritional requirements of healthy adult dogs and cats, growing animals, as well as animals with diagnosed disease conditions. Due to the metabolic differences between dogs and cats, these sets of food ingredient proportions are different for dogs and cats. Expressed as a set of 3 percentages, these proportions constitute the "recipe".

Calcium is added based on a computational body surface area algorithm which is different between the two species. See Tables 1 & 2 for calcium requirements by body weight in pounds for dogs (Table 1) and for cats (Table 2). For large breed puppies, supplementation with calcium, amount of protein required and appropriate caloric intake need to be adjusted as described in the section that follows this on the feeding large breed puppies.

Although this author has not experienced problems with this approach to feeding the large breed puppy in the 20 years that this system has been used in his clinical practice, it is not uncommon for clients to not adhere to these details of calcium, protein and caloric intake. This may increase the risk that large breed puppies can develop problems. With clients that are not detail-oriented, it may be safer to recommend feeding a commercially available diet formulated for large breed puppies until after the period of their growth and past the period in their development of increased risk for diet-related problems.

Table 3, below is a summary of ingredient proportions this author recommends for a variety of conditions of health and disease for both dogs and cats.

TABLE 3: Nutrient Proportions for Different Conditions of Health and Disease.

PATIENT STATUS	DOG PROPORTIONS %CHO:%PRO:%VEG	CAT PROPORTIONS %CHO:%PRO:%VEG
WELL-PET	50:25:25 or 33:33:33	10:75:15
GROWTH	50:25:25 or 33:33:33	5:90:5 or 0:100:0
LIVER	33:33:33	0:90:10
ALLERGIES	0:50:50 or 60:20:20	0:90:10
CANCER	20:50:30	0:90:10
KIDNEY* **	50:25:25 or 60:20:20	20:60:20
OBESITY	37.5:25:37.5 or 33:33:33	0:90:10
DIABETES	33:33:33	0:90:10

Complex Carbohydrates

If using grains as a source of carbohydrates, cook rice or barley with more water to soften and expand the grain, in order to increase its digestibility. Depending upon the altitude, use 1.5-2.5 (or more) cups of water for each cup of grain. Cooking rolled oats is quite rapid, instructing pet owners to pour boiling hot water on top of the rolled oats and wait 10 minutes for the rolled oats to soften and expand. This technique does not use a lot of heat, time in preparation, nor necessitate cleaning up cookware later on.

Oats are a good grain to use, although may possess some glutinous properties, with a well tolerated taste to dogs and cats, decent protein, fiber and omega three fatty acid content without costing very much. Most pet foods do not contain oats, so food allergies are less common to this readily available grain. “Minute” oats are processed and do not as complete a nutrient profile as rolled oats. Steel-cut oats take more time to cook, and usually need to be placed into a pot with boiling water to adequately soften them for a meal. With rolled oats the meals can be made “on the fly” each day. Baked potatoes, yams, sweet potatoes and squash are all good non-grain complex carbohydrate sources.

Simply have your clients use cup measurement of the **cooked** complex carbohydrates to put the meal together. Less allergenic cooked grains such as buckwheat, quinoa or millet can be used as alternate sources of complex carbohydrates for some gluten or grain sensitive patients.

Protein-rich Food Proportions

DOGS = 20% - 25% - 33% - 67% - 75% CATS = 50% - 67% - 75 % - 100%

Ground turkey or beef is recommended as the meat source, unless there are specific allergies identified. If clients want to go vegetarian (which is not recommended) then cooked beans, tofu, eggs and cottage cheese are recommended as substitutes for this fraction. Clients can mix meat with the above "vegetarian" protein sources to fill the requisite amount of cups required for the pet's meal.

Raw Meat?

This author recommends raw meat for its unadulterated content of nutrients, including food enzymes, but doesn't push the issue with clients who are reluctant. Cooked meat has a higher caloric and protein density than raw meat so it is necessary to account for that when recommending portions to feed. Ground meat is easier to estimate its fraction by volume in this recipe.

A problem with feeding "raw meaty bones" (E.g. BARF diet) is the variability in protein, fat and carbohydrate content from bone to bone, which makes it more difficult to estimate portions to feed. Clients get easily confused with the meaty bone approach, and this author has seen many cases of inadequate or over-abundant caloric and protein feeding with that approach.

Vegetable Proportions

DOGS = 0% - 10% - 33% - 50% **CATS = 0% - 10% - 25% - 40% - 50%**

Vegetables are a great source of soluble and insoluble fiber, and are also a wonderful source of vitamins and minerals, anti-oxidants and other valuable phytonutrients. Vegetables can be served raw and or cooked, but in every case it is recommended that they be chopped up finely in a food processor and mixed in with the ground meat and cooked complex carbohydrates. Cats may need the vegetables to be pureed, or for convenience can be fed a vegetable baby food without onions or garlic. Seaweed (kelp, dulse, etc.), alfalfa, nettles, lecithin, spirulina, chlorella, wheat grass and/or barley grass juice powder can be added to each meal to improve its nutrient profile. (1/8-1 tsp per meal)

Fats and Oils

Healthy fats are provided to dogs using flax seed oil and fish oils, and to cats with fish oils (cod liver oil, salmon oil, krill oil, sardine or mackerel oil—any of these are good for dogs as well). Oil contains ~40 calories/tsp. Dogs are given about **1 tsp of oil/15 pounds/day to provide about 5-15% of their total consumed energy from fats.** Cats are given about **½ tsp of oil/10 pounds/day**. Flax seed oil provides both linoleic acid (essential) and alpha linolenic acid (possibly essential), an omega 3 fatty acid, in approximately equal proportions. Cats are unable to convert flax oil to eicosapentaenoic or docosahexaenoic acids, but the fatty acids in flax oil are healthy fats for their metabolism and digestion. Additionally, the soluble and insoluble fiber found in freshly milled flax seed can help with hairballs in the cat.

Feeding flax seed is another way to provide fresh vegetable oil, and also provides soluble fiber, vitamins, minerals and phytolignans. Flax seed needs to be ground freshly just before serving or needs to be soaked for 20' before adding to the diet. It can be added to the vegetables just before they are ground up in the food processor. Flax seed contains 30% oil, so it is recommended that **1 Tbsp per 15 pounds per day** be added to the dog or cat's diet. For cats this is usually about **1.5 teaspoon of freshly milled seed per meal**. The fiber portion of the milled flax seed will help manage hairballs.

Flax seed oil contains the extremely heat-labile omega three fatty acid alpha linolenic acid (ALA). Following pressing, rancidity of the ALA can begin as early as 12 weeks, even when the oil is stored in a cool dark place. Freezing the oil will substantially increase its shelf life before rancidity develops, but each time the oil needs to be served it needs to be defrosted in order to enable it to pour.

Calcium Requirements

Dogs and cats have a much higher calcium requirement than do humans, estimated to be 3-5 times the average requirement for humans. For that reason it is important that any homemade diet have adequate calcium supplementation appropriate to the needs of the patient. The calcium RDA for humans = 400-1200 mg/day depending on size and metabolic age. Assuming the average human weight to be 70 kg or 150 pounds, the approximate daily calcium requirement, all things considered, is **1200 mg**. A dog of the same 150 pound weight would need about **3000 mg** daily of calcium.

Due to the high phosphorus content of muscle and organ meats and of grains, it is important to add a source of calcium to provide adequate calcium as well as a balanced ratio of calcium to phosphorus in the animal's diet.

Total daily need for calcium as a crude estimate, would be 100 mg of calcium per five pounds of body weight per day (assuming a 30-40% absorption from dietary sources) is enough to balance the high phosphorus found in meats and grains. In the wild, predators eat the bones of their prey. It would be uncommon in the wild for animals to consume the quantities that are recommended in some diet plans such as the raw meaty bone BARF diets.

Sources of calcium other than raw bones include: Dried bone meal, dried egg shells, oyster shell, coral calcium, fossilized marine sediment (including fossilized coral calcium; this is the source of the RxVitamins Canine and Feline mineral supplements) mineral-rich plants such as seaweed, , alfalfa, nettles, or green leafy vegetables. Bone meal is commonly resourced from non-domestic sources and may therefore have higher amounts of lead in it than other calcium sources.

A small amount of raw bone can be fed as a means of providing healthy exercise for the gums and jaw muscles, and as an additional source of dietary calcium. Raw chicken wings, backs and necks (small cancellous bones) have been recommended in this author's practice without a single incident or problem to date (8 years).

Clients are advised to exercise caution, that it is not appropriate to feed raw bones to some dogs (the gulpers or competitive feeders or those with small mouths or poor dentition), and clients are informed that this is a practice that they must assume at their own risk.

Feeding The Large Breed Dog-Puppy

Energy:

The energy requirements for any individual puppy will depend on breed, age, neuter status, environment and activity level. However, in general, growing puppies require twice the energy that a mature adult requires for maintenance. The need is greatest right after birth and decreases as the dog grows. The rate of growth of the dog is directly influenced by the dietary energy intake. Puppies should be fed based on their energy needs. However developing a calculation to estimate these needs is difficult, and often impractical. A puppy's energy needs will be continuously changing as the dog grows.

A body condition scoring (BCS) system provides an easy and practical way to evaluate the effectiveness of the amount of food being fed in terms of affecting the body mass of the growing cat or dog, and therefore how well the diet and amount fed are meeting the young animal's appropriate energy needs. Current thinking recommends that maintaining a BCS of 3/9-4/9 during growth will reduce excess body fat, help control excess growth, and reduce the potential for development skeletal abnormalities. Body condition scoring needs to be taught to owners/guardians and should be done every two weeks during puppy growth. Maintenance of an optimal BCS can be managed by altering the amount of food fed.

The caloric needs (MER) of an actively growing puppy have been defined as being 1.5-2.5 X the RER which can be computed from the formula for RER on page 9 of this document. This formula provides a starting point for providing adequate dietary calories to the actively growing puppy, whether large breed or not. It is important to use the BCS determination of 3-4 as your endpoint to ascertain if adequate calories are being fed. Research studies have shown that puppies that are fed to a BCS of 3-4/9 have improved longevity (20%) and in general do better with serious chronic diseases such as cancer over puppies that are fed to higher BCS scores.

Calcium:

The absolute level of calcium in the diet has been shown to be more important than the calcium/phosphorus ratio with respect to skeletal development. Excess dietary calcium has been shown to significantly increase the incidence of developmental bone diseases in growing puppies. **Chronically** high dietary calcium intake increases the frequency and severity of OCD. Its easier for dogs to adjust to slightly lower serum calcium levels, by mobilizing bodily calcium stores, than it is for the body to deal with eliminating excess calcium.

A calcium of ~1.1% (dry matter basis) is recommended for **high risk** growing puppies. This translates into approximately 1100 mg of calcium daily for a 50 pound puppy. 110 mg of calcium daily for a 5 pound puppy. This compares this with 1353 mg of calcium for non-large breeds weighing 50 pounds.

Protein:

Protein requirements of growing puppies are higher than protein requirements for adult dogs. Both quality and quantity of protein in the diet are important to supply the proper balance of amino acids. Amino acids are vital for growth and development.

Protein excesses in growing large breed dogs has **not** been shown to adversely affect skeletal development. Excess dietary protein only contributes to the energy content of the food, it does not accelerate the growth of bone or muscle. It is recommended that a growth formula for large breed dogs contain a high quality protein, with 28% or greater protein content (dry matter basis).

Introduction Of The New Food To The Old Pet

Cats may need added palatability enhancers to assist in their transition to a home made diet. Introduce new foods slowly and gradually to all animals, especially cats.

The use of bribe foods or familiar foods can assist greatly in convincing cats to make the transition. I often quote Mary Poppins: "A spoonful of tuna helps the new food go down."

Using strongly smelling highly tasteful foods in small amounts to flavor the new food may assist in the transition, or may be necessary throughout the feeding process. Cats that are dry food junkies may never make the transition. They imprinted to dry food at weaning so strongly when they were kittens that they don't recognize anything else as legitimate food. A cat that won't eat canned food or tuna fish or "people" food, probably won't eat a homemade diet readily. For those cats that eat canned food you can gradually add increasing amounts of home made diet to the canned food ration as a means of introduction of the new unfamiliar tasting food.

Recipe Drift

One factor that is important to take into account is that human nature being what it is, it is not uncommon for clients who are preparing food for their animals to substitute other food materials or use differing proportions and amounts than have been recommended by their veterinary nutritionist. The professional recommendations have been given in order to provide for that animal a complete and balanced diet. Changing the diet this way is called: "Recipe Drift", and potentially could be a source of inadequate nourishment of the animal. For this reason, it is important that during annual examinations and other medical appointments that the client be queried as to the exact food materials amounts and proportions that are actually being fed. It takes a little more time to do this, but clients are appreciative of your interest in their animal's diet, and it helps to ensure nutritional adequacy.

Compromise Diets

If this were the "best of all possible worlds", then we would all have enough time and resources to prepare every meal for ourselves and for our pets from scratch from totally organic and range-fed sources. Since for most individuals, this is not the case, I recommend for flexibility an approach to feeding called the "Compromise Diet."

A compromise diet is inclusive of the best possible meals that can be served, under whatever the moment to moment circumstances may be regarding kitchen facilities, preparation time, storage capacity, and food material availability. Many clients will express the desire to prepare meals for their pets on a regular basis, but actually cannot make the time to do that in their busy lives.

I would rather clients prepare one good meal a week. At least their pet will get some wholesome nutrition. Combining meals of the best commercial food with healthy leftovers from family meals or healthy restaurants is a simple way to do this. I have the client offer the same proportions of carbohydrate, protein and vegetables as they would if they were preparing a meal from scratch.

If the pet's people eat healthy (unfortunately most do not), providing the *starch du jour*, *protein du jour* and *veggies du jour* can offer a superior plane of nutrition to their pets without much effort. This is the "table scrap" diet. If people are traveling with their pets, they can go to a restaurant and order a beef patty, baked potato or rice pilaf and steamed broccoli, and they are "good to go". Obviously, eating on the road isn't healthy in the long term for pets or their people, though.

It is appropriate for veterinarians to NOT recommend the feeding of table scraps because they may unbalance a complete commercial diet, or add unnecessary or unhealthy amounts of calories and/or protein to an animal's balanced nutritional regimen. Also some table scraps may be excessively fatty and promote pancreatitis or diarrhea and vomiting in some patients. However, for clients who pay attention to providing themselves and their

families with wholesome nutritious and balanced meals, it is not unreasonable to suggest that they simply divert some of the food intended for their family to their animal in the proportions and amounts that their veterinary nutritionist recommends. After all, before the inception of commercial foods, this is how companion animals were fed.

Using the feeding guidelines suggested above, for each cup of fresh food offered, be sure to have the pet guardian remove a half cup of kibble, to approximately account for the additional carbs and protein. This way the pet won't be given an excessive amount of calories or grams of protein that are not needed.

I have found that by being too rigid and demanding too much perfection from my clients turns many of them off from home made diet preparation. If they know that when their lives get busy its OK to bail on homemade diet preparation, at least in part, and its OK to go back to commercial foods, if only briefly, and its OK to mix commercial diets with home made diets or with left-overs as long as consideration is given to not feed an excessive amount of carbs and protein.

CITATIONS

1. Vlassara H, Cai W, Crandall J et al. Inflammatory mediators are induced by dietary glycotoxins, a major risk factor for diabetic angiopathy. Proc Natl Acad Sci USA, 2002 Nov 26;99(24):15596-601.
2. Arlian LG, Schumann RJ, Morgan MS, Glass RL. Serum immunoglobulin E against storage mite allergens in dogs with atopic dermatitis. Am J Vet Res. 2003 Jan;64(1):32-6.
3. Hard GC, Neal GE. Sequential study of the chronic nephrotoxicity induced by dietary administration of ethoxyquin in Fischer 344 rats. Fundam Appl Toxicol. 1992 Feb; 18(2):278-87.
4. Knize MG, Salmon CP, Felton JS. Mutagenic activity and heterocyclic amine carcinogens in commercial pet foods. Mutation Research 539 (2003) 195-201.
5. Torres CL, Backus RC, Fascetti AJ, Rogers, Q. Taurine status in normal dogs fed a commercial diet with taurine deficiency and dilated cardiomyopathy. J. Animal. Physiolo. A. Anim. Nutr. 87 (2003), 359-372.
6. Schroeder HA, "Losses of vitamins and trace minerals resulting from processing and preservation of foods." American Journal of Clinical Nutrition, 1971; 24(5), 562-573
7. Severi S., et al, "Effects of home-based food preparation practices on micronutrient content of foods." European Journal of Cancer Prevention, 1998; 7(4): 331-335
8. Liu H.R., "Health benefits of fruit and vegetables are from additive and synergistic combinations of phytochemicals." American Journal of Clinical Nutrition, 2003; Vol. 78, No. 3, 517S-520S
9. Raghavan M., et al, "Evaluation of the effect of dietary vegetable consumption on reducing risk of transitional cell carcinoma of the urinary bladder in Scottish Terriers." Journal of the American Veterinary Medical Association, 2005; Vol. 227, 94-100
10. Remillard R.L., Paragon B.M., Crane S.W., et al: "Making pet foods at home," in Hand MS, Thatcher CD, Remillard RL, Roudebush P (eds): Small Animal Clinical

Nutrition, ed 4. Topeka, KS, Mark Morris Institute, Walsworth Publishing Company, 2000; 163–182.

11. Boermans HJ, Leung MC. Mycotoxins and the pet food industry: toxicological evidence and risk assessment. Int. J. Food Microbiol. 2007 Oct 20;119(1-2):95-102.

12. Strombeck, Donald R., Home-prepared dog and cat diets: a healthful alternative; Iowa State University Press, 1999.

13. WEBSITES for FOOD PREPARATION
    a. www.ACVN.org
    b. www.petdiets.com
    c. www.balanceit.com

ACADEMIC NUTRITION SERVICES
    d. UC Davis 530 752 1393 (pet owners); 530 752 1387 (veterinarians)
    e. University of Tennessee 865 974 8387
    f. Michigan State University 517 432 7782
    g. North Carolina State University; Dr Korinn Saker 919 513 6488
    h. Angell Animal Medical Center 617 522 7282
    i. Ohio State University 614 292 1221 or 292 3551
    j. Tufts Cummins School of Veterinary Medicine 508 839 5395 X84696