Hyperthyroidism is the most common endocrine disease of cats worldwide. It is most often associated with a benign thyroid tumor that produces excessive thyroid hormone. Options for managing hyperthyroid cats have included thyroidectomy, radioactive iodine therapy, and anti-thyroid drugs. Recently, using a limited-iodine food (Hill’s® Prescription Diet® y/d™ Feline Thyroid Health) was introduced as another option for managing hyperthyroidism in cats. A panel of experts discussed the role of nutritional management of feline hyperthyroidism and answered key questions from attendees of a symposium on Feline Hyperthyroidism held at the Western Veterinary Conference in Las Vegas, Nev., February 22, 2012. The panel was moderated by Dr. Edward Kanara.

**Dr. Kanara:** When should nutritional management with Prescription Diet y/d be recommended for hyperthyroid cats and how do you select patients for this option?

**Dr. Scott-Moncrieff:** Most of the cats that I see come in for radioactive iodine treatment. The cases I’ve managed with y/d Feline have been those where the owners were not willing to consider radioactive iodine therapy, and most of them were cats that did not tolerate methimazole therapy.

**Dr. Bruyette:** We approach it just like any other disease — we give the owner all the various choices, talk to them about medication (oral and topical) versus nutritional management and radioactive iodine. There’s a treatment that’s hopefully best for each particular cat and their owner; we try to help them decide what’s best for them in terms of treating the cat, with the caveat that if they opt for anti-thyroid drugs or nutritional management first and it’s not working or they’re not happy with it, we’ve got other ways to treat the cat.

**Dr. Kirk:** I would say we have the same at Tennessee — nothing really different, other than, as Dr. Bruyette said earlier, the requirements for radioactive iodine are very different by state. Our cats typically stay in the hospital for seven to 10 days and during that time they can’t be touched by anybody or receive medications for hyperthyroid-related diseases (e.g., cardiac disease). For us, cats that can’t tolerate radioactive iodine tend to be a little broader because people don’t want to leave their cats for that period of time, and they do want their medications to be given. What we haven’t looked at is using nutritional management initially, and then radioactive iodine once those cats’ clinical signs have resolved.

**Dr. Melendez:** One thing that I would also add, as you’re becoming more comfortable with nutritional management as an option for hyperthyroid cats and trying to decide which cases might be the best for y/d Feline, is to call our Veterinary Consultation Service. In addition to answering general questions, they
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Hill’s Veterinary Consultation Service

The Hill’s Veterinary Consultation Service provides no-cost total case management, nutritional counseling, and product support for both domestic and international veterinary hospitals. The team includes licensed and boarded veterinarians, licensed veterinary technicians, and paraprofessionals with more than 200 years of combined clinical and academic experience available for free consultation on individual case management. For more information, visit HillsVet.com/practice-management.html or call us at 1-800-548-VETS (8387).

Nutritional management of hyperthyroidism may have a role.

Dr. Bruyette: When you look at introducing treatment for a newly diagnosed disease that’s superimposed on top of other diseases, you need to consider all options. If those other diseases are being adequately managed with a dietary manipulation, then I’m probably not going to change the food, especially with hyperthyroidism where we have other management options. It comes down to an individual patient decision — what is going to be the best option for this cat?

Dr. Kanara: Does anyone have any additional comments about managing hyperthyroid cats with either kidney disease or diabetes?

Dr. Kirk: Early on, when a limited-iodine food was in initial investigation, one of the first things noted was a reduction in serum creatinine and improvement in renal parameters. And you certainly could look at that and say, well, it’s a lower protein food. But the food is similar in protein concentration when compared with other standard maintenance pet foods on the market. So it’s not really a protein-restricted food but the nutrient values are very renal friendly. The food was developed with the same profile that we would consider appropriate for kidney disease. So in terms of managing concurrent kidney disease, I think that it’s actually a very good option. And from a nutritionist’s standpoint, we always pick what is the most important disease in the animal if we have different foods to choose from.

So the next question was, what about diabetes mellitus and kidney disease. How we manage those cases may change over time. Early on in the cat’s history, the diabetes may be the number one concern in terms of impacting quality of life, and we’re going to pick a nutritional profile that optimizes diabetic management, which would usually be a higher-protein, low-carbohydrate pet food with or without exogenous insulin therapy. But as time goes on in some of these cats, kidney disease develops; we know that at least 30% of cats over 12 years of age have some kind of renal abnormalities based on histopathologic examination. At that point, the primary disease may become kidney disease and we sometimes will switch them to a food formulated for kidney disease and manage their diabetes with exogenous insulin.

In summary, you should look at the individual patient. From a compatibility standpoint, I think the food (Prescription Diet y/d Feline) will work well for cats with kidney disease and hyperthyroidism, and the data support that early on.

can provide guidance on challenging cases, especially for older cats that have concurrent conditions such as chronic kidney disease.

Dr. Kanara: Should you recommend nutritional management of hyperthyroidism in cats that have concurrent diseases?

Dr. Scott-Moncrieff: I think the most important thing is an individualized approach to each case. For some cats with concurrent illness (e.g., inflammatory bowel disease or heart disease) that are being well controlled with nutritional management for that disease, I would be much less inclined to change their food since there are other options to manage the hyperthyroidism. And then a lot of it also depends on their age. If you have a 12- or 13-year-old cat with hyperthyroidism, you need to be thinking down the road about how long those cats are going to potentially live with hyperthyroidism. If you treat them with radioactive iodine, you can cure the thyroid adenoma. There are so many different patient factors that come into it, so I think that you can’t make a broad recommendation — it has to be individualized for each patient.

Dr. Kanara: So the take-home message is obviously these are all unique cases with certain considerations that you’re going to take into account. Depending on patient and owner
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Dr. Kanara: There was a question about monitoring and the best way to determine that the disease is under control. Where should the thyroxine (T4) be within the reference range and what about monitoring blood pressure in hyperthyroid cats?

Dr. Bruyette: If you look at the human literature, they very rarely talk about where T4 is within the reference range. They monitor thyroid stimulating hormone (TSH). That’s one of the things I would be very interested in evaluating, not just for nutritional management, but for all the other treatment options that we use for hyperthyroidism. What is the best criterion to judge a cat as being euthyroid — total T4, free T4, or TSH? My guess would be from the pituitary/thyroid axis standpoint, TSH probably makes the most sense. But we don’t have as much information about using that test to monitor cats. So I think if their total T4 is in the middle of the range and the cat’s clinical signs are going away, I would consider that cat to be successfully treated. They definitely don’t need to be low, and, like Dr. Scott-Moncrieff indicated, the data show that hypothyroid azotemic cats have a shorter survival time. So in summary, we don’t need to bring them too low or have them hovering around the upper limit of the normal range.

Dr. Scott-Moncrieff: The other thing to talk about is that reference ranges aren’t the same from one laboratory to the next. For a methimazole-treated cat, if the T4 is anywhere within the reference range and the cat’s clinically well controlled, I’m really happy because with methimazole sometimes their T4 values really do bounce around a lot. I also agree that if we had a better TSH assay, it would be really helpful. That would give us a better idea of whether a cat with a T4 at the bottom end of the reference range is there because of its concurrent illness or because it’s trending toward being hypothyroid. I don’t think we really know that right now.

Regarding blood pressure, that’s something that’s really changed for me as far as managing hyperthyroid cats in the last couple of years. We used to be concerned about blood pressure before diagnosis, and then send cats home and not really worry about their blood pressure anymore. Now we know, based on the work out of the UK, maybe 25% of cats develop hypertension a median of 5 months after treatment for hyperthyroidism. I don’t think we really know for sure why, but I make blood pressure one of the parameters I monitor for all my hyperthyroid cats after treatment with radioactive iodine or methimazole.

Dr. Kir: I don’t think BPA is added directly to any of the pet food products that I’m aware of, but most all commercial cans are plasticized and so most have some level of BPA in them. What I tell my clients, if they’re concerned, is to feed a dry food. Some have asked, “What about feeding half canned and half dry?” For me, that’s a recipe for an obese cat. That’s what I do in my research colony when I need to make them fat so they’ll have insulin resistance and diabetes. So I’m concerned that, without portion control, that may not be a good thing.

Dr. Melendez: I don’t think you can find a can that’s not plasticized but, as Dr. Kirk said, those cans probably do have a little BPA in them, but it’s not something that is added to the food.

Dr. Kanara: So let’s follow up with a different question. What amount of protein should be fed to meet the needs of a hyperthyroid cat, including maintenance of muscle mass?

Dr. Kir: There are no data on the protein requirement in hyperthyroid cats. The only data that’s out there, that I’m aware of, is about digestibility of protein with aging, and it does show that very geriatric cats have a reduction in protein digestibility. And so there’s been a lot of discussion that old cats need very high protein pet foods because of that. But I don’t think that’s actually ever been demonstrated, and there certainly are no data that support that higher protein pet foods increase longevity and reduce disease incidence in older cats. So, yes, digestive function declines with age — we know that happens in people and other geriatric animals. Of the protein requirements that are established by the National Research Council (NRC) and Association of American Feed Control Officials (AAFCO), the AAFCO level is probably more than they need. I think the data in cats with kidney disease support that 3.5 g of protein per 100 kcal is sufficient to maintain health. Whether it’s optimum for immune function, I don’t know the answer to that. The amount of protein in y/d Feline is more than adequate. It provides somewhere between 8 and 9 g per 100 kcal. That’s considered a high-protein food in our Intensive Care Unit when we’re using total parenteral
nutrition (TPN), and I'm pretty comfortable that's a sufficient food for hyperthyroid cats.

In terms of maintaining lean mass, just one other quick comment. If you look at weight loss and weight regain, certainly you can prevent the loss of lean muscle mass by feeding a higher protein pet food. So for two foods that are equivalent otherwise, high-protein is going to maintain muscle mass better. And on weight regain, you're going to regain muscle mass better on a high-protein pet food. But with time and maintaining energy balance, we actually see that those animals eventually get to the same spot.

Dr. Kanara: Relative to protein intake, are there any other comments regarding cats that have been eating y/d Feline for extended periods (4 or 5 years)?

Dr. Melendez: Hyperthyroid cats that have been eating the limited-iodine food for a long period of time appear to maintain their body condition, unless they have another concurrent disease that creeps up along the way.

Dr. Kirk: We just finished evaluating two groups of cats with and without hyperthyroidism across a variable age range and looked at amino acid concentrations in those cats to determine whether or not there was evidence of protein malnutrition in cats that were losing weight. We also evaluated for specific amino acid deficits because tyrosine is important in thyroid hormone production. We were trying to determine whether tyrosine insufficiency may be contributing to a lack of or alteration in thyroid hormone production. And we really didn’t see any difference between hyperthyroid and normal cats. While there were very minor changes, they did not match the amino acid profile of protein malnutrition.

When we look at the differences between those very cachectic hyperthyroid cats that have significant muscle wasting compared with most cats we see now, those are different populations. And those early cats definitely had protein/energy malnutrition to the point of severe muscle wasting. I think the hyperthyroid cats we see now rarely have that syndrome. They’re losing weight because they’re energy deficient.

Dr. Kanara: If a veterinarian has opted to transition a hyperthyroid cat from anti-thyroid drugs to nutritional management, what’s the best way to do that? What are the considerations that a practitioner needs to take into account?

Dr. Scott-Moncrieff: My experience is based on four or five cats that were having problems with methimazole. My approach has been to stop methimazole and then start the transition to y/d. I think that has worked for me and I haven’t had any issues with immediate methimazole withdrawal. We’ve always discontinued methimazole for 1 to 2 weeks before radioactive iodine treatment and have never run into any problems. I think that makes more sense because I worry about the potential for making these cats hypothyroid, and I worry more about hypothyroidism than I do about hyperthyroidism. I don’t think that you need to worry about thyroid storm. I know that’s been out there, but I’m just not convinced that it really happens in cats.

Dr. Bruyette: I agree and I plan to adopt a simpler approach — when we transition them to the food, we’re going to stop the methimazole. I’d rather have cats with T4 values that are a little high initially than risk hypothyroidism in a cat that’s eating the limited-iodine food and still receiving methimazole.

Dr. Scott-Moncrieff: From a practical point of view based on my experience, and again I don’t have nearly the number of cats that Dr. Bruyette has managed, it helps for cats to have a really good appetite when you start them on a new pet food. I had one cat that wasn’t tolerating methimazole so we stopped it and began feeding y/d and the cat didn’t want to eat. So we stopped y/d and let the T4 increase and 2 weeks later the cat thought the food was great.

Dr. Kirk: Well there’s what we say, and what we do. We take them off methimazole and the few cats that we have are similar to Dr. Scott-Moncrieff’s cases. Typically, we’ll transition them over several days because cats that are sick or have concurrent diseases don’t like new pet foods (they’re neophobic). In contrast, healthy cats like new foods (they’re neophilic). So we consider that for hyperthyroid cats, a slower start, like 3 or 4 days, is probably the maximum transition that any of us have the patience to do.

Dr. Kanara: Are you planning any studies on pathogenesis? Your closed colony is an ideal study group for this.

Dr. Melendez: We are in the process of looking at some factors related to pathogenesis of hyperthyroidism. It’s early at this point, but the answer to the question is yes.

Dr. Bruyette: I think Dr. Scott-Moncrieff made a really good
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point when she was talking about those types of studies earlier; it will take a really long time. Some of the best information I’ve read in the veterinary literature in the last 10 years was about studies on dogs that were continued for a lifetime and still generate a large amount of data. Obviously, there are many things that would go into designing similar studies evaluating the pathogenesis of hyperthyroidism. For example, thinking about where the cats live (no flame retardants or plastics) – they would be cats in a bubble. But I think that those types of things from a pathogenesis standpoint would be very, very important, and we as a profession would have to look for something coming out in 10 to 20 years to give us information that we really need.

Dr. Scott-Moncrieff: I think it’s very important that we don’t lose sight of the pathogenesis of feline hyperthyroidism because I believe that cats are a sentinel for humans, and I think that we need to figure out what things are impacting feline thyroid health. And so just because we have one more management option, and that it’s even easier to manage your hyperthyroid cats, doesn’t mean that we shouldn’t be focusing on the pathogenesis of the disease. If you start evaluating the published literature and reading about all the chemicals that we’re being exposed to, it’s kind of scary. So I do think that we need to be thinking about pathogenesis.

Dr. Bruyette: For those of you who may not be aware, there was a recent publication for physicians as well as for patients regarding endocrine disrupters, and all of the various chemicals that are in the environment that affect endocrine function and other organs.

Dr. Kanara: Is it okay to feed y/d to healthy cats in a multi-cat household? And, if so, what considerations do you advise owners in multi-cat households?

Dr. Kirk: I’ll start on that one. You know, it’s really tough — owners have difficulty feeding a single pet food or a single quantity to one cat because of different needs and so it’s a challenge. I think looking at the potential of feeding all cats in the household a single food makes it easier to keep the one cat that’s hyperthyroid on its food. What has been recommended by Hill’s is to feed a small amount (1 tablespoon, dry or wet) of a life-stage appropriate food on a daily basis, because we know that very minor amounts of different foods with higher iodine concentrations are going to meet the needs of those cats. So from a practical standpoint, I think that’s probably going to be the most rational thing to do because it’s very difficult to feed a single cat in a multi-cat household.

Dr. Kanara: An additional related question — can you make a cat hypothyroid by feeding a limited-iodine food like y/d?

Dr. Melendez: When feeding y/d as the only form of management for hyperthyroidism, we have not had any hyperthyroid cats become hypothyroid. In the 1-year study by Dr. Karen Wedekind looking at healthy cats being fed iodine amounts similar to what’s in y/d, as well as a 6-month study conducted at Hill’s, no healthy cats developed any total T4 or T3 concentrations below the normal range.

Dr. Kirk: One thing that’s really difficult about determining a minimum iodine requirement in almost any species, but particularly in cats, is that there is a really strong adaptive phase with up- and down-regulation of the sodium iodide transporters. And so many of the studies looking at the minimum requirements are done short-term and they aren’t reflective of what occurs long-term. Long-term evaluations as recommended by Dr. Bruyette are going to be important in those cats. But the capacity of the animal to respond (absorb, retain, and recycle iodine from the body) and maintain thyroid iodine levels for sufficient thyroid hormone production seems to be quite profound. I think for those healthy cats that have normal functioning metabolism, they’re capable of adapting over the period of 3 to 6 months, and certainly the early studies looking at requirements were poorly done because they were either not allowed to have a long enough period of time for adaptation to occur, or they used foods that weren’t fully balanced for other reasons.

Dr. Kanara: We have a question about thyroid carcinomas: are they more likely to develop with nutritional management of hyperthyroidism?

Dr. Scott-Moncrieff: I think we know that looking at whole cat populations, thyroid carcinoma is quite rare. I’m really interested in thyroid carcinoma, so I’m always looking for them, but we don’t see thyroid carcinoma very commonly. The big question is whether or not there’s an increased rate of carcinoma in hyperthyroid cats that are managed medically as opposed to with radioactive iodine. The short answer is that we don’t really know. I think it’s possible that over time if you manage a cat...
for 5 or 10 years with methimazole, there’s an increased risk of thyroid carcinoma. With medical management, we’re not treating the abnormal thyroid tissue, we’re preventing it from producing thyroid hormone so it’s possible for mutations to occur that lead to carcinoma. But in the cats that we see, I haven’t recognized that. Do we see more cats with thyroid carcinoma that have been treated long term with methimazole? Some of the cats I’ve seen have been treated for 1 or 2 years, but I’ve also seen cats that have been treated for 5 or 6 years that have done fine. So I really don’t know. I think with any medical management that doesn’t cure the underlying abnormal tissue, there is some potential for an increased rate of thyroid carcinoma. But I think it’s still going to be pretty rare.

**Dr. Melendez:** We have evaluated thyroid tissue of 66 hyperthryroid cats in our colony that have died. These cats were managed with a limited-iodine food for 2 to 5 years and none had a thyroid gland that look histologically benign, but they don’t necessarily behave in a benign fashion. So I think, again, that’s a good question. That’s something that we need to continue to watch, but it’s not going to be an easy question to answer.

**Dr. Kirk:** I think there’s one epidemiologic study in dogs from a low-iodine area in Germany that suggests there might be a slight increase in risk of carcinoma, and there have been some of those suggestions in areas of variable iodine production in people as well. But there’s nothing published regarding cats, and I think the data again were fairly obtuse. So I wouldn’t say there was any cause and effect. It was all associations, and it was fairly mild. At this point, it’s something that would need to be tracked, but I don’t think there’s any evidence that supports it would be of concern.

**Dr. Scott-Moncrieff:** I think probably the most important part is that we can’t just start these cats out on nutritional management and then send them home to live a happy life. They need to be coming back in for geriatric monitoring, and I really think that an important part of that is to evaluate the size of the thyroid gland. I know that Dr. Melendez said that cats fed y/d do not have enlargement of the thyroid gland over time, but if iodine restriction is working the way we presume it is, it’s preventing the thyroid glands from synthesizing thyroid hormone because there’s no iodine, and you would expect that over time the thyroid glands are going to get bigger as they do with methimazole. Veterinarians can monitor changes in the thyroid gland over time, by palpation. I would emphasize that we need to make sure veterinarians are very comfortable being able to palpate feline thyroid glands. If you identify a change in the thyroid gland that would be a reason to say maybe this isn’t something we want to continue and consider other options such as radioactive iodine.

**Dr. Bruyette:** In general, I agree. There are a couple of things to add about carcinomas. We’re getting ready to go back and look at between 5,000 and 6,000 scans on cats that were taking anti-thyroid drugs before the scan, and try and stratify them by how long they were receiving the medications, to determine if we see any difference in the pattern of uptake on technetium scans. Now, that’s completely different than confirming a carcinoma because these are looking at scans and not histopathologic evaluations. The other thing that we sometimes see is cats referred for thyroid carcinoma because there’s a big mass in the neck or a mass that’s expanding, and there are lots of reasons why you can have a mass that isn’t carcinoma. It can be really hard to diagnose thyroid carcinoma even on histopathologic examination. Sometimes the pathologists go back and forth because the tumors look histologically benign, but they don’t necessarily behave in a benign fashion. So I think, again, that’s a good question. That’s something that we need to continue to watch, but it’s not going to be an easy question to answer.

**Dr. Kanara:** In closing, would each of you please share the one or two take-home messages or key points you’d like to leave with practitioners regarding nutritional management of feline hyperthyroidism?

**Dr. Scott-Moncrieff:** What I would say is that nutritional management is now another option for management of hyperthyroid cats. I think the most important thing that I would like people to remember is that every cat is going to be different. I think that for younger cats, or an owner who can afford definitive therapy with radioactive iodine, that should be the number one consideration. I think that y/d is another option for cats that cannot be treated with radioactive iodine and that do not tolerate methimazole. I think over time, we’re going to figure out how many cats will do really well long term with this pet food. I hope there will be ongoing discussions as we accumulate case experiences with this option. This is what we know right now. In a couple of years, I think we’ll know a lot more, and we’ll be able to give people better guidelines about which are the best cases for recommending nutritional management. But as I said, I’ve treated four or five cases, and I’ve been really happy with the cases that I’ve had experience with. It’s really given the owners options that they didn’t have before.

**Dr. Kirk:** I would echo those statements. I think radioactive iodine is still standard of care for most cats. But certainly, there are
a large number of cats where that just is not the correct option for them. In terms of the food, and its profile, I think it’s very good for cats that have concurrent kidney disease. I don’t believe that it’s a protein insufficient food. I think the ingredients are unique because they have to be, and ingredients in the pet food industry change day to day. So the comment was made earlier that there were foods that didn’t have iodine on the label, and so they might have been a cause for hyperthyroidism. The challenge is that the pork producers add iodine and vitamin A to increase reproductive fecundity in their animals, and so the ingredients that are now going into pet foods actually may have more iodine. So that’s important because what we know about mineral nutrition in particular is that the availability and the sufficiency of a certain concentration of a mineral is really matrix dependent. So what may be appropriate and sufficient in this food may not be sufficient in another food. Studies need to be done using a single matrix to make sure that you’re confirming that the protein and the iodine are appropriate. You can’t really extrapolate from one food to another when you’re looking at nutritional studies and minerals in many instances.

**Dr. Bruyette:** We see it every year in this profession, where something new comes out that looks like it’s potentially beneficial, and it’s been based on a number of studies or pilot studies with numbers of cats comparable to those that have been studied here, and I think what you’re going to see is what we’ve seen with virtually every other treatment option — what we say today, or a year or 5 years from now, is going to change. The practitioners in the world are going to be the ones who give us the most information about what’s happening because you’re going to treat more cats than we do. It’s going to be very important that we get that information so we can see what’s happening in the field, so that we can try and figure out why things may or may not be occurring the way that we expected. It will be an ongoing process. The bottom line is that it’s another option that will work quite well in cats, and will work quite well for some owners.

**Dr. Melendez:** I’d like to echo what’s been said. It’s another option for managing cats with hyperthyroidism, and appropriate patient and owner selection is very important. Monitoring patients is also important. I think that as we get more familiar with using this new modality, the more monitoring that we can do up front to learn as much as possible is going to be very important. And hearing about your experiences is also going to be incredibly important as well. We’re excited to have the opportunity to see how nutrition impacts disease conditions in older cats.

The audio file and transcript for this panel discussion on “Nutritional Management of Feline Hyperthyroidism” are also available at [HillsVet.com/Thyroid](http://HillsVet.com/Thyroid).