

Health in the Aging Animal

ASSIGNMENT 5: THE AGING PROCESS

Read this assignment. Then read pages page 1355–1376 in your textbook, *McCurnin's Clinical Textbook for Veterinary Technicians*.

Aging

Preventive health programs should be followed consistently for all patients, but this is especially important for the senior and geriatric pet population. The effects of aging in animals are similar to those in humans and include overall deterioration in physical and mental condition, organ function, and immunity. Although it's important to treat conditions once they become apparent, it's equally important to teach owners about how to recognize early signs of disease. The role of the veterinary technician is to do just that—educate owners. Early identification and treatment of disease can radically improve quality of life and lengthen life in senior and geriatric patients.

Aging is the animal's decreased ability to adapt to the changing environment. Younger animals are able to adapt to changes in environment and nutrient intake, but older animals may not be able to adapt as easily. They may not be able to handle nutrient excesses, deficiencies, or changes. Feed the aging pet a consistent food that doesn't vary in quality.

A lifetime incorporates the sum of the various life stages of dogs and cats. Age isn't a disease. However, understanding changing physiologic functions in aging pets requires an appreciation of the effect that aging has on body systems. Aging is a continuum, so although organized veterinary medicine has attempted to categorize life stages, these categories should be considered estimations (Table 1). General health, size, breed variations, and other factors affect life expectancy and how quickly animals age. This aging population of animals makes up more than 30% of your clients' pets.

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Table 1
Estimation of Lifestage Categories

Species	Pediatric	Young Adult	Mature Adult	Senior	Geriatric
Cats	Birth–12 months	1–6 years	6–10 years	10–14 years	14 years +
Dogs	Birth–12 months	1–5 years	6–9 years	9–12 years	12 years +
Dogs (Large and Giant Breeds)	Birth–12 months	1–2 years	3–5 years	6–9 years	9 years +

The three most common causes of nonaccidental death in dogs are cancer, renal disease, and heart disease. The average life span of a dog is about 12 years with cats averaging a lifespan of 14 years. Small and toy breeds of dogs generally live longer than large breeds. Males of either species have shorter lives than females. Animals that are allowed to roam freely outdoors typically don't live as long as those kept inside. Much of the increase in an animal's lifespan may be attributed to preventive medicine. Preventive medicine focuses on educating clients and working with patients to prevent the potential for disease. *Preventive medicine* involves vaccinating animals against disease, controlling parasites, maintaining sanitary conditions, proper nutrition, and detecting and treating diseases or abnormalities. As animals age, much of the medical management involves alleviation and control of diseases. The goal of feeding the aging pet is to increase its quality and length of life and decrease the risk of disease.

Aged animals react more slowly than young adult animals. Also older animals recover more slowly after exertion. Older dogs and cats are less sensitive to thirst and may not realize they're thirsty. This leads to an increased risk of dehydration. They also have a decreased ability to regulate their body temperature, which may increase the risk of hypothermia or hyperthermia. Overall, the senior patient has decreased functioning. Aging results in the loss of an animal's complete use of every organ and every organ function. Additionally, senior animals are unable to adapt to the physical and physiological effects of change.

Geriatric Care Program

Implementing sound preventive medicine principles in the veterinary practice is very important. However, there are other aspects of geriatric care to consider. The kinds of conditions that affect geriatric pets require different strategies for early screening and detection, client education, and treatment modalities than those that may occur in other life stages. All hospitals should have programs in place for senior pets. A protocol implementation would include the following elements:

1. Complete patient evaluation
 - In-depth history, including nutritional history
 - Thorough physical examination
 - Extended laboratory screening and testing
 - Specialized examinations
2. Proactive intervention
 - Extensive client education and counseling
 - Treatment planning and treatment of specific conditions
 - Preventive care
 - Relationship with and referral to specialists when appropriate
3. Quality-of-life and end-of-life issues
 - Pain management
 - Home care
 - Psychosocial and spiritual care

Various pathologic conditions associated with aging are discussed throughout the following sections of your study guide, as well as in your textbook. But an important part of geriatric care is *detecting* these conditions as early as possible.

Physical examinations shouldn't be limited to those body systems associated with current or presenting complaints. Anticipation of the normal decline in function should prompt a careful evaluation of potential problem areas, and a nose-to-tail examination should be performed. As a pet enters adulthood, clients should be educated that more proactive and extensive health screening—such as laboratory tests, diagnostic imaging, and in-depth neurologic, ophthalmologic, and cardiologic examinations—are to be expected as part of quality health-care delivery. Pet parents should be aware that appropriate geriatric care requires more than just responding to obvious problems. In senior pets, such recognition comes too late in the disease process to allow optimal medical intervention.

Unless clients are thoroughly educated along the way, they're far less likely to comply with your healthcare suggestions and more apt to "think about it" or "wait and see," to the detriment of the pet. Similarly, sharing medical findings and discussing changes in the pet's condition as well as providing compassionate care of the pet throughout its entire life are essential to maintaining your integrity as a medical professional.

Frequently, the technician is the client's most trusted confidant when it comes to the health of a pet. The technician is one of the primary communicators and educators with whom clients will come into contact during their relationship with the clinic. If the client asks questions beyond your comfort zone, it's perfectly acceptable to say you don't know and refer these questions to the veterinarian as promptly as possible. Acting as a liaison for clients and conveying the desired information to them, allows for the proper care of their four-legged family members—from youth to old age.

If your clinic doesn't provide specific geriatric-care protocols, consider compiling them for cats and dogs (and any other species for which you care). These recommendations, as client brochures or handouts, can become a helpful educational tool as well as provide a step-by-step protocol when it comes to clinic procedures.

A healthy reciprocal relationship with board-certified veterinary specialists is also important, and you shouldn't hesitate to offer the possibility of referral if the situation requires. For example,

anesthesia protocols for geriatric patients, advanced dental care, or complicated endocrine disease management may be best managed by a specialty hospital.

Diet and Exercise

Nutrition plays a huge role in the health of senior and geriatric patients. Proper nutrition helps an animal function to the best of its ability at every stage of the life cycle. Studies show that nutrition may affect aging as well. One study that looked at obesity and weight management found that dogs fed a slight restriction in calories lived almost two years longer than the control group of non-calorie restricted dogs. Imagine discussing nutrition with an owner and educating them that keeping their pet at its ideal weight can help reduce the risk for certain disease conditions, as well as potentially extending the life of their pet! Remember, older animals generally require fewer calories. Also, the food should be palatable and higher in fiber.

Obesity can be a frequent problem in older animals. To control obesity, feed a food moderately high in fiber and restricted in protein, sodium, and phosphorous. Obese animals need a high-fiber, low-calorie diet. On the other hand, some older dogs and cats may have a decreased appetite and decreased digestion and absorption abilities, resulting in weight loss. A palatable, higher-calorie diet offered in small multiple meals may help manage this problem. Since the older animal's senses of smell and taste may not function as well as those of younger animals, it may be necessary to feed a canned or moistened dry food. Warming the food also helps increase the aroma of the food, which may entice the pet to eat. Along with proper feeding, exercise is important in maintaining muscle tone and lean body mass in older animals. Exercise enhances circulation and improves waste elimination. Lack of physical exercise allows faster deterioration of many functions controlled by the brain. Taking the pet on a short walk or finding ways to increase physical activity will be beneficial. Remember—it's important to begin gradually and not overexert the pet or the owner. This causes frustration and will stop the exercise regimen before it truly begins.

Completing a Nutritional Evaluation

The following are some questions to ask the client when completing a nutritional evaluation:

- Can you tell me about the pet's activity level?
- Have you noticed any changes?
- Tell me about where your pet spends his/her days and nights.
- Have you noticed if your pet has lost or gained weight?
- What's the percentage of change of weight?
- What's the time frame of the change?
- How often do you body condition score your pet?
- Tell me the latest three scores that you've done.
- Does the pet have good hydration?
- Is water available at all times?
- How is it offered?
- Is the pet losing muscle mass?
- Tell me what your pet eats over a 24-hour period.
- What feeding method is used?
- Does your pet have a good appetite?
- How much food is offered at each feeding?
- Have you noticed any difficulties when your pet eats?
- Tell me of any recent changes in anything your pet eats.
- What doesn't your pet like to eat?
- Does the pet have any adverse food reactions?
- How is the food stored at home?
- Tell me about the treats your pet receives.
- Does your pet receive any medications? Supplements?

- Is the pet experiencing any vomiting or diarrhea?
- Tell me about your pet's sleeping habits.
- Tell me about your pet's toileting habits.

Answering these questions will help better identify problems and potential solutions in managing the patient, both in wellness and disease.

Obesity

Obesity is one of the more common clinical problems associated with malnutrition. The Association for Pet Obesity Prevention estimates that 54% of cats and dogs in the United States are overweight or obese! The definition of obesity states an increase in fat tissue mass sufficient to contribute to disease. Dogs and cats weighing 10–19% more than the optimal weight for their breed are considered overweight; those weighing 20% or more above the optimum weight are considered obese. Obesity has been associated with a number of disease conditions, as well as with a reduced lifespan. A combination of excessive caloric intake, decreased physical activity, and genetic susceptibility are associated with most cases of obesity. The primary treatment for obesity is reduced caloric intake and increased physical activity. Obesity is one of the leading preventable causes of illness/death and with the dramatic rise in pet obesity over the past several decades, weight management and obesity prevention should be among the top health issues discussed with every pet owner.

Obesity is caused by an imbalance of energy intake and energy expenditure—simply put, too many calories in, not enough calories out! There are several risk factors that affect energy balance. In today's society, indoor pets in the United States are typically neutered. While there are many positive health benefits associated with neutering, it's important that metabolic impacts and energy intake are addressed as well. Obesity occurs twice as often in neutered animals as in intact animals. Neutering an adult cat reduces its metabolic rate by 20 to 30%. We must remember to adjust the amount fed to compensate for the decrease in caloric need. Veterinary technicians should be comfortable calculating the amount to feed and explaining the amount to the owner. Also, sending home

the amount to feed in writing with a measuring cup will further benefit the owner and ensure the pet is receiving the proper amount of calories as recommended by the healthcare team. Other recognized risk factors for obesity include breed, age, decreased physical activity, and type of food and feeding method. A veterinarian should evaluate all obese or obese-prone patients for systemic-related diseases before beginning a weight-loss program, as obesity may be a secondary disease.

It's important to talk to owners about what goes into their pets' mouths on a daily basis. It's important to know the type of food (all food) fed, the feeding method (how much, how often), who is responsible for feeding the pet, and any other sources of energy intake (no matter how small or seemingly unimportant).

The following questions should be part of every pet owner discussion about nutrition:

- What brand of food do you feed your pet (try to get a specific name)?
- Do you feed moist or dry or both?
- How do you feed your pet—feeding method (how much, how often)?
- Does your pet receive any snacks or treats of any kind? If so, what and how often?
- Do you give your pet any supplements?
- What type of chew toys does your pet play with?
- Do you feed your pet any foods or treats not specifically designated for pets (such as human foods)? If so, what and how often?
- Does your pet have ANY access to other sources of food (neighbor, trash, family member, and others)?

The strategy for weight loss in overweight dogs and cats is to decrease the daily caloric intake. The majority of usual maintenance pet foods are balanced according to their energy density as well as the expected ingestion required to support a given body weight. It's important to note that if energy restriction is attempted by having the pet owner feed less

of their current food, the intake of all nutrients is restricted, not just energy. A deficiency in energy and other nutrients may occur if the amount of a maintenance food being fed is reduced to produce weight loss.

A better approach would be to use an energy-restricted food. A properly formulated restricted-calorie food will be complete with all nutrients except energy. Therefore, protein, essential fatty acids, vitamins, and minerals will be present in amounts sufficient to support normal physiologic processes and retention of lean body tissue, even when calorie intake is insufficient to maintain body weight. The goal of a weight-management food should be to restrict energy, not other nutrients. Pet foods sufficiently restricted in energy content are more suitable for weight management. Remember that pet foods marketed as restricted in calories can vary widely in caloric content, including the proportion of nutrients contributing calories, fiber, and digestibility. The recommended upper limit for dietary fat for weight loss in dogs is 9% DMB and for cats it's 10% DMB; for preventing regain of weight, the upper limit of dietary fat in dogs is 14% DMB and for cats no more than 18% DMB fat.

The range for fiber content of dog foods intended for weight loss should fall between 12 and 25% DMB and for cats between 15 and 20% DMB; to maintain the weight loss, the fiber range for dogs should be between 10 to 20% DMB and for cats between 6 and 15% DMB. It's important to remind owners that increased fiber in the diet may lead to more stools and potentially loose stools.

Protein in the diet affects weight loss in a few ways. Increased dietary protein and amino acids are necessary for pets on a weight-loss program to prevent loss of lean body mass. Dog foods for weight loss should contain at least 25% DMB crude protein (higher is better) to help combat loss of lean body mass. Dog foods intended for prevention of weight regain should contain at least 18% crude protein (higher is better). Cat foods for weight loss should contain at least 35% DMB crude protein (again, higher is better) for the same reason. These values are also suggested for prevention of weight regain in cats. We know the amount of protein is important in protecting against loss of lean body mass during weight loss, and so is the protein quality. The quality of a protein depends on the makeup of amino acids.

The maximum amount of carbohydrates in foods for weight loss in dogs is 40% DMB and in cats it's 35% DMB. To maintain the weight loss and prevent the weight from returning, the maximum amount of carbohydrates is 55% DMB and in cats carbohydrates shouldn't exceed 40%.

L-carnitine is a vitamin-like amino acid nutrient that can be found in all cells of animals. L-carnitine is involved in fat metabolism and the production of energy. It's responsible for helping convert fat to lean tissue. The recommended level of L-carnitine in foods intended for weight loss in dogs and cats is at least 300 ppm (parts per million) (DM) and at least 500 ppm, respectively. The same ppm amount is recommended for weight maintenance in dogs and cats as well.

Proper exercise is also a key component. Most clients don't provide enough exercise for themselves or their pets. Encouraging a daily walk for the pet will benefit both the client and the pet. Also veterinary technicians need to educate clients on how to assess their pet's body-condition scoring. The body-condition scoring goal for an animal is 3 out of a possible 5. (There's also a 9-point scale.) Those pets that score 4 out of 5 are moderately overweight; they should be evaluated for obesity and managed before they reach a score of 5. It's also recommended that the client bring the pet in for monthly weight checks.

Feeding a "light" food may be appropriate, but what exactly is a low-calorie or less-caloric food? In 1997, AAFCO set standards on caloric content for foods labeled "light," "lite," and "lean." Many foods probably would claim to be lower in calories or fat if manufacturers weren't required to meet certain standards. Foods that are marketed as "light" or "lite" must meet the following requirements:

- Dry dog foods must have fewer than 3,100 kcals ME (metabolizable energy)/kg of food and 9% fat as fed.
- Semi-moist dog foods must not exceed 2,500 kcals ME/kg of food and 7% fat as fed.
- Moist dog foods must not exceed 900 kcals ME/kg of food and 4% fat as fed.

- Dry cat foods must not exceed 3,250 kcals ME/kg of food and 10% fat as fed.
- Semi-moist cat foods must not exceed 2,650 kcals ME/kg of food and 8% fat as fed.
- Moist cat foods must not exceed 950 kcals ME/kg of food and 5% fat as fed.

Clients should also be educated on the breeds that are at risk for becoming obese—especially if they own one of the breeds. Beagles, Golden Retrievers, Labradors, Dachshunds, Cocker Spaniels, and Pugs are just a few examples of breeds that commonly experience obesity.

What's the correct feeding method for obese or obese-prone pets? Free feeding, or overfeeding, is contraindicated in obese patients, as they'll most likely consume too many calories. Meal feeding is the most appropriate feeding method. Ask clients if they're able to feed the pet more than twice a day. If the client is unable to do so, then a modified method will have to be created. Clients should offer their pet small, multiple meals throughout the day. Divide the total amount of food calculated to be fed into three to six feedings and offer the measured portion of food to the pet in a meal setting. Remember to exclude treats or to factor appropriate treats into the amount fed each day. Treats shouldn't exceed 10% of the total calories fed. Offer weight-reduction foods as a treat to the pet. Measure an amount of weight-reduction food into the treat container. Offer a few kibbles as a reward or treat, but remember to subtract the amount fed as treats from the total daily amount fed.

Decline of Bodily Systems

As an animal ages, the various systems that make up the body decline. Although these changes are easier to see in older animals, they actually begin much earlier in life. Different body systems decline at different rates. The effect of aging on many body systems can make an animal more susceptible to disease or may actually result in disease. This topic will be covered in more detail in the next assignment.

Skin

Older animals lose the elasticity of their skin, which results in wrinkling. They also may have a dry, flaky hair coat with possible hair loss. The cause may be due to aging or an endocrine or nutritional problem. The most common skin *neoplasias* (cancer) in older animals are *lipoma* (benign fat tumors), *mast cell tumors*, *sebaceous gland hyperplasia* (abnormal multiplication of cells that produce sebum), *adenoma* (benign glandular tumor), and *papilloma* (warts). In dogs, half the skin tumors are malignant, whereas cats have three times as many malignant masses as benign masses. An animal's skin tends to become more folded and wrinkled with age because of fat in the dermis and a loss of elasticity.

Gastrointestinal Tract

Constipation is a common problem in the older animal. The motility of the gastrointestinal tract is decreased. The decrease in motility causes the stool to dry out and become difficult to pass. Feeding a higher-fiber canned food and increasing the pet's water consumption will be beneficial to managing constipation. Older pets may also have a difficult time swallowing because of the loss of muscle tone and decreased salivary secretions. Liver function is decreased, which also may affect digestion. The animal may not be able to digest the nutrients as efficiently, which might result in reduced nutrient digestibility or weight loss. *Pancreatitis* (inflammation of the pancreas) is also more common in the older animal. It's important not to feed a food too high in fat.

Cardiovascular System

Heart disease is one of the top three causes of nonaccidental death in dogs. The most common cardiac disease is *chronic degenerative valvular disease*, which leads to heart failure. *Hypertension* is a common serious disease in cats and dogs. Nearly 75% of dogs with renal disease have hypertension. Most veterinary hospitals don't check blood pressure in older animals. Hypertension easily can be managed with nutrition and medical observation. Feeding a restricted sodium and chloride food will benefit the cardiac patient.

In dogs and cats, cardiovascular disease is a common disorder with an estimated 11% of canines and 20% of felines affected. Chronic valvular disease has been found to be the most common acquired heart disease in dogs with an overall incidence greater than 40%. Chronic mitral valvular disease is the most common acquired cardiac abnormality in dogs, affecting more than one-third of patients over 10 years of age. The prevalence of valvular disease has been found to be higher in small-breed dogs. Acquired valvular disease in cats is rare. Following the discovery that taurine deficiency was the principal cause of dilated cardiomyopathy in cats in 1987, the prevalence of this disease has decreased significantly. Hypertrophic and restrictive cardiomyopathies are more prevalent causes of myocardial failure in cats.

Nutrition is an important component in managing cardiac disease and each cardiac patient should have a nutritional assessment and specific dietary recommendation as part of their overall management. The goals of nutritional management of cardiac patients include

1. Maintaining the pets' ideal body condition
2. Maintaining appropriate balance of nutrients
3. Receiving benefits from pharmacologic doses of certain nutrients

Endocrine and Reproductive Systems

As animals age, the hormones produced by the endocrine glands are less effective on their target organs. This poor response may be due to the poorer ability of the cell to make the hormone, the inability of the circulatory system to deliver the hormone, or the decreased ability of the target organ to respond.

Intact dogs and cats are at higher risk for diseases involving the reproductive system, which is greatly influenced by the endocrine system. Changes in the thyroid, pituitary, and adrenal glands may cause the testicles in an intact male to shrink. The testicles have a higher risk of developing tumors. The most common disease among intact male dogs is prostate disease. Prostatic cancer is seen in dogs over the age of 10.

The intact female dog is at risk for uterine infection and mammary cancer. *Pyometra*, an infection of the uterus, is a very common disease. The only treatment is to surgically remove the pus-filled uterus. The patient is generally in poor health, and the surgical risk is higher. The mammary glands may also develop cysts, fibroids, or tumors. If the female is spayed before the first heat cycle, the incidence of mammary cancer is completely preventable.

Muscular and Skeletal Systems

The most obvious signs of change in the muscular and skeletal systems are loss of muscle mass and thinning of the bones (*osteopenia*). Degenerative joint disease is a common musculo-skeletal disorder. Older dogs have limping episodes that need veterinary intervention. Animals at risk for degenerative joint disease or osteoarthritis should be monitored closely, and their weight should be managed to prevent obesity.

Respiratory System

The older animal has an increased risk of respiratory infection. Chronic bronchitis and obstructive lung disease are common problems associated with aging. The senior animal experiences changes in the vital capacity of its lungs and the compliance of the lung tissue. The animal's respiratory rate increases to compensate for the respiratory disease. Oxygen doesn't diffuse through the tissues as easily as in a younger animal. This decrease in function may lead to confusion in animals, especially at night, when their breathing during sleep may be somewhat decreased.

Urinary System

A normal part of aging is a decline in the function of the kidneys. Renal failure is the second-leading cause of nonaccidental death in dogs. The average age of the renal patient is 7 years. Older animals have smaller kidneys than younger animals. They also have fewer *glomeruli*, the functional units of the kidney. The kidney has reduced renal blood flow, decreased filtration of wastes through the glomeruli, a decreased ability

to concentrate urine, and a decreased ability to maintain the sodium, water, and acid base balance of the body. A pet with renal disease should be fed a food restricted in protein, phosphorus, and sodium chloride.

Nervous System

Degenerative myelopathy and *intervertebral disk disease* are commonly seen in dogs over the age of 7. If a pet lives long enough, it will experience a loss in cognitive function. Older animals may have altered sleep patterns, wander aimlessly or pace, experience periods of confusion, or not be able to recognize normal surroundings. They may not greet family members normally or may have house-soiling accidents.

These are examples of decreased cognitive function, which is common in older animals and often goes undiagnosed. A client may believe this is just part of getting old or senile. He or she may believe the only solution is euthanasia when things get too difficult to handle. Aging, disease, environmental factors, and nutrition may affect cognitive function. An animal with renal or liver disease has an increased risk of cognitive dysfunction due to toxins building up in the body. Carbon dioxide, oxygen, and carbon monoxide are all environmental factors in which free radicals are produced. The free radicals attack the brain and other parts of the body. The brain is high in fat and is very appealing to free radicals. Over time, these free radicals can reduce brain function and may cause behavioral changes. Free radicals are made in the mitochondria of the brain cells. Damaged mitochondria produce less energy and more free radicals, which causes neuron loss, brain tissue atrophy, and beta amyloid deposition in the brain tissue. Aging also causes the brain to change in shape and decrease in weight. Circulation of blood to the brain also decreases, resulting in a lack of oxygen.

Early research points to feeding foods high in antioxidants, specifically vitamins E and C to neutralize the free radicals. DHA and EPA, N-3 fatty acids, will help protect cell membranes from free radicals. Lipoic acid and L-carnitine help maintain the mitochondria and reduce the production of free radicals. Carotenoids and flavonoids also help reduce cell damage by searching for free radicals. Nutrition is a key element in successfully managing the older patient.

Sensory Organs

Older animals have a decreased ability to smell, taste, see, and hear. Their ability to smell and taste may affect their desire to eat. Poor eyesight and hearing loss may affect their daily routines. Cataracts, glaucoma, and degenerative retinal diseases affect many older dogs. If a dog or cat suffers from vision loss, instruct the client not to move the furniture; pets can compensate quite well if their environment doesn't change significantly.

Oral Disease

Older animals produce decreased amounts of saliva, which increases the risk of oral disease. Dental plaque and calculus (tartar) accumulate on the surface of the teeth, increasing the risk of tooth loss. Tooth loss may be preceded by inflammation and recession of the gum tissue. An animal with advanced renal failure also may have oral ulcers. This may prevent the pet from eating enough food to meet its energy needs.

Oral disease also may contribute to weight loss. One of the greatest factors in helping animals to live long and healthy lives is proper dental care at this age. Oral disease is the most common health problem of adult dogs. Eighty percent of dogs over the age of 3 have some form of oral disease, gingivitis, and/or periodontal disease. *Gingivitis*, the most common form of dental disease, is an inflammation of the gingiva, or gum tissue. Gingivitis is completely reversible with good oral care. Without such care, gingivitis will progress to periodontitis, or periodontal disease. *Periodontal disease* is the regression of the inflamed gingiva with potential bone loss. The supporting structures become damaged, and tooth loss may be inevitable. Periodontal disease is irreversible, so action should be taken to manage gingivitis before it proceeds to periodontal disease. The patient with a healthy mouth will live longer than one with untreated oral disease.

The material that accumulates on teeth is a combination of enamel pellicle, dental plaque, tartar, and stain. *Enamel pellicle* is a thin film composed of proteins that covers the teeth. *Dental plaque* is pellicle with bacteria, proteins, cellular debris, and food materials. Plaque isn't removed easily from pets' teeth,

and pets are unable to reduce it by drinking water or eating. If plaque isn't removed, it hardens with mineral deposition; tartar, or calculus, now covers parts of the teeth. These substrates covering the teeth set the stage for oral disease, which will negatively affect the pet over time.

The breed does play a role in the risk of dental disease. Smaller dogs and brachycephalic breeds are at a higher risk for dental disease. Dogs that breathe with their mouth open (such as many brachycephalic breeds) have a higher risk for dental disease. Mouth-breathing dries out the oral cavity and irritates the oral tissues. The irritated tissues create an increased risk for oral disease. Smaller breeds may also have overcrowded teeth or a misaligned bite, which also increase the risk for dental disease.

Cats develop *resorptive lesions*, which are noncarious deficits in the enamel, cementum, and dentin of the teeth. Purebred cats seem to be at a higher risk than domestic cats. There's no known cause or preventive measure for resorptive lesions.

Each time an animal visits the veterinary hospital, the veterinary technician has an opportunity to help educate the client about oral care. Clients need to be educated about the importance of oral health to the long-term health of their pet. "Flip the lip" of the pet on every visit. The client will appreciate your care and attention.

There are several methods that clients can use to help manage their pets' oral disease. You may recommend that the client brush the pet's teeth. Although this is a great way to manage oral health, the number of clients who actually brush is very low. Another method is to feed a food specifically formulated to either prevent or manage oral disease. Not all products are effective. The healthcare team has the responsibility to understand how each product works and recommend foods with a solid dental benefit. The Veterinary Oral Health Council (VOHC) is a third party that evaluates veterinary dental foods, as long as the manufacturer is interested in promoting the oral care seal on its product. The oral care seal is another way to verify the efficacy of the product and the research behind the food. Visit www.vohc.org for the most current listing of products that have received the VOHC seal of acceptance.

The key nutritional factor for preventing or managing dental disease is feeding a food that will promote chewing and mechanical cleansing of the teeth. That dry food keeps teeth clean is a myth. Regular dry kibble breaks apart and doesn't provide mechanical cleansing. Dry foods that provide mechanical cleaning of the tooth surface are the dry foods that will actually provide oral health. Minerals like calcium and phosphorus should be restricted, as they promote calculus formation.

Before proceeding to the next assignment, take a moment to complete *Self-Check 5*.



Self-Check 5

1. *True or False?* As cats age, they become less active and gain lean body mass.
2. What are the three most common nonaccidental causes of death in pets?

3. *True or False?* An animal with a healthy mouth is more likely to live longer than one with oral disease.
4. What are two common gastrointestinal problems that older animals face?

5. _____ are the functional units of the kidney.

Check your answers with those on page 132.

ASSIGNMENT 6:

DECLINE OF BODILY SYSTEMS

Read this assignment. Then read pages 1377–1397 in your textbook, *McCurnin's Clinical Textbook for Veterinary Technicians*.

Renal Disease

Renal disease is a significant cause of nonaccidental death in dogs and cats. There are four stages of the disease:

- Loss of renal reserve
- *Renal insufficiency* (insufficient excretion of wastes by the kidneys)
- *Azotemia* (an abnormally high level of nitrogen-type wastes in the bloodstream, caused by conditions that reduce blood flow to the kidney and therefore reduce the filtration of the blood)
- *Uremia* (advanced-stage kidney failure in which urea and other nitrogen-containing wastes are found in the blood)

When a pet loses renal reserve, there are no clinical signs or blood-level elevations. This loss of functional units of the kidney is part of aging, and early detection is impossible. The pet must lose 66% of renal function before any clinical signs are evident. The pet may or may not have any clinical signs. The pet may be drinking more water or urinating more than usual. Oftentimes, however, the pet owner doesn't notice these signs in their pet. Blood analysis typically doesn't reflect any abnormalities.

The most important screening test is the *urinalysis*. The pet may not be able to concentrate its urine. If the specific gravity of the pet's urine is below 1.025, it may have renal insufficiency. If the pet is unable to concentrate its urine above a specific gravity of 1.030 (dogs) or 1.035 (cats), it may be experiencing renal tubular damage. The pet also may be losing protein in the urine, which is abnormal. The veterinarian will need to determine a treatment plan based on the technician's laboratory findings.

If a pet loses 75% of renal function, typical clinical signs include vomiting or diarrhea, weight loss, drinking a lot of water, urinating excessively, or acting lethargic, anorexic, and possibly dehydrated. It's often these signs that motivate the owner to take their pet into the veterinary hospital. However, at this point 75% of the kidney is no longer functioning. The pet's blood pressure may be elevated, and toxins may be accumulating in the bloodstream. *BUN (blood urea nitrogen)* values and creatinine (Cr) values also will be elevated. When the pet loses 90% of renal function, it's extremely ill. The pet is in advanced renal failure and no renal reserve tissue remains. The pet will have high levels of toxins in the bloodstream (BUN and creatinine) and all the same clinical signs, with the addition of profound weight loss and possibly oral ulcers. It also may have been unresponsive to nutritional management.

Nutritional Management

When addressing renal disease, the goals of dietary management are to maximize the quality and quantity of life of the pet by ensuring adequate intake of energy, limiting the extent of uremia, and slowing the rate of progression of the disease. Nutritional therapy is aimed at the following:

1. Reducing the workload of the kidney and improving kidney function
2. Slowing ongoing damage to the kidney
3. Reducing the accumulation of toxic waste and signs of illness
4. Providing highly palatable and optimally balanced nutrition

In an attempt to keep as much of the kidney functioning as possible, we want to intervene with nutritional therapy as early as possible. As mentioned, a study of chronic renal failure in dogs fed a food lower in protein, phosphorus, sodium, and vitamin D, and higher in Omega-3 fatty acids versus a control adult food found dogs on the “test renal food” lived over three times as long versus those with the control food. It was also found that the dogs on the test food were 50% less

likely to suffer clinical signs of renal failure, thus improving their quality of life. Finally, the kidney function of the dogs on the test renal food remained stable for a longer period of time.

Research in dogs and cats with advanced renal disease has shown that decreasing the level of phosphorus consumed in the food slows the progression and reduces the severity of renal disease. Restricting phosphorus throughout the animal's life may reduce the progression of renal disease in its earliest stages, when the disease is difficult to diagnose. It's also important to avoid feeding a food with high levels of protein, sodium, and chloride. Restricting these nutrients early in life also may slow the progression of renal disease.

Approximately 75% of dogs with renal disease are also hypertensive. Nearly 50% of cats with renal disease and high blood pressure (*hypertension*) were fed a low-sodium food that lowered their blood pressure. Reducing sodium and chloride will help decrease the animal's blood pressure and decrease the potential damage to the kidneys from high blood pressure.

Nutritionally treating a pet with renal insufficiency can be quite successful. The pet should be fed an energy-dense food restricted in protein, phosphorus, and sodium chloride. The calories should be provided in nonprotein calories. The protein content should be less than 15% in dogs and less than 30% in cats. Phosphorus should comprise 0.15 to 0.3% of dry matter for dogs and 0.04 to 0.6% of dry matter for cats. Sodium chloride should be restricted to less than 0.25% of dry matter for dogs and less than 0.35% of dry matter for cats. In cats, it's important to supplement potassium to prevent *hypokalemia* (abnormally low potassium concentration in the blood). The advanced renal failure patient should be fed a food further restricted in protein and phosphorus.

Liver Disease

The liver is the hardest-working organ in the body and is responsible for more than 1,500 different functions. Nonetheless, it's the only organ able to regenerate tissue. The liver is responsible for breaking down and processing dietary amino acids, carbohydrates, fats, and vitamins. The liver metabolizes

hormones and drugs and synthesizes proteins, glucose, and blood-clotting factors. The liver stores vitamins and minerals, converts ammonia to urea, and excretes internal waste products into bile. *Bile* serves as a vehicle to transport and eliminate internal waste products. Bile is secreted by the liver and emulsifies dietary fat in the gastrointestinal tract with the help of bile salts. Bile is eliminated from the body.

The liver has endless responsibilities; it's no surprise that when disease affects the liver, the total body is affected. If the body wasn't producing bile salts, the animal would be unable to absorb fat and fat-soluble vitamins. If the liver is unable to break down the waste product ammonia to urea, the pet would have high levels of ammonia and demonstrate signs of encephalopathy. If the liver is unable to produce plasma proteins, the pet may experience *ascites* (accumulation of serous fluid in the abdominal cavity). If the liver is unable to produce enough clotting factors (fibrinogen, prothrombin, and factors V, VII, IX, and X), the pet will be prone to bleeding. As you can see, the liver is one of the body's most important organs.

The liver also is very susceptible to toxins, bacterial infections, cancer, and cardiac insults. The liver receives more venous blood flow than any other organ. It processes the blood and removes the toxins and nutrients for storage before the heart receives the blood. This helps prevent a systemic infection from occurring. It also helps prevent the circulation of other harmful substances in the body.

When disease strikes the liver, it may be a primary disease or, more commonly, a disease secondary to another problem. The primary diseases may be due to liver necrosis, liver degeneration, inflammation of the liver, regeneration of the liver, and fibrosis of the liver.

The goals of dietary intervention for the liver patient are to decrease the workload of the liver, restore normal function of the liver, slow the progression of the disease, avoid toxic waste products produced by the liver, and support liver repair and regeneration (Table 2). It's important to feed a food that will provide adequate energy. Carbohydrates and fats should provide most of the energy. This will prevent the breaking down of protein for energy, which creates higher levels of ammonia.

Protein levels should be restricted but should be of a high quality to decrease the workload of the liver and decrease waste products. Egg, vegetable, and dairy protein sources are recommended over meat sources. Dietary fiber may be beneficial for the liver patient. Dietary fiber helps reduce the amount of nitrogenous wastes in the intestinal tract. Carnitine has been shown to help transport fatty acids across the mitochondrial membrane for beta oxidation. Studies have shown that L-carnitine supplementation seems appropriate for obese cats undergoing weight reduction and in cats with hepatic lipidosis.

Table 2
Key Nutritional Factors for Dogs and Cats with Liver Disease

Nutrient (DMB)	Dog	Cat
Energy density (kcal/gm)	≥4.0	≥4.2
Protein (%)	15–20	30–35
Carbohydrate (%)	45–55	30–40
Total dietary fiber (%)	3–8	3–8
Sodium (%)	0.08–0.25	0.07–0.3

Heart Disease

The heart is one organ that typically is affected as pets age. Heart disease is one of the top three causes of nonaccidental death. There are three stages or classifications of heart disease. In *class one*, the patient doesn't show symptoms. Heart disease is detectable, but the patient isn't exhibiting any clinical signs. *Class two* is mild to moderate heart disease. The patient may exhibit clinical signs of disease, but at this point heart disease

isn't harmfully affecting quality of life. The patient may exhibit exercise-intolerance, mild coughing, or fluid retention. *Class three* is advanced heart failure and the pet is unable to compensate. Outward clinical signs of congestive heart failure are seen and experienced by the pet. The pet may have respiratory distress, ascites, and significant exercise intolerance. The greatest risk factors for heart disease are the breed of the animal, obesity, and kidney disease.

The most frequently encountered problems associated with cardiovascular disease that require nutritional modification are fluid retention states associated with chronic congestive heart failure (CHF), primary or secondary hypertension, obesity, cachexia and myocardial diseases related to a specific nutrient deficiency (taurine and carnitine) and electrolyte disorders that may predispose to cardiac dysrhythmias.

Effective treatment requires a multifaceted approach, of which nutritional management is an important component. Foods designed for patients with cardiovascular disease should supply age-appropriate nutrition and specific nutrients that may help manage hypertension, decrease fluid retention and control the signs associated ascites, maintain heart muscle function, help slow the progression of concurrent kidney disease, and help counter the loss of nutrients in the urine of pets prescribed diuretics.

Heart failure is characterized by inadequate cardiac output and insufficient delivery of nutrients relative to tissue metabolic needs. Heart failure is a clinical syndrome that results from a variety of structural and functional disorders of the heart or great vessels. Clinical manifestations of heart failure are due to reduced cardiac output (weakness, exercise intolerance, syncope), pulmonary congestion (dyspnea, orthopnea, cough, abnormal breath sounds with crackles and wheezes), systemic fluid retention (jugular venous distention, hepatomegaly, ascites, pleural effusion) or a combination of these conditions. Obesity and chronic bronchitis often occur in dogs and cats with heart disease and cause clinical manifestations similar to those of heart failure, which can further complicate the diagnosis.

Knowing the risks are important; this creates an opportunity for you to educate clients about the best care for their pets. Obesity is a preventable risk factor for heart disease. The obese patient experiences signs of heart disease like exercise intolerance, weakness, and increased respiratory rate, all of which mirror the clinical signs of heart disease. Reducing the patient's weight will resolve any of the clinical signs. Obesity can cause cardiac changes that later will worsen the pet's heart disease. This is another reason to help the client manage the overweight pet. The key nutritional factors for the heart disease patient are sodium, chloride, potassium, magnesium, energy, phosphorus, taurine, and carnitine. Since congestive heart failure causes fluid retention, it's important to restrict sodium and chloride.

Normal dogs are able to excrete excess levels of sodium, but the cardiac patient loses this ability. Therefore, it's important to restrict sodium and chloride. Sodium and chloride levels also affect the pet's blood pressure. Many pets with heart disease are hypertensive. Reducing sodium and chloride levels will help manage high blood pressure.

Potassium and magnesium may be lost with the use of diuretics. Potassium and magnesium should be supplemented if a specifically formulated food for heart disease isn't instituted. Phosphorus should be restricted in the cardiac patient's diet. Phosphorus can be damaging to the kidney and has been shown to increase the progression of renal disease.

Taurine is supplemented in both feline and canine patients suffering from cardiomyopathy. Cardiomyopathy due to taurine deficiency was common until the late 1980s. The discovery of the relationship between a deficiency of taurine, which is an essential amino acid, and the development of cardiomyopathy has nearly eliminated this condition. Carnitine also is supplemented in canine patients suffering from cardiomyopathy. Carnitine is used by heart cells for fatty-acid metabolism, generation of energy, and detoxification of certain metabolic compounds.

Patients with heart disease have difficulty excreting excess levels of sodium. If an animal has heart disease, it's a good idea to feed food that's formulated for its condition. It's always important to make a gradual change from the food the client is currently feeding to food formulated for heart disease. Evaluate the sodium content of the current food so that a gradual transition can be made to a food with a lower sodium content. This allows the patient to compensate gradually.

Cancer

Cancer is one of the most alarming yet potentially treatable diseases a veterinarian can diagnose. Most clients know someone with, or they themselves have had, cancer. The word itself invokes fear. The client may be shocked by the diagnosis of cancer yet terrified by the thoughts of chemotherapy. In a study done by Morris Animal Foundation, pet owners were asked how their pet died. More than 45% of pet owners said their pet died of cancer. Pets, like humans, are living longer, and cancer is becoming more prevalent.

What causes cancer? There isn't definitive proof, but breed, age, and environment all may be factors in the incidence of the disease. Dogs are living longer and develop cancer later in life. Dogs are generally 10 to 12 years old when they're diagnosed with cancer. Certain breeds may be at a higher risk for developing cancer. Golden Retrievers and Boxers are two breeds that may have a higher risk of being diagnosed with *lymphosarcoma* (cancer of the lymphatic system) and *mast cell disease* (an abnormal increase in the number of cells that control the body's allergic reactions). Dogs over 55 pounds have a higher risk for lymphosarcoma and *osteosarcoma* (bone tumors). It's important to understand the types of cancer and prevalence to better educate the client on what to watch for in their older pet.

There are now good treatment plans to help support the patient, including surgery, chemotherapy, and nutrition. This *multimodal approach* (joining together several treatment plans) may help increase the patient's chances of beating the cancer. Feeding the right food can increase the pet's quality of life and life span. The cancer patient has specific nutritional requirements as compared with the healthy older dog. Cancer alters the dog's carbohydrate, fat, and protein metabolism.

The pet's ability to use carbohydrates is significantly affected; the cancer patient is unable to metabolize carbohydrates normally. The tumor prefers glucose as an energy source, but lactic acid is generated as a by-product. The dog then must expend energy to convert lactic acid back to glucose, resulting in a benefit to the tumor and a loss of energy for the dog. As a by-product of glucose metabolism, the patient has high levels of insulin and lactate in the bloodstream. High levels of lactate cause further energy loss when the body converts lactate back to glucose. Feeding high levels of carbohydrates will feed the tumor and starve the patient. Many adult or senior dog foods are higher in carbohydrates. It's recommended to feed a food with less than 25% carbohydrates.

The tumor also has an affinity for protein. The tumor may prefer breaking down proteins for energy through gluconeogenesis. The cancer patient must be fed high enough levels of protein, but the source must be of high quality. This need is like a "tug of war." The body is tugging for a specific amount of protein, and the tumor is tugging for its share as well. The protein level should be between 35 and 48% on a dry matter basis (DMB). The levels need to exceed adult or senior levels to prevent lean body mass loss and cachexia (general ill health and malnutrition). It's imperative to feed high-enough levels of the amino acid *arginine* to prevent immunosuppression. Arginine should be at least 2% DMB.

Increased levels of fat and the use of N-3 fatty acids have been shown to be beneficial to the cancer patient. Dietary fat is an essential energy source for the patient, and the tumor doesn't use fat efficiently for energy. The dietary fat levels should be between 27 and 35% of the food's dry matter. Studies demonstrate that N-3 fatty acids inhibit tumor formation or growth and support the immune system. N-3 fatty acids help prevent the patient's immune system from becoming compromised or suppressed. N-3 fatty acids should be at least 5% of the food's dry matter.

There's strong data to demonstrate that feeding a food formulated for the cancer patient along with providing a chemotherapy regimen will increase the patient's survival time (Table 3). In the published studies, patient survival times were increased by 29%, and the patients' quality of life

also was believed to be higher. Another study involving patients receiving radiation treatment found the food to be protective against radiation burns. The N-3 fatty acids in the food also help protect cells from radiation damage during treatment. Those patients receiving radiation and consuming this nutrient profile experienced reduced side effects. Often, clients want to play a role in their pet's care. Feeding a food designed to help cut down on the negative effects of cancer is one way for them to do so. When feeding the cancer patient, always understand that the cancer treatment may affect the desire to eat. Chemotherapy causes alterations in human patients' ability to smell or taste. Chemotherapy affects the desire to eat, and patients may be nauseated, have diarrhea, or develop food aversions. It's believed that veterinary patients also may experience these side effects. Good nursing care and communication will help clients manage their pet in difficult times.

Table 3 Cancer Key Nutritional Factors for Canine Cancer (Dry Matter Basis)	
Nutrient	Percentage
Protein (%)	35–48
Fat (%)	27–35
N-3 Fatty Acids (%)	>5
Carbohydrates (%)	<25
Arginine (%)	>2

Uroliths

Urinary crystals and bladder *uroliths* (also referred to as stones) occur in animals of all ages and many breeds. How do uroliths form? Urine is a very complex solution. There are components in the urine that inhibit crystal and stone formation. Conversely, there are those that promote crystal and stone formation. If the minerals that make up a stone are present in the urine at high concentrations, or if the minerals are present in high concentrations and the urine concentration or specific gravity increases, the minerals are likely to come out of solution and form a crystal. If there's an infection in the bladder, or if the pet has a physiological defect in the bladder, the pet is at higher risk for crystal formation.

Not all crystals will form into larger uroliths. Minerals are building blocks for uroliths and if there are enough of these minerals available in the urine, in conjunction with the right environment in the urinary tract, uroliths may form. Think of urolith formation as being similar to making rock candy. First, heat some water, and then dissolve as much sugar into it as possible. Remove the solution from the heat, and dip a string into the solution repeatedly. Sugar crystals will come out of solution and attach themselves to the string. Repeated dipping of the string will increase the size of the sugar crystal forming on the string. This experiment illustrates how stones form in the bladder. If the animal drinks enough water to lower the concentration of the urine, the minerals will be unable to form crystals. Along with restricting the minerals that make up the stone in the food offered to the pet, it's imperative that the pet's water consumption be increased. Increased water consumption will help prevent crystal and stone formation. Consider offering distilled or demineralized water. However, there's no data to suggest that a pet's consuming water high in minerals creates a higher risk for crystal formation. Tap water may have an offensive smell or taste that may decrease intake. Educate clients on the use of water fountains aimed at enriching the cat's environment. Instruct the client not to salt the food or use bouillon cubes to increase the pet's interest in the water. Bouillon is high in sodium and may increase the risk of forming calcium oxalate crystals. One method of increasing water consumption is to feed a canned food when trying to manage crystal and stone formation.

Struvite uroliths (uroliths comprised of ammonium, magnesium, and phosphate salts) can be dissolved with nutritional intervention. The majority of other types of uroliths must be removed surgically. Veterinary technicians must understand the causes of each type of urolith and know what preventive measures can be taken to prevent urolith formation (*crystalluria*).

Human-Animal Bond

The human-animal bond is a very strong emotional bond that ties animals and humans together in a manner beneficial to both the pet and the human. The bond is formed through respect, trust, devotion, and love for each other. In today's society, owners treat pets as their children and/or their closest friend. The human-animal bond typically is a very deep, strong, and lasting bond. The veterinary healthcare team helps to strengthen the human-animal bond, and with each visit educates the owner further on how to properly care for their pet. As the bond forms among the owner and pet, especially over a lifetime of visits to the veterinary hospital, the bond also strengthens amongst the pet, owner, and healthcare team. Consequently, it becomes very difficult for empathetic team members to face euthanasia of a beloved lifelong patient.

The Circle of Life

When the number of ailments and the decline of bodily function become so great that organisms—be they mice or men—can no longer cope, sooner or later, death will prevail. In veterinary medicine, we have the ethical responsibility and legal authority, if not always the wisdom to implement them, to end a suffering creature's life by humane euthanasia. Because of its finality, the healthcare team should anticipate the medical, emotional, moral, and financial complexities that can overwhelm clients when the time comes to consider this possibility.

Euthanasia is one of the most difficult procedures to be performed by the veterinary healthcare team. There are numerous factors that must be considered prior to the decision to euthanize an animal—by the pet owner, the veterinarian, and the healthcare team, in addition to the patient itself.

The term *euthanasia* implies an “easier” death. However, euthanasia is widely recognized as one of the most stressful procedures that veterinarians and healthcare team members must perform. What must also be remembered by each healthcare team member is the degree of stress that the pet owner is going through and the stages of grief that all involved will confront.

First and foremost, it absolutely must be stressed that pain can and must be managed, regardless of whether euthanasia is an eventual possibility. Based on the current state of our medical knowledge and the prevailing standards of care, no veterinary medical professional can ever again plausibly proffer the excuse, once fashionable in certain circles, that animals don’t feel pain or that their suffering is somehow of no importance. Modern techniques in pharmacologic pain management—often coupled with other treatment modalities such as physical rehabilitation or other surgical or medical interventions—provide a multitude of effective strategies for alleviating and eliminating pain in the veterinary patient. As a veterinary professional and an advocate for animals, you have the enormous privilege and responsibility of assuring clients that the presence of pain alone isn’t necessarily a sufficient reason to euthanize their beloved pets. While life shouldn’t be extended beyond a point of sustainable comfort and quality, the healthcare team may temper a client’s anxiety over a suffering pet by reminding them of the availability of an increasing range of effective pain-management therapies. Once the pet’s suffering is alleviated, future decisions regarding euthanasia may be more thoughtfully considered without the immediate pressures of emotional stress and sense of crisis.

Ultimately, not all physical conditions can be managed, and out of kindness both to pet and client, the option of euthanasia (for patients beyond reasonable medical hope or where intractable pain can no longer be treated without heroic measures, for example) should be compassionately discussed. Many clients may choose to care for their declining pet at home. In this instance clinics should make every effort to provide education, support, and medical supplies, as long as it’s clear that the client is both responsible and prepared for the ramifications of such a decision. Counseling regarding the pet’s

quality of life should be judicious and neither unduly optimistic nor pessimistic. If the pet is comfortable and the client has been well-educated and is able to care for his or her pet adequately, don't press the issue of euthanasia unless and until the client requests it. In the event that adequate medical care at home isn't possible, the client should be gently persuaded that in the interests of their pet, hospitalization may be the more compassionate option. Additionally, if at all possible, and if the specific situation warrants, at-home euthanasia can sometimes be a blessing to many pets and clients under the appropriate conditions.

No client should be made to feel ashamed for his or her grief, and the medical staff indeed may share the sorrow and loss at the death of a patient they've known and for which they've cared. Despite the notion that medical professionals must be "tough" to survive, in actuality many clients appreciate and understand that the death and loss of a loved one has emotional effects on all of us and are relieved to see that they aren't isolated in their grief.

The entire clinic staff should pursue training in end-of-life issues and grief with a competent counselor prior to dealing with euthanasia situations. When possible arrangements should be made with the counselor to be available to clients and staff when desired or needed. Euthanasia policies and procedures should be made explicit to all staff, and confusion and conflict must be kept to a minimum during this stressful time for both client and staff. It's unfortunate and unnecessary that for many clients, the traumatic experience of saying farewell to a pet is additionally marred by inept, inappropriate, or insensitive staff behavior. Under no circumstances should the clinic staff employ "gallows humor"—whether it's a coping mechanism or not—while in the presence of other staff members or clients, and false stoicism or indifference is equally unacceptable. While it's necessary to remain professional at all times, the very real pain individuals experience at this time must not be ridiculed or minimized.



Self-Check 6

1. Decreasing the level of _____ in food decreases the severity of renal disease in cats and dogs.
2. *True or False?* Liver patients should get most of their energy from proteins and amino acids.
3. The _____ is the hardest-working organ in the body.
4. *True or False?* Not all urinary crystals form bladder stones.
5. *True or False?* Due to the difficult nature of euthanasia, gallows humor as a coping mechanism is acceptable.

Check your answers with those on page 132.
