

A Long Recovery Road for Norrie: Exotic Animal Nutritional Needs and Deficiencies

by

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Part I – Welcome Home, Norrie

“She’s so cool!” Josh’s face lit up as he looked inside the box to see a small green iguana blinking back up at him. “I’ve been waiting so long for this! I’m going to name her Norrie.”

Josh’s mom smiled as she brought in the enclosure and heat lamps from the car. She and Josh had just moved to Massachusetts from New York, and it was now legal to own an iguana. Josh’s mom thought getting a pet would make the transition easier.

She had purchased Norrie that afternoon at the local pet store. Green iguanas were fairly inexpensive at that location. She wanted to make sure she and Josh were prepared to care for Norrie, so she purchased everything that the store employee had recommended.



Consider the following two webpages as you answer the questions below. Please cite any other resources you consult.

- Pollock, C. (2012). Basic information sheet: green or common iguana [webpage]. LafeberVet. <<https://lafeber.com/vet/basic-information-sheet-for-green-or-common-iguana/>>
- Long Island Bird and Exotics Veterinary Clinic. (n.d.). Iguana care guide [webpage]. <<https://www.birdexoticsvet.com/iguana-care-tips>>

Questions

1. Describe the natural habitat of a green iguana. Include details about the climate and vegetation of the area in which it normally lives. Describe what features a home enclosure might require to simulate this environment.
2. What is meant by the term “exotic pet”? What are the challenges of owning an exotic pet?
3. What responsibilities would a pet store have with respect to selling exotic animals? A breeder?
4. What responsibilities would accompany anyone purchasing an exotic animal?
5. In states such as New York and Hawaii, it is illegal to own iguanas. Many states limit ownership of other exotic pets without the possession of a special permit. Speculate as to why these laws exist.

Part II – Norrie’s Nutritional Needs

“You’ll need to give Norrie this reptile food every day and plenty of water,” Josh’s mom said as she took the bag of IguanaMAX pellets out of the trunk.

“Of course! I’ll make sure she has everything she needs. Thanks, Mom!”

Josh was very excited about his new pet and immediately began reading the label on the food his mother had given him. He wanted to know what Norrie should eat and how much. The details of the label are shown below.

IguanaMAX

Guaranteed Analysis

Crude protein (min).....	18%
Crude fat (min).....	2%
Crude fiber (max).....	16%
Moisture.....	12%

Ingredients

Corn, soybeans, wheat germ, dried apple, calcium carbonate, dicalcium phosphate, salt, ascorbic acid, choline chloride, dried mango, vegetable oil, methionine supplement, vitamin E supplement, ferrous sulfate, potassium chloride, zinc sulfate, zinc oxide, manganese sulfate, niacin, copper sulfate, biotin, vitamin B12 supplement, vitamin A acetate, riboflavin, sodium selenite, thiamine mononitrate, sterol, vitamin K supplement, cobalt carbonate, inositol, folic acid, artificial color, artificial flavor.

Feeding Instructions

Freely offer Iguana Max in a clean container each day. Iguana Max may be offered moistened or dry. Discard any uneaten moistened food daily. Small amounts of fruit may be offered in addition periodically. Ensure excess water is always available.

When he started examining the food, Josh realized he didn’t understand most of the information. He decided he had better start doing some research. He quickly learned that pet food commonly contains proteins, carbohydrates, lipids, vitamins, and minerals.



Use the following resource to help you answer the questions below:

- Freemoan, L.M. (December 28, 2020). What is guaranteed about the Guaranteed Analysis [webpage]? Cummings School of Veterinary Medicine, Tufts University. <<https://vetnutrition.tufts.edu/2020/12/what-is-guaranteed-about-the-guaranteed-analysis/>>

Questions

1. Briefly define and provide a purpose for each element of pet food: proteins, carbohydrates, lipids, vitamins, and minerals.
2. For each of the ingredients listed on the label of Norrie’s food, determine if it should be primarily categorized as a protein, carbohydrate, lipid, mineral, or vitamin. Some ingredients may fall in multiple categories. Please ignore the artificial color and artificial flavors as their composition is unknown.
3. What is the relationship between the guaranteed analysis and the individual ingredients? Do you think pet owners should be more concerned with a pet food’s ingredients or guaranteed analysis? Why?
4. For each of the following vitamins/minerals (see table on next page), indicate (1) why animals need it, (2) an organ or organ system for which it is vital, and (3) examples of the type of food from which an animal might get this nutrient.

<i>Nutrient or Vitamin</i>	<i>Why do animals need it?</i>	<i>Vital for which organ/organ system?</i>	<i>Food source?</i>
Calcium			
Iron			
Magnesium			
Manganese			
Phosphorus			
Potassium			
Sodium			
Vitamin A			
Vitamin B12			
Vitamin D			
Vitamin E			
Vitamin K			
Zinc			

- Calcium is a very important mineral to both humans and iguanas. Veterinarians suggest that most reptiles have a calcium powder dusted on their food once or twice a week. Why might this be necessary for reptiles but not for humans?

Part IV – Treating Norrie

“There are many types of metabolic bone disease that we see in reptiles,” Dr. Ibrahim said. “I think Norrie has nutritional secondary hyperparathyroidism, or NSHP. Most often the cause for NSHP is an imbalance of calcium and phosphorus in the animal’s diet. It can also be triggered by minimal access to UV-B light or not enough activated vitamin D₃. Sometimes it is caused by a combination of all three.

“Unfortunately, we won’t be able to replace the bone that Norrie has lost, so we will not be able to return her to normal. Fortunately, she is still capable of eating and moving around well enough on her own such that I believe her quality of life will still be good with long-term management. Moving forward, we can support her for the duration of her life by providing continued calcium supplementation, adequate husbandry, and regular check-ups to make sure that she stays stable and doesn’t worsen.”

This wasn’t the news that Josh and his mom wanted to hear. “Is this my fault for not taking good care of her?” Josh asked, tears welling up in his eyes.

Josh’s mom leaned over to console him and asked, “What about the folks at the pet store? They told me I had everything I needed.”

“I know you had the best intentions when caring for Norrie, and you did your best to educate yourself on her needs. There’s a lot of conflicting information out there on how to care for unusual species, and even vets like me are learning new things about their needs. You did a great job of noticing that she needed to see a veterinarian, and now I can help you learn about what to improve for her care moving forward.” As Dr. Ibrahim said this, Josh’s shoulders relaxed a bit.

Dr. Ibrahim continued, “Sometimes iguanas arrive to the pet store already in an early state of metabolic bone disease. Additionally, it’s really hard to accurately design commercial pet foods for iguanas. They have different needs during different seasons, and their needs change when they are in the wild versus in captivity. Most exotic animal diets haven’t even undergone a feeding trial.”

“What’s a feeding trial?” Josh asked.

“A feeding trial is a kind of scientific experiment where a number of animals are fed the product under controlled conditions for a period of time to make sure they remain healthy and in good condition. The animals are assessed regularly with respect to their health and well-being. Although feeding trials are regularly conducted for cat and dog food, they are not as common for pets like iguanas. You were probably feeding Norrie exactly what IguanaMax said, but the company didn’t have enough data to be 100% sure that the diet would keep her healthy.”

“So now what do we do?” Josh asked.

“To start Norrie’s treatment, I’d like to give her an injection of calcium today in the hospital as well as fluids under her skin to rehydrate her. I’ll send you home with calcium gluconate that you can administer by mouth once daily. You can also dust her food twice per week with additional calcium powder that you can purchase from a pet store.

“I’d also like you to switch food brands to either Mazuri, ZooMed, or Repashy, as these tend to be more nutritionally balanced. For her UV light and heat needs, a combination lamp is fine to use, but be sure to change the bulb every six months, as the heat may continue but the UV effectiveness dies out. Measure the temperature in her tank at the hottest point to make sure she is not being overheated. Also make sure that there are cool spots in her enclosure so that she can cool down if needed. The rest of what you’ve been doing in terms of enrichment, substrate, and feeding is excellent, so keep up that great work.”

Josh and his mom expressed their gratitude for Dr. Ibrahim’s assistance. They instituted all of the treatments and changes that were suggested and returned regularly for check-ups. Norrie’s condition remained stable, and they were able to support her needs for the remainder of her life.



Part V – Nutritional Deficiencies and Other Exotic Species

Nutritional deficiencies are common in exotic pets. Veterinarians are often asked to treat and diagnose many nutrition-related diseases. This may be challenging for a clinician who normally specializes in dogs and cats.

Some nutritional diseases in exotics include:

- iron storage disease in birds, rhinos, and dolphins;
- vitamin C deficiency (scurvy) in Guinea pigs;
- vitamin A deficiency in birds and reptiles;
- gout in reptiles;
- atherosclerosis in psittacine birds;
- hypocalcemia in African grey parrots;
- calcium carbonate urinary stones in Guinea pigs; and
- iodine deficiency (goiter) in Elasmobranchs (e.g., sharks, other cartilaginous fish).



To answer the questions below, begin by selecting one of the diseases listed above. Then use PubMed to find a peer-reviewed article that addresses the relationship between a nutritional deficiency and the animal disease you selected. This should not be a review article. Provide the reference. Read the article and answer the following questions.

Questions

1. What exotic species is predisposed to the disease you selected? How prevalent is the disease?
2. Describe the clinical signs observed in animals with this disease.
3. How is this disease diagnosed?
4. What is the treatment/prognosis with this disease?
5. How has this disease been studied/researched?
6. How might owners prevent this disease?
7. What other ethical concerns may be inherent in ownership of this type of exotic?

