VITAMIN D AND WHY IT'S SO IMPORTANT

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Reptiles are popular pets these days but, as many owners know, keeping them healthy and happy is often dependent upon the husbandry that is provided for their scaled friend. Many details go into the care of reptiles and people must consider factors such as lighting, heat, substrate, diet, supplementation and housing. Although all of these factors are important and necessary to consider, this article focuses on one very important topic: vitamin D3.

Vitamin D is a hormone and is important for the absorption of calcium from the diet. The body is able to create it on its own, or it can be supplemented. To create vitamin D3 in the body, there are many intricate processes that must occur. It all starts with cholesterol found in the skin. As UVB radiation (sunlight) hits these molecules of cholesterol, it causes them to change their structure and convert to a pre-vitamin D3 form. Heat is then required to convert pre-vitamin D3 to vitamin D3. Vitamin D3 is then processed first by the liver to form an intermediate structure and then processed by the kidneys to form its final, active form, 1,25-dihydroxyvitamin D3 (also known as 1,25-dihydroxycholecalciferol or calcitriol.) This final active form then acts on cells in the intestinal tract to turn on pumps that allow for the absorption of calcium from the intestines. Once calcium is absorbed from the intestines it is able to circulate to different parts of the body and function in cells of the bones, muscles, and nervous system. When vitamin D is supplemented in the diet, it goes through the same conversion process in the liver and kidneys to become active and functional.

The next most often asked question is, "Can all reptiles use vitamin D3 supplemented in the diet?" The answer is, no. Many carnivorous reptiles, such as snakes, will absorb vitamin D3 from their prey items and don't need to make it on their own. Herbivores, on the other hand, don't appear to absorb vitamin D3 well from the diet and require exposure to adequate UVB radiation in order to make it on their own. For insectivores and omnivores, some can and some cannot absorb vitamin D3 adequately from the diet. Therefore, some require exposure to UVB radiation and some don't. Veterinarians have started to question this hypothesis, though, and have begun looking into whether or not certain species that we traditionally thought did not need UVB radiation could actually benefit from it. Research that was recently performed in snakes, which have historically been said not to require UVB radiation, showed that those snakes that had exposure to UVB radiation actually had much higher levels of vitamin D3 in their system. So, now we know that they had more vitamin D3 after sunlight, but the next question is, "Do they benefit from this extra vitamin D3?" The answer is, we don't know. Recent research in humans has shown that vitamin D3 has many more benefits than just the adequate absorption of calcium. It has been shown to help control obesity, elevate moods, have an effect on the

immune system and is important in reproductive health. Could this be the same for reptiles? Maybe. Further research needs to be done to answer these important questions.

Ok. So now we know how vitamin D3 works and who needs it but the next question is how can people get their reptiles this necessary nutrient? For those that can get it from their diet, the answer is to provide them with prey that they can absorb it from or supplement it on their food. Snakes should be able to absorb vitamin D3 from their prey. Insectivores can have it sprinkled on the top of their food from a multivitamin formulation. For those that need to absorb UVB radiation to make vitamin D3 on their own, there are a couple of options. The first is to provide exposure to natural, unfiltered, direct sunlight. This means getting your reptile outside, in the sun, for several hours a day. Often people will say that they have their reptile exposed to the sun through a window. The unfortunate reality is that regular glass windows actually filter out UVB radiation. So, your reptile can sit in the sun all day long behind glass and not receive any of the benefits. Due to this, if your reptile is going to live indoors, as many should, and you can't get them outdoors every day for exposure to the sun, the next best thing is to provide them with a UVB light. It's important when you purchase one of these lights that you follow a few rules.

First, when you go to the pet store, you need to make sure you are buying a UVB light, not just a UV light. There are many different lights available and UVB lights emit UV radiation in a very specific range. This range is 280-320 nm to be exact and the packaging for the light should indicate that it emits in this range. If it doesn't, you have the wrong light. Put it back and look for the right one! Next, once you have the correct light, you need to make sure it is placed in the correct location for your reptile to benefit from it. The light should be placed between 18-24 inches away from your pet. Any farther and your reptile won't get any of the necessary UVB radiation. Closer and you could run the risk of causing a burn. Make sure the light is not going through glass to get to the animal. The rule of having unfiltered UVB radiation still applies for artificial lights. In addition, the light needs to be changed frequently. The bulb is designed to only emit radiation for 6 months to 1 year, depending on the type of bulb. After that time, the light may still work, but all that important radiation won't be there. You won't be able to tell the difference by looking at the light so it's important to keep track of when you bought the light and when it should be replaced. Lastly, as silly as it sounds, the light needs to be on in order for it to emit the UVB radiation. It should be on for 8-10 hours a day.

What can happen if a reptile doesn't get its necessary vitamin D3? Many things can go wrong but the blanket term for this is metabolic bone disease. If there is no vitamin D3, calcium will not get absorbed. If there isn't enough calcium then several systems can be affected. Bones can become soft and brittle. Reptiles will come into the hospital with fractured bones or distorted, bent limbs. Their jaws and spines can be misshapen. The nervous system can be compromised and reptiles may have tremors, twitching toes, tails and limbs, or even seizures. Some will be very weak and unable to walk. Female reptiles that are laying eggs may have difficulty forming the shell around an egg or problems passing the egg. Others will have problems like impaired motility of the gastrointestinal tract or prolapsing of the cloaca. While some of these problems are able to be fixed with adequate vitamin D3, calcium, and heat, not all are. Some changes are permanent and can't be altered once they have occurred.

So now you know more about vitamin D3 and its importance. Basically, know which reptile you have and how it requires its vitamin D3. For those that need to make it on their own, be sure to have the correct kind of UVB light, keep in the correct location for the right length of time and be sure to change the bulb frequently.

One quick thing to mention is that vitamin D3 is important for more than just reptiles. Other pets, like amphibians, birds and small mammals may require exposure to UVB radiation to stay healthy. If you are not sure whether or not your pet requires vitamin D3, be sure to consult with your veterinarian so that you can determine what is best for your companion animal.