

Nutritional Supplements 101 – What Are They and How Do They Work? - Part 1

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Nutritional supplements, i.e. nutraceuticals, are regulated differently than pharmaceuticals, but scientific research has been performed to establish safety and efficacy of several commonly used ingredients despite it not being required. This presentation will discuss what nutraceuticals are, how the FDA is not involved in the production of products, how to pick a safe and effective nutraceutical, why nutrition is important in all pets, why owners want to use nutraceuticals, why nutraceuticals should be included as part of a multi-modal veterinary medical plan, and why veterinary technicians should be knowledgeable resources on pet nutrition in order to offer advanced veterinary care to their patients.

The word “nutraceutical” first came into use in 1989 after combining the words nutrition and pharmaceutical. These products can be confusing since some of them are considered food products by AAFCO (Association of American Feed Control Officials) while others are not. They also act more like drugs but cannot have drug claims. They are in a gray area of veterinary products. The word nutraceutical is often defined as “...a substance that is produced in a purified or extracted form and administered orally to patients to provide agents required for normal body structure and function and administered with the intent of improving health and well-being of animals.”

Unlike pharmaceuticals, the FDA does not monitor label claims, scientific research, or the production of veterinary supplements. This means the FDA is not ensuring veterinary supplements are safe and effective or even that the consumer is purchasing what they think they're purchasing. It is completely up to the company producing and distributing these products to do this research and perform quality control and assurance on their products. When you purchase a prescription or FDA regulated pharmaceutical you know that the active ingredients have been researched for the species on the label, dosing instructions have been derived from that research, side effects and safety concerns have been established, product purity and contaminants are analyzed, monitoring is done to ensure the amount of an ingredient that is stated on the label is factual, and that it is effective for use in the species on the label. None of these requirements exist for veterinary supplements though, much to the surprise of most consumers and veterinary professionals. If the company producing and distributing the supplements decides they don't want to do any of these things, they do not have to. Anyone can put anything in a bottle in their garage, label it as they please (as long as it does not have drug claims on the package) and sell it as a veterinary supplement with instructions they made up. Of course, these products do not typically survive long term in the market due to competition, lack of efficacy, and safety concerns but they are available. As veterinary professionals, we do not want to recommend products that could potentially do more harm than good, delay supporting a pet's condition, or waste our client's money. It is important for us to know how to decipher what products are safe and effective and how various commonly used supplement ingredients may be beneficial to our patients.

Consumers are moving towards products that they perceive as being healthier and safer than pharmaceuticals, not only for themselves but for their pets. Many of our clients are taking supplements themselves for preventative health or as part of a multi-modal treatment regimen. They are asking more and more to do the same for their pets. If veterinary professionals are not a resource for their clients to find safe and effective options for their pets, then the internet and “Dr. Google” will be. It is to our advantage as veterinary professionals to be well-versed in common supplements in order to be able to be the educated resource that our clients want and our patients need. Misinformation is rampant online and deciphering accurate information from misleading claims may only further confuse our clients and potentially endanger our patients.

A variety of independent studies have been performed demonstrating the wide variance of veterinary products when compared to what their labels state they should contain. Glucosamine/ chondroitin and SAM-e products are just two common supplement examples that have been shown to vary greatly in their label claims based on who has manufactured them. This needs to be taken into consideration when choosing a supplement since potential allergens may be present to elicit an immune response, or a lack of efficacy may result with an inferior product when compared to the purity and benefits of a quality supplement. Not all veterinary supplements are created equal.

To choose a quality veterinary supplement, veterinary professionals must look for the following information on the product and manufacturer:

- Scientific evidence of need and efficacy
- Safety and toxicity studies, preferably on target species/tissue
- Free of contaminants
- No known contraindications
- No or low adverse reactions
- Means to report unexpected events
- Tracking capabilities
- Stability of product/expiration date
- Bioavailability in delivery method
- Follows Good Manufacturing Practices (GMP)
- Tests raw materials
- Maintains a sanitary environment
- Product testing during production
- Label accuracy testing before shipment

Major categories of veterinary nutritional supplements will be thoroughly dissected in this presentation. These categories include brain health, digestive health, and joint health. Within these categories are a multitude of specific ingredients. This presentation will explain what some of the most commonly seen ingredients are, where they are sourced from, and what they are used for. It will also discuss scientific studies that have been performed to demonstrate the safety, efficacy, and bioavailability of these ingredients in pets. Mechanisms of action will be explained so that a veterinary

technician can confidently explain to a client what they and the doctor are recommending for their pets, why they are recommending it, how it will work, and why it is different from other nutritional supplements. Part 2 of this presentation will go over other categories and ingredients.

Brain health supplements are newer to the veterinary supplement market. As research continues, more options will continue to emerge for pet owners. Supplements are found in combination products, as sole ingredient products, and even in therapeutic diets. They may be used for supporting pets with stress and anxiety, seizures, cognitive dysfunction, and other things pertaining to brain health. All these following ingredients have been studied to various extents for use in dogs and/or cats.

Milk whey protein and colostrum are sourced from the milk of cows. They supplement amino acid precursors by providing specific milk proteins such as alpha-lactalbumin and alpha-caseozepine. These proteins go on to produce serotonin, cysteine, glutathione and other compounds within the body and help reduce excitatory responses and increase GABA release. L-theanine is found in tea and helps stimulate alpha brain wave production and blocks glutamate. Probiotics, either bacterially or yeast based, help promote a normal GI microbiome which has shown to be linked to behavioral functions. SAM-e (S-adenosylmethionine) is synthetically produced for supplement use but is naturally found in the body. It helps produce more glutathione, a natural antioxidant, within the body to facilitate normal brain function. Omega-3 fatty acids, such as EPA and DHA, are sourced from fish oil. They potentiate serotonin release and may benefit pets with seizures. L-carnitine is an amino acid found in various meat and eggs but is synthetically produced to make supplements. Studies have shown it may help improve cognitive function. Medium chain triglyceride (MCT) oil is sourced from coconut and palm oil and supports patients with seizures. Finally, other antioxidants are also commonly used as supplements to help scavenge free radicals.

Joint health supplements are widely known and utilized. They are primarily given to support the joint cartilage, decrease inflammation, and scavenge free radicals which can break down cartilage further. Many ingredients have synergy with other ingredients, so they are often seen as combination products. There are a multitude of joint health supplement ingredients.

Glucosamine hydrochloride is most commonly sourced from the chitin of shellfish or synthetically for vegetarian options. Dosing is different than glucosamine sulfate, but it is a building block of cartilage. It is often combined with sodium chondroitin sulfate due to the high level of synergy these ingredients have. Chondroitin is sourced from animal cartilage and is naturally a very large molecule so bioavailability can be low unless a low molecular weight is achieved. Chondroitin is a glycosaminoglycan which is found in cartilage, so it helps support cartilage health in addition to relieving some inflammation. MSM (methylsulfonylmethane) is a man-made form of sulfur used for pain relief. Manganese is a mineral beneficial for bone health. Omega-3 fatty acids from fish are helpful with joint inflammation as well as cartilage support when dosed appropriately. *Boswellia serrata* tree extract may provide inflammatory relief when it contains AKBA (acetyl-11-keto-boswellic acid). Curcumin longa is a specific part of the turmeric plant and if made bioavailable, can provide inflammatory relief as well as antioxidant properties. ALA (alpha-lipoic acid) is an antioxidant that is synthetically produced for supplements. HA (hyaluronic acid/sodium hyaluronate) is another glycosaminoglycan which is found in

joint fluid as well as cartilage and can be sourced synthetically or from animal cartilage. Eggshell membrane is used as a cartilage protectant and is sourced from eggs. ASU (avocado/soybean unaponifiable) is an extract of soy and avocado that may help with inflammation and cartilage health, plus it has synergy with other commonly used joint supplements such as glucosamine, chondroitin, and ALA. Beta-glucans are sourced from yeast, mushroom, or cereal grain cell walls through a special extraction process. They are immunomodulators and address inflammation as well as joint pain to decrease clinical signs of joint diseases. Green tea contains EGCG (epigallocatechin gallate) and provides antioxidants as well as inflammatory relief to joints. Finally, UC-II (undenatured collagen-II) is sourced from chicken cartilage and may provide pain relief.

Digestive health supplements include ingredients that may benefit the stomach and intestines as well as the liver since it is part of the digestive process. Some of these ingredients are widely used and often not thought of as being supplements despite their technical classification.

SAM-e (S-adenosylmethionine) is synthetically sourced for supplementation but helps produce the antioxidant glutathione within the body to facilitate liver detoxification and decrease inflammation. Cranberry extract may be used as an antioxidant and/or liver protectant. Peppermint oil has shown to be beneficial for decreasing inflammation and acting as an anti-spasmodic. Zinc is a mineral and also an antioxidant. Curcumin longa sourced from turmeric may help decrease inflammation if made bioavailable. Milk thistle is a plant that contains silymarin and silybin (i.e.: silibinin or sylibinin) and helps increase bile flow, decrease inflammation and other functions pertaining to the digestive tract, but it must be made bioavailable. B9 and B12 are water soluble vitamins that are synthetically produced for supplementation and are vital to a multitude of digestive as well as whole body functions. Beta-glucans are sourced from yeast, mushroom, or cereal grain cell walls through a special extraction process and help facilitate a normal gut microbiome as well as support dogs with IBD by decreasing inflammation. Vitamin E is synthetically produced for supplementation and is an antioxidant that may benefit GI health. Medium chain triglyceride (MCT) oil is sourced from palm or coconut oil and since it is easier to absorb than long chain triglycerides, it is a good source of energy for a compromised liver. *Boswellia serrata*, a tree, provides gastric ulcer protection. Pancreatic enzymes sourced from the pig pancreas provide necessary enzymes needed to break down and absorb fats, starches, and proteins. Finally, probiotics may be sourced from bacteria to reseed “good bacteria” in the gastrointestinal tract, or yeast to help suppress toxins and allow the “good bacteria” to flourish.

Veterinary technicians can play an integral role in discussing supplements and nutrition with their clients. Safe and effective recommendations can be made by the veterinary team with a little research ahead of time. They can provide options for pet owners who are looking for alternatives to traditional therapies or simply as a complementary product to an existing treatment protocol.

References available upon request.