Use of dietary supplements and 'nutraceuticals' for pets and companion and working animals is booming, and its growth mirrors the 'boom'in the human market. Many veterinarians and veterinary practices have added private label, brand label, or even their own label supplements and nutraceuticals for sale in-clinic, and certainly have fielded questions from their clients about adding supplements to their pet's diet. While much of the research as to the benefits and value of nutraceuticals and supplements is still evolving, it’s clear that consumers have made some decisions as to the value—to the tune of hundreds of millions of dollars. In this issue of the INSIDER, we’ll explore what’s driving those (still growing) numbers, review some professional organization’s guidances on supplements, and provide some tips, tools and information for you, your practice staff, and your clients.
WWhile the growth rate of the pet industry moderated during the recession, most pet owners value the comfort and health of their dogs and cats more than ever and are willing to buy more than just the basics. High-end pet foods, such as organic, grain-free, refrigerated and raw foods are gaining more shelf space in outlets that are increasingly catering to the “pet parent.” Doggie daycare centers that charge $20-35 per eight-hour day and boarding facilities where dogs can sleep in a bedroom with a person are extremely busy. Celebrity endorsed foods and accessories as well as high end “doggie boutiques” have become commonplace.

It really has been a phenomenal decade for the pet industry. Packaged Facts, a Rockville, MD-based market research firm, reported that pet retail sales reached $55 billion in 2010 and were expected to hit nearly $60 billion by the end of 2011—a far cry from 2001 total pet sales of $28.5 billion. U.S. retail sales of pet food totaled $18.4 billion in 2010, an increase of 2.8% over 2009 sales, and were projected to reach $19 billion in 2011.

According to Nutrition Business Journal (NBJ), Boulder, CO, natural and organic pet foods, pet supplements and other natural and organic pet supplies grew 5.2% in 2010 to reach $3.2 billion, with the animal supplement category alone adding $80 million in new sales dollars to reach $1.6 billion.

Packaged Facts reported the compound annual growth rate (CAGR) of U.S. retail sales of pet supplements and nutraceutical treats for dogs, cats and other small animals was 6.6% between 2006 and 2010 and projected to hit 7.4% during the 2010 to 2015 period. The market researcher also reported the percentage of dog and cat owners who purchased pet supplements and nutraceutical treats increased from 19% and 12%, respectively, in 2005 to 31% and 22% in 2010.

The average household in the U.S. spent $655 on routine visits for dogs to the veterinarian last year, up 47% from a decade ago, according to the APPA.
The top-selling supplement group continues to be joint health, with a 4% growth rate and sales of $690 million, or 45% of total category sales, according to NBJ. The dental category grew almost 7% to reach $20 million as pet owners looked for ways to prevent one of the leading reasons for a visit to the veterinarian. Skin and coat supplements grew 8% and accounted for 10% of sales. A recent survey by Nestle Purina Petcare, St. Louis, MO, found that 40% of dog owners and 50% of cat owners expressed interest in purchasing veterinary medications, foods or supplements to address their pet’s gastrointestinal (GI) condition. Multivitamin sales continue to decline as condition-specific supplements evolve and pet food manufacturers improve their formulas with added functional ingredients.

Sales Drivers & Trends
Pets are living longer and subsequently developing age-related problems similar to their human guardians. People are taking clues from their own ways of staying healthier by eating better and taking supplements, which is particularly important as veterinary healthcare costs rise. The average household in the U.S. spent $655 on routine visits for dogs to the veterinarian last year, up 47% from a decade ago, according to the APPA. Expenditures for cats soared 73% over the same time frame, as parenting a cat became more “respectable.”

However, the major driving force behind the growth of animal supplements is that pet owners view these products as natural ways to promote health and wellness, the main reason Packaged Facts’ March 2011 report, “Pet Food in the U.S., 9th edition,” concluded the outlook was “especially good” for pet supplements and holistic pet foods. Veterinarians have also come to view supplements as reasonable alternatives to animal drugs and are more willing to recommend them as adjuvant or even replacement therapy.

Mintel’s Global New Products Database reported that 72% of U.S. consumers consider pets as part of the family and want the best for their dogs and cats. It comes as no surprise that well formulated supplements with functional ingredients that target specific physiological—and psychological—needs of today’s pets are enticing to a whole population of pet parents committed to optimizing the quality of their animals’ lives.

Education is still the key to selling dietary supplements and it behooves retailers, including veterinary practices, to appreciate thoroughly the intended functionality of a particular product as well as its active ingredients to sort out which supplements are “therapeutic” and which ones are “treats.” This distinction is not as easy as it sounds because supplements are no longer just available in pill form; increasingly, functional ingredients are appearing in toppers, gravies, foods and snacks. Pet food companies market their diets as providing more than “nutritional adequacy” by adding functional ingredients that help maintain skin and coat condition, joint flexibility, digestive healthiness and immune strength.

Product Opportunities
Much like the human vitamin category, pet owners appreciate the importance of dietary supplements as a complement—not a replacement—to high quality natural or organic pet foods. Nearly 70% of dog owners are aware of vitamins and supplements specifically formulated for animals, yet this knowledge does not necessarily translate into purchase unless the pet parent has a reason to buy.

As pet owners take a more holistic approach to their pet’s health, veterinary endorsements of supplements are growing and increasingly re-enforcing their importance in maintaining overall pet health. Many retailers now partner with nearby veterinary facilities to support clinicians’ recommendations and in turn provide the clinics with in-depth product information and samples.

There has been a fundamental change in how pet owners view their animals, with natural and organic pet foods and supplements finding a broader, more receptive audience. Health and wellness shoppers offer future business opportunities for veterinary practice owners that understand the importance that proactive pet owners put on keeping their animals healthy for a long time. This is not a fad that will fade away—even in difficult economic times. Knowledge combined with well-merchandised, attractive displays that don’t confuse clients are effective in-clinic marketing tools.
Consumers, which of course include your veterinary practice clients, are increasingly looking for ways to eat healthier with foods that contain unique ingredients formulated to provide more than traditional nutrition. This same view is taken when giving consideration to buying dietary supplements and nutraceuticals for their pets. Below is a primer on some of the more widely available and widely used ingredients for you, your practice staff, and your clients.

**Prebiotics** are non-digestible food ingredients that stimulate the growth of beneficial bacteria that have the potential to improve host health, inhibiting the growth of pathogenic microorganisms. Fructooligosaccharides (FOS) act by stimulating the growth of Bifidobacterium species in the large intestine. Not much is known about the correct and effective dosage levels of prebiotics for dogs or cats, but preliminary evidence seems to indicate that very low levels (0.3% of a dog’s diet) are most effective and produce the least number of side effects (bloating, gas, etc.).

**Probiotics** are friendly bacteria, such as Lactobacillus acidophilus, Bifidobacterium bifidum and Lactobacillus bulgaricus, that help to keep harmful bacteria from colonizing and creating digestive problems, and thus support the body in fighting illness and disease. If beneficial bacteria become depleted or the balance is disturbed, potentially harmful (pathogenic) bacteria can overgrow. Probiotics are live cultures unstable at temperatures over 75 degrees and thus need be applied to pet foods after cooking. Most veterinarians feel that standalone supplementation is more efficacious.

**Glucosamine and chondroitin** are critical components of cartilage, but the body’s natural production diminishes with age. Many manufacturers formulate these chondroprotective nutrients into their pet foods to help stimulate cartilage metabolism and inhibit its degeneration as well as provide anti-inflammatory properties.

**Omega 3 fatty acids** from fish oil or other marine sources contain high levels of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) capable of modifying inflammatory skin responses of healthy dogs. Pet foods supply ample omega 6 fatty acids, but not omega 3. Omega 9 fatty acids have no benefit to dogs or cats. Flaxseed oil contains alpha-linolenic acid (ALA), but its conversion by the body to EPA and DHA is slow and inefficient, and thus flaxseed oil does not appear to be as effective as fish oil in reducing inflammation.

**Antioxidants** such as vitamins C and E, zinc and other trace elements help neutralize the effects of stress and environmental irritants. Although dogs—unlike humans—manufacture vitamin C, many veterinarians look at it as a “conditionally essential” nutrient helpful in times of stress. Pet owners like to see this vitamin in pet foods as well as vitamin E.
The A.C.C.L.A.I.M. Method

(Adapted from Oke SL, McIlwraith CW. Review of the potential indications and contraindications for equine oral joint health supplements, in Proceedings. 54th Annual AAEP Convention 2008)

So which dietary supplements, if any, should your clients choose for their pet, companion or working animal? In every case, the first step is a consultation with you, their veterinarian. No-one, including “Dr. Google”, is more qualified than a veterinary medical professional with an existing relationship with the client and the animal patients in his or her care.

How you know that the product contains what the label says it does, plus is safe and effective? Even if the supplement contains what is listed on the label, are the levels of ingredients included those levels that have been found to be helpful? Sorting through what may seem to be an endless array of products to find the optimal product can be a difficult task.

The good news is that you can use the product label to your advantage. Just take a few minutes and use the guide below, known by the acronym ACCLAIM, when looking at supplement labels to help you make your choice. This same guide can be used to evaluate other kinds of supplements, too. Share with your clients and your entire practice staff.

A company name you recognize: Supplements made by established companies that offer educational material to veterinarians are generally a better choice over companies that you’re not familiar with and that offer no educational information about their products.

Clinical experience: Look for a company that supports clinical research showing safety and efficacy of its products. Results should be published in peer-reviewed journals to which your veterinarian will have access.

Contents: Ingredients should be clearly noted on the label.

Label Claims: The products should not include unrealistic claims. Stay away from products using words like “cure” or “prevent.” Testimonials aren’t necessarily a bad thing, but a company with only testimonials and no scientific data to support its claims is less likely to be producing a quality supplement.

Administration recommendations: How to administer the supplement to your companion or working animal should be clearly stated on the label. You should be able to determine how much of each active ingredient you’re giving your animal per day.

Identification of lot and expiration date: Choose a joint health supplement with a lot number and expiration date noted on the label. A lot number means that the company has a tracking system in place to ensure product quality. An expiration date shows that the company has evaluated product quality over time.

Manufacturer information: Information about the manufacturer should include name, address, phone number, and website. You should have a way to contact the company if you have a question.
Growing numbers of pet owners are giving their pets dietary supplements in hopes of supporting their health. This increased use of animal dietary supplements has raised concerns regarding the safety of specific supplements and the guidelines for determining safety of dietary supplements for horses, dogs, and cats. This report examines issues in determining safety of animal dietary supplements in general, and the safety of three animal dietary supplements; lutein, evening primrose oil, and garlic, in particular.

Like many people who take multivitamins and other supplements to support a healthy lifestyle, growing numbers of pet owners are also giving supplements to their pets for similar reasons. It is estimated that between 10 to 33 percent of dogs and cats in the United States are fed an animal dietary supplement, with some of the same supplements being fed to horses. But are these supplements safe for pets?

The increased use of animal dietary supplements has raised several concerns. Among the issues involved are the safety of specific dietary supplements, the general approaches taken to determine the safety of animal dietary supplements, the monitoring of adverse effects, and the state of the regulation of animal dietary supplements.

To assist in making decisions about the safety of dietary supplements for horses, dogs, and cats, the Food and Drug Administration (FDA) asked the Natural Research Council to produce a report on the safety of supplements in general and to review three specific supplements (lutein, evening primrose oil, and garlic) offered for horses, dogs, and cats. A committee of experts, consisting of animal nutritionist, veterinarians, clinical pharmacologists, and toxicologists, was established for this purpose. The committee addressed safety only; utility or efficacy of animal dietary supplements was not part of its task.

The committee found that there was a lack of quality safety data available for the supplements lutein, evening primrose oil, and garlic, that would be required to determine safety in drugs and animal food additives. Therefore, the committee could only report on historical safe intakes (HSI) and estimate a presumed safe intake (PSI) for the three animal dietary supplements (see opposite page). The presumed safe intake (PSI) was estimated by reviewing evidence to determine a level at which the animal health or production efficiency were not impaired. While the historical safe intake (HSI) was based on the known levels consumed by wild or domestic animals over long periods of time with no apparent ill effects.

Despite these limitations, the committee took this opportunity to review the general issues of animal dietary supplement safety. They identified a number of data elements for consideration when constructing any framework for assessing animal dietary supplement safety that may be different from those routinely considered for prescription drugs.

Regulation of dietary supplements in the United States

Dietary supplements for both humans and animals are subject to regulation under the Federal Food, Drug, and Cosmetic Act (FFDCA). The way in which human dietary supplements are regulated was amended by the passage of the Dietary Supplement Health and Education Act (DSHEA) in 1994, but the Food and Drug Administration concluded that the Act does not apply to dietary supplements for animals. Thus, dietary supplements for humans and dietary supplements, despite often being the same substance, given in the same manner, and for the same purpose. Currently, the FDA and other regulatory bodies are under pressure...
to resolve the public’s desire to provide some of the same supplements available to humans to their animals.

Assessing Safety of Animal Dietary Supplements

The safety of a supplement, additive, or drug is generally assessed in two ways. Controlled studies, such as a study looking at the toxicity of a compound, usually done prior to the compound hitting the market, with the intent of identifying potential adverse events (box 2) associated with the administration of the compound. And surveillance studies, generally post market, done to monitor anticipated or unanticipated adverse events associated with general use of the compound.

The committee found that in addition to there being limited safety studies there are many other factors that further challenge the assessment of animal supplements safety, including the lack of standardization among active ingredients in the animal supplement market and the lack of a comprehensive adverse event reporting system. Because of these challenges, other types of evidence, found in the evidence pyramid (figure 1), were reviewed and should be reviewed when determining safety of animal supplements such as lutein, evening primrose oil, and garlic.

Findings and Recommendations

In assessing animal dietary supplement safety, elements such as the relevance of the study to safety, dosage, contaminants in the supplements, and size of the study, all need to be considered when designing and assessing animal dietary supplements. Although the use of animal dietary supplements is potentially greater than the use of drugs or food additives, minimal safety data were available. Ideally, the committee would have liked to have adequate data to determine a no observed adverse effect level (NOAEL) for or a safe upper limit (SUL) for each of the three supplements. With the limited data currently available, the committee could only report historical safe intakes (HSI) and estimate presumed safe intake (PSI) for garlic (except for cats), evening primrose oil, and lutein.

The use of other species (i.e. non-target species) is important in assessing safety of supplements but is limited. Because of limited amounts of data about supplements in the animals of intended use (i.e. target species), research using other species can provide important safety signals. Although non-target species provide important evidence about safety they do not guarantee safety in the target animals. An example is garlic, although considered safe in humans when taken as a supplement, there is a concern that excess garlic supplement can cause hemolytic anemia in horses, dogs, and cats. The committee has identified several fac-

### DIETARY SUPPLEMENTS FOR HORSES, DOGS AND CATS

Presumed safe intake (PSI) and historical safe intake (HSI) are given in milligrams per kilogram of body weight (mg/kg BW)

#### LUTEIN

Lutein is abundant in green and yellow fruits and vegetables. The purported benefits of lutein supplements in humans include:

- Treatment or prevention of age-related macular degeneration
- Anti-oxidant and anti-cancer effect
- Protection against UV radiation

<table>
<thead>
<tr>
<th>Animal</th>
<th>PSI (mg/kg BW)</th>
<th>HSI (mg/kg BW)</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horses</td>
<td>8.3*</td>
<td>8.3*</td>
<td>*When eaten as forage or natural sources; no data exist for supplements</td>
</tr>
<tr>
<td>Dogs</td>
<td>1.8*</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>Cats</td>
<td>7.2*</td>
<td>0.85</td>
<td></td>
</tr>
</tbody>
</table>

#### EVENING PRIMROSE OIL

Evening primrose oil (EPO) is an oil found in the evening primrose plant. EPO is made up of fatty acids. Two of the fatty acids found in EPO are recognized for their contributions to the maintenance of normal health and metabolism.

<table>
<thead>
<tr>
<th>Animal</th>
<th>PSI (mg/kg BW)</th>
<th>HSI (mg/kg BW)</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horses</td>
<td>400*</td>
<td>25-80</td>
<td>*Assumes that total fat will not exceed 23 percent of diet</td>
</tr>
<tr>
<td>Dogs</td>
<td>424*</td>
<td>42-424</td>
<td>*Which is the upper limit used in trials</td>
</tr>
<tr>
<td>Cats</td>
<td>391*</td>
<td>20-391</td>
<td>*It is likely that cats could tolerate higher levels</td>
</tr>
</tbody>
</table>

#### GARLIC

Garlic has been used in the diet of humans for centuries. Ancient medical text from Egypt, Greece, Rome, China, and India include prescribed medical applications of garlic. Today garlic is thought to have numerous health benefits including reducing the risk of cardiovascular disease and cancer, stimulating immune function, and restoring physical strength.

<table>
<thead>
<tr>
<th>Animal</th>
<th>PSI (mg/kg BW)</th>
<th>HSI (mg/kg BW)</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horses</td>
<td>90</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Dogs</td>
<td>56</td>
<td>22*</td>
<td>*There is a long history of safe use.</td>
</tr>
<tr>
<td>Cats</td>
<td>N/A*</td>
<td>17</td>
<td>*The committee was unable to estimate a PSI for garlic.</td>
</tr>
</tbody>
</table>
tors that should be considered when selecting appropriate substitute animals. Factors to be considered include the metabolic and natural dietary pattern similarities between surrogate and target animals and whether the supplement is naturally occurring in both animals’ diet.

There is a clear need for a comprehensive adverse event reporting system. Existing systems are deficient and limited by the difficulty of defining dosages, active ingredients, or consistent adverse signals. Some systems require payment to access (e.g., the poison control center of the American Society for the Prevention of Cruelty to Animals) or are limited by membership (e.g., the National Animal Supplement Council). Any system should be easily accessible for reporting and retrieving purposes, generate accurate data with a high level of confidence, and build upon the experience embedded in existing systems. The committee’s analysis of these supplements has not uncovered a system for adverse reporting that is similar to those in place for drugs. The committee believes that lack of adverse events being reported to a manufacturer is weak evidence for a lack of adverse effects having actually occurred.

Current regulations addressing animal dietary supplements are in disarray. Clarification is required to clearly differentiate between an animal dietary supplement and a food additive or animal drug, as well as factors that differentiate regulation of human and animal supplements. Any future animal dietary supplement regulations should take into account existing standards set by the American Association of Feed Control Officials (AAFCO), Codex, and U.S. Pharmacopeia (USP).

CONCLUSION

Many people presume that supplements are safer than drugs, but the reality is that there is very limited safety data on dietary supplements for horses, dogs, and cats to determine safe use. The committee was unable to determine an upper limit of safe use for the three supplements, lutein, evening primrose oil, and garlic. This shortage of data resulted in trying to estimate existing intake levels as those presumed to be safe. The committee believes these levels are conservative for lutein and evening primrose oil, but probably more on target for garlic because of known reports of adverse events.

Many challenges stand in the way of determining whether or not animal dietary supplements are safe and at what dosage. Supplements considered safe in humans and other cross-species are not always safe in horses, dogs, and cats. An adverse event reporting system is badly needed. And finally, regulations dealing with animal dietary supplements are in disarray. Clear and precise regulations are needed to allow only safe dietary supplements on the market.

Committee on Examining the Safety of Dietary Supplements for Horses, Dogs, and Cats: Jim E. Riviere, (Chair), North Carolina State University; Dawn M. Boothe, Auburn University; Gail L. Czarnecki-Maulden, Nestle Purina PetCare PTC; David A. Dzanis, Dzanis Consulting & Collaborations; Patricia A. Harris, WALTHAM Centre for Pet Nutrition; Wouter H. Hendriks, Wageningen University; Claudia A. Kirk, University of Tennessee; Lori K. Warren, University of Florida; Austin J. Lewis (Study Director); Ruth S. Arieti (Senior Project Assistant).

This report brief was prepared by the National Research Council based on the committee’s report. For more information or copies, contact the Board on Agriculture and Natural Resources at (202) 334-3062 or visit http://dels.nas.edu/banr. Copies of Safety of Dietary Supplements for Horses, Dogs, and Cats are available from the National Academies Press, 500 Fifth Street, NW, Washington, D.C. 20001; (800) 624-6242; www.nap.edu.

Special Days This Month

» Month and Week - Long Events include:
  September 21 - 27 • Sea Otter Awareness Week
  September 21 - 27 • National Farm Safety & Health Week
  September 21 - 27 • National Deaf Dog Awareness Week

» September Special Days include:
  September 4 • National Wildlife Day
  September 8 • National Iguana Awareness Day
  September 14 • National Pet Memorial Day
  September 22 • National Elephant Appreciation Day
  September 25 • National Teach Ag Day
  September 28 • World Rabies Day

Catalyst Council’s
Happy Healthy Cat Month
For More Information...

There’s far too many quality resources available to veterinarians, veterinary technicians, practice managers and staff, and to clients and consumers on the topic of Dietary Supplements and Nutraceuticals to include in this edition of the INSIDER. We’ve provided some additional web links below:


- [www.thehorse.com/articles/28184/the-science-behind-equine-nutritional-supplements](http://www.thehorse.com/articles/28184/the-science-behind-equine-nutritional-supplements) GREAT article and information on equine nutritional supplements (free registration may be required).

- [www.acvn.org](http://www.acvn.org) The website for the American College of Veterinary Nutrition

- [www.nutritiontechs.org](http://www.nutritiontechs.org) The website for the Academy of Veterinary Nutrition Technicians (AVNT, whose mission is “to advance the area of and promote excellence in the discipline of veterinary nutrition.”)

- [www.nasc.cc](http://www.nasc.cc) The website for the National Animal Supplement Council, an “industry group dedicated to protecting and enhancing the health of companion animals and horses throughout the United States. Founded in 2001, NASC members are industry participants and other stakeholders of the finest animal supplements who are committed to the highest current standards of quality in the industry today”

- [www.fda.gov/AnimalVeterinary/NewsEvents/FDAVeterinarianNewsLetter/ucm110415.htm](http://www.fda.gov/AnimalVeterinary/NewsEvents/FDAVeterinarianNewsLetter/ucm110415.htm) A very comprehensive overview from the FDA on the regulations and requirements surrounding the marketing of Dietary Supplements.
Introducing OSPHOS, the new intramuscular injection from Dechra Veterinary Products

OSPHOS contains clodronate disodium, a bisphosphonate indicated for the control of clinical signs associated with navicular syndrome in horses. OSPHOS is the only FDA-approved bisphosphonate for use in horses that is labeled for intramuscular injection. In a clinical trial evaluating OSPHOS in 86 horses, lameness improved in 74.7% of horses by at least one grade 56 days after treatment. Only 9% of horses displayed clinical signs of being uncomfortable, nervous, colicky and or pawing after receiving OSPHOS. Less than 1% of horses experienced colic requiring treatment.

WITH OSPHOS THE BENEFITS ARE CLEAR . . .

As with all drugs, side effects may occur. In field studies, the most common side effects reported were signs of discomfort or nervousness, colic, and/or pawing. OSPHOS should not be used in pregnant or lactating mares, or mares intended for breeding. Use of OSPHOS in patients with conditions affecting renal function or mineral or electrolyte homeostasis is not recommended. Refer to the prescribing information for complete details or visit www.dechra-us.com.

CAUTION: Federal law restricts this drug to use by or on the order of licensed veterinarian.
Nutritional Supplements in Horses

Veterinarians must show caution when recommending nutritional supplements.

What should practitioners consider when evaluating and recommending nutrient supplements for equine patients? In addition to looking at the traditional issues of an animal’s age, activity level and general health, practitioners should also consider the nutrient’s perceived benefits, efficacy and bioavailability.

Following is a look at nutritional supplements, including nutraceuticals, how they are and aren’t regulated and the purported benefits of some of the supplements.

First, the basics
The Nutrient Requirements of Horses from the National Academy of Sciences is the basis for evaluating nutrient needs of horses. Published in 2007, it provides a thorough review of the various classes of nutrients (e.g., energy, carbohydrates, protein and amino acids, fats and fatty acids, vitamins, minerals), including estimates of nutrient requirements for growth, maintenance, reproduction and performance. It also discusses water and water quality, feeds and feed processing, feed additives, feed analysis, ration formulation and evaluation and the nutritional needs of horses experiencing various disease states.

When feeding horses, management conditions are pivotal; environmental access to nutrients can influence the feeding management that’s implemented. Horses that live outdoors with access to pasture are fed very differently from those in confinement.

In addition to the nutritional requirements responsible for sustaining normal physiology, nutrient expenditures associated with degrees of activity can influence feeding practices. Horses may be involved in high levels of performance (e.g., racing, polo, dressage, cutting and roping, ranch and farm work), as well as moderate levels of exercise. Horses at varying levels of exercise require different amounts of energy, as well as other nutrients such as electrolytes and water for intense physical activity and performance. Special considerations are also given to young and growing horses, breeding stallions and pregnant or lactating mares.

Horses may be fed fresh and stored forages; grain mixtures; processed grains compressed by rolling, flaking or crimping; pelleted grain mixtures; pelleted forage; textured feeds and extruded feeds (cubes, wafers, pellets). Rations are usually composed of ingredients that are processed after harvesting. Processing can affect the physical, chemical and microbiological properties of the feedstuff by altering the size, density, nutrient content and texture. Digestibility, utilization, intake and acceptance may also be affected.

Nutrient supplements defined
The Federal Food, Drug and Cosmetic Act [Title 21, Code of Federal Regulations §321(f)] defines feed additives and includes items that are intended or reasonably expected to become either directly or indirectly a constituent of food or that may alter the characteristics of a food. Additives also include substances intended for use in the manufacturing, processing, packaging and storage of a food. Animal diet feed additives may be non-nutritive ingredients that stimulate growth or other aspects of production, improve the efficiency of food utilization or benefit the animal’s health or metabolism.

Numerous nutrient supplement compositions are available. Such supplements are often mixtures of vitamins and minerals, though some include ingredients not commonly part of the natural equine diet. These supplements may include botanicals, herbs, extracts, enzymes, metabolites and amino acids. They’re sold in the form of tablets, liquids,
pastes, powders and granules.

The American Association of Equine Practitioners (AAEP) endorses the 1996 American Veterinary Medical Association (AVMA) guidelines, including the use of nutraceuticals. The therapeutic use of micronutrients, macronutrients and other oral nutritional substances is permitted, though veterinarians should be aware of the ingredient content and their benefits, bioavailability, efficacy and safety.

While not applicable to animals, a dietary supplement is defined by the Dietary Supplement Health and Education Act (DSHEA) as one that "contains one or more of the following dietary ingredients: vitamin, mineral, herb, or other botanical, amino acid or dietary substance for use by man to supplement the diet by increasing the total dietary intake, or a concentrate, metabolite, constituent, extract, or combinations of these ingredients." Under DSHEA, dietary supplement manufacturers are responsible for ensuring a supplement is safe before it’s marketed and providing a reasonable assurance that no ingredient presents a significant or unreasonable risk of illness or injury.

Manufacturers cannot claim their products prevent, treat or cure disease. Within the DSHEA, though limited in its ability to regulate products prior to marketing, the Food and Drug Administration (FDA) is responsible for taking action against any unsafe dietary supplement product after it reaches the market. Generally, manufacturers are not required to register their products with the FDA nor get the FDA’s approval before producing or selling dietary supplements. Manufacturers must ensure product label information is truthful and not misleading. Unlike for human dietary supplements, the Center for Veterinary Medicine (CVM) has determined DSHEA doesn’t apply to animals, animal feeds or to veterinary nutraceuticals.

**Animal dietary supplements**

According to the National Research Council, an animal dietary supplement is defined as "a substance for oral consumption by horses, dogs and cats, whether in or on feed or offered separately, intended for specific benefit to the animal by means other than provision of nutrients recognized as essential or for provision of essential nutrients for intended effect on the animal beyond normal nutritional needs, but not including legally defined drugs."

Nutrients and nutrient supplements are regulated by various agencies including the FDA’s CVM and the individual states where the products are sold. Guidance for the state agencies is provided by the Association of American Feed Control Officials (AAFCO). AAFCO writes and revises model bills, which include food and drug regulations set forth in the Code of Federal Regulations and are often the basis of state feed regulations. The AAFCO official publication, published yearly, includes continuous revisions and additions to approved ingredients and animal feed additives. Some manufacturers have introduced animal products from their position within the human nutraceutical market. Many of these products have emerged in the horse market via a bridge from the human supplement market with the assumption that all species need the supplement sometimes without scientific data supporting its efficacy, bioavailability and nutritional purpose in horses. Equine practitioners should scrutinize those products before recommending their use in horses.

The National Animal Supplement Council (NASC), formed in 2001, is a nonprofit industry group consisting of manufacturers, suppliers, veterinarians, dealers and animal owners dedicated to protecting and enhancing the health of horses and companion animals. The group’s aim is to place safety standards on animal supplements and on the manufacturers and to promote the use of safe ingredients in their products. The NASC Quality Seal Program is awarded to those manufacturers that meet the organization’s standards (for more information, visit [http://www.nasc.cc/](http://www.nasc.cc/)).

However, NASC does not require companies to perform efficacy studies on their products or verify that scientific research data are available proving the products are effective for the benefit(s) they claim in horses.

Note, numerous reputable nutrient supplement companies...
Various herbal and botanical nutraceuticals are marketed by equine supplement manufacturers for multiple purposes. Here is a brief synopsis of some of these items, their purported benefits and their noted application in horses. Although included in the list of horse products, some of these nutraceuticals have been scientifically proven only for laboratory animals or people. Regardless of the manufacturer’s common claims, most of these are not AAFCO-approved feed ingredients, nor are they supported by research for use in horses.

**Boswellia serrata:** Safe use in pregnant mares hasn’t been established, so it should be of concern for breeding mares. It may be a GI irritant.

**Methylosulfonylmethane (MSM)** is used to treat various illnesses in horses, including chronic muscle soreness, epiphysitis, acute laminitis, pleuritis, recurring digestive tract disorder and arthritis. While no data exist for its effectiveness, and it’s intended as a source of bioavailable sulfur, studies evaluating its potential chondroprotective effect in horses haven’t been reported.
Equine influenza virus (EIV) and equine herpesvirus (rhinopneumonitis) cause the most common respiratory diseases in horses — and without a second vaccination, the risk increases.¹² Don’t take the gamble. Help protect your at-risk horse by vaccinating with FLUVAC INNOVATOR® EHV 4/1 every six months. Download the Equine Influenza Calculator on iTunes® or learn more at FluvacInnovator.com/calculator.

¹ EHV-1 and EHV-4
³ Manley L, Caceres P. Retrospective Cohort Study of an Equine Influenza Outbreak in the Chilean Army in the Metropolitan Region of Santiago, Chile, during 2006, in Proceedings: 12th Symposium of the International Society for Veterinary Epidemiology and Economics, Durban, South Africa 2009:64.

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Beta-hydroxy beta-methylbutyrate (HMB): Although HMB is used as a supplement to increase performance; prevent muscle damage after strenuous effort; increase strength, endurance, and lean muscle mass and prevent exertional rhabdomyolysis, there are little or no data to support its use in horses.

Devil’s claw (Harpagophytum procumbens) is purported as a natural anti-inflammatory and analgesic for providing pain relief to horses and reducing inflammation in equine joints, but there are no supportive data in horses. It is contraindicated in horses with gastric and duodenal ulcers.

Cat’s claw (Uncaria tomentosa): No studies are believed to have been performed in horses, but cat’s claw purportedly fights viral infections and toxins and inhibits microorganism growth.

Valerian (Valeriana species): Its composition includes valerenic acids (monoterpenes, sesquiterpenes) and iridoid glycosides. Several positive benefits are claimed for horses for its sedative or tranquilizing properties because of its effects on suppressing gamma-aminobutyric acid, but no known studies have been done in horses. Valerian should not be used in conjunction with central nervous system depressants or before a horse is anesthetized.

Ginseng (Panax species) is commonly studied for its immunostimulatory properties. It’s been shown to exert an inhibitory effect on IL-1β and IL-6 gene expression; decrease TNF-α production by macrophages; decrease COX-2 expression and suppress histamine and leukotriene release in mice and rats. As an equine supplement, ginseng is purported for stimulating the immune system, decreasing stress and increasing optimal performance, but there’s no scientific literature to support its use in horses.

Fenugreek (Trigonella foenum-graecum) is noted as a digestive tonic, but it should not be used during pregnancy. Moreover, there is no data to support its use in horses. Most of these nutraceuticals are not AAFCO-approved feed ingredients. No scientific literature exists that shows nutritional or other benefits in horses or supports their use in horses. Other substances in need of data to support their use in horses are outlined in Table 1.

Some of these ingredients should be prescribed with precautions. For example, some may be associated with adverse reactions to their active ingredients. Some may cause undesirable side effects or may produce effects when given with prescribed drugs. Some herbs should be of concern if fed to pregnant mares since they may stimulate the uterus (e.g., licorice root, oregano, sage, vervain, fenugreek). Milk thistle may interfere with uptake of P450 drugs. And marshmallow root shouldn’t be used simultaneously with drugs absorbed into the intestine, since it may decrease uptake.
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In this issue of the INSIDER, please meet one of our instructors, Dr. Victoria Lukasik.

Dr. Victoria Lukasik
Diplomate, American College of Veterinary Anesthesia & Analgesia (DACVAA)

Dr. Victoria Lukasik received her undergraduate degree from the University of Arizona and her doctorate in veterinary medicine from Washington State University where she was awarded the Outstanding Senior Student in Medicine and Surgery (across all disciplines) and the Dorothy Eggerman Memorial Compassion Award.

Dr. Lukasik completed her residency in anesthesiology at Cornell University and received her Diplomate status from the American College of Veterinary Anesthesia and Analgesia (DACVAA) in 1997. She has received awards from the American College of Veterinary Anesthesia and Analgesia, American Animal Hospital Association (AAHA), research awards from the National Institutes of Health and the National Cancer Institute, and actively participates on a committee at the National Cancer Institute. In addition, Dr. Lukasik is involved in research at the Arizona Health Sciences Center at the University of Arizona and has published numerous professional articles and contributed to textbooks on the field of anesthesia. She is a nationally and internationally recognized speaker and has been presented with several professional awards, including one for compassion.

Lecture & Lab Events:
- Monitoring Anesthesia: Breathing and Capnography
- Monitoring Anesthesia: Circulation and Blood Pressure
- Monitoring Anesthesia: Electrocardiogram
- Monitoring Anesthesia: Inadvertent Hypothermia
- Recognizing Patient Trends and Managing Anesthetic Events I
- Recognizing Patient Trends and Managing Anesthetic Events II
- Management of Anesthetic Events I
- Management of Anesthetic Events II

Lecture Events:
- Anesthesia of Patients with Limited Physiologic Reserve
- Alternative inductions to Propofol
- Anesthesia of the Geriatric Patient
- Geriatric Anesthesia
- Anesthesia of the Geriatric Cat
- Anesthesia of the Pediatric Patient
- Anesthesia of Patients with Chronic Renal Failure
- Sedation of Emergency Patients
- Balanced Post-operative Analgesia
- Multimodal Medical Management of Chronic Pain
- Multimodal Management of Chronic Pain
- Local Anesthetic Blocks for Canine and Feline Dentistry
- Acute Pain Management, Trauma and Critical Care in Cats
## 2014/2015 Small Animal Dental Lecture and Labs

**Dental - Level 1 - 2014**
- Dental Lecture & Lab w/ Dr. Brook Niemiec  
<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>October 18-19, 2014</td>
<td>Seattle, Washington</td>
</tr>
<tr>
<td>November 22-23, 2014</td>
<td>Pomona, California</td>
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**Dental - Level 2 - 2014**
- Dental Lecture & Lab w/ Dr. Brook Niemiec  
<table>
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<th>Date</th>
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<tbody>
<tr>
<td>October 25-26, 2014</td>
<td>Austin, Texas</td>
</tr>
<tr>
<td>December 13-14, 2014</td>
<td>Napa Valley, California</td>
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</tbody>
</table>

**Dental - Level 1 - 2015**
- Dental Lecture & Lab w/Dr. Brook Niemiec  
<table>
<thead>
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<tbody>
<tr>
<td>March 28-29, 2015</td>
<td>El Paso, Texas</td>
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<tr>
<td>April 11-12, 2015</td>
<td>Nashville, Tennessee</td>
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<tr>
<td>June 13-14, 2015</td>
<td>Tampa, Florida</td>
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<tr>
<td>August 22-23, 2015</td>
<td>New Orleans, Louisiana</td>
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<td>September 26-27, 2015</td>
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<td>October 17-18, 2015</td>
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<tr>
<td>November 21-22, 2015</td>
<td>Midwest - IWCC</td>
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<td>December 5-6, 2015</td>
<td>Site TBD</td>
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## 2014/2015 Orthopedics Lecture and Labs

**Cruciate Management by CBLO**  
- Date  | Location |
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<tbody>
<tr>
<td>October 11-12, 2014</td>
<td>Oquendo Center, Las Vegas, NV</td>
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**Comprehensive Stifle Disease**  
- Date  | Location |
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<tbody>
<tr>
<td>February 5-7, 2015</td>
<td>Oquendo Center, Las Vegas, NV</td>
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**Cora-Based Tibial Leveling Osteotomy (CBIO)**  
- Date  | Location |
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<tbody>
<tr>
<td>February 8-9, 2015</td>
<td>Oquendo Center, Las Vegas, NV</td>
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**Basic Orthopedics**  
- Date  | Location |
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<tr>
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<tbody>
<tr>
<td>March 21, 2015</td>
<td>Midwest/High Plains - IWCC</td>
</tr>
<tr>
<td>April 25, 2015</td>
<td>New Orleans, Louisiana</td>
</tr>
<tr>
<td>May 16, 2015</td>
<td>Roanoke, Texas</td>
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</table>

## 2014/2015 Anesthesia Lectures and Labs

**Anesthesia - Level 1 - 2014**
- Advanced Anesthesia w/Dr. Victoria Lukasik  
<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
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<tbody>
<tr>
<td>September 6, 2014</td>
<td>Burbank, California</td>
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<tr>
<td>October 11, 2014</td>
<td>Phoenix, Arizona</td>
</tr>
<tr>
<td>November 15, 2014</td>
<td>Austin, Texas</td>
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</table>

**Anesthesia - Level 1 - 2015**
- Advanced Anesthesia Level-1 w/Dr. Victoria Lukasik  
<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>June 6, 2015</td>
<td>Denver, Colorado</td>
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</table>

**Anesthesia - Level 2 - 2015**
- Advanced Anesthesia Level-2 w/Dr. Victoria Lukasik  
<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
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<tbody>
<tr>
<td>April 18-19, 2015</td>
<td>Midwest/High Plains - Sioux Falls</td>
</tr>
<tr>
<td>May 30-31, 2015</td>
<td>Site TBD</td>
</tr>
<tr>
<td>September 12-13, 2015</td>
<td>Austin, Texas</td>
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</table>

## 2014 Equine Lecture and Labs

**Advanced Equine Dentistry w/Dr. Jack Easley**  
- Date  | Location |
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<tbody>
<tr>
<td>September 19-20, 2015</td>
<td>Elk River, Minnesota</td>
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**Equine Anesthesia w/Dr. Victoria Lukasik**  
- Date  | Location |
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<tbody>
<tr>
<td>October 3-4, 2015</td>
<td>Site TBD</td>
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Mosquitoes may be small, but as transmitters of West Nile virus, they can cause big problems for your horse. Talk with your veterinarian about WEST NILE-INNOVATOR®, the West Nile vaccine that has helped protect more horses than any other.

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1 Mosquitoes may be small, but as transmitters of West Nile virus, they can cause big problems for your horse. Talk with your veterinarian about WEST NILE-INNOVATOR®, the West Nile vaccine that has helped protect more horses than any other.

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