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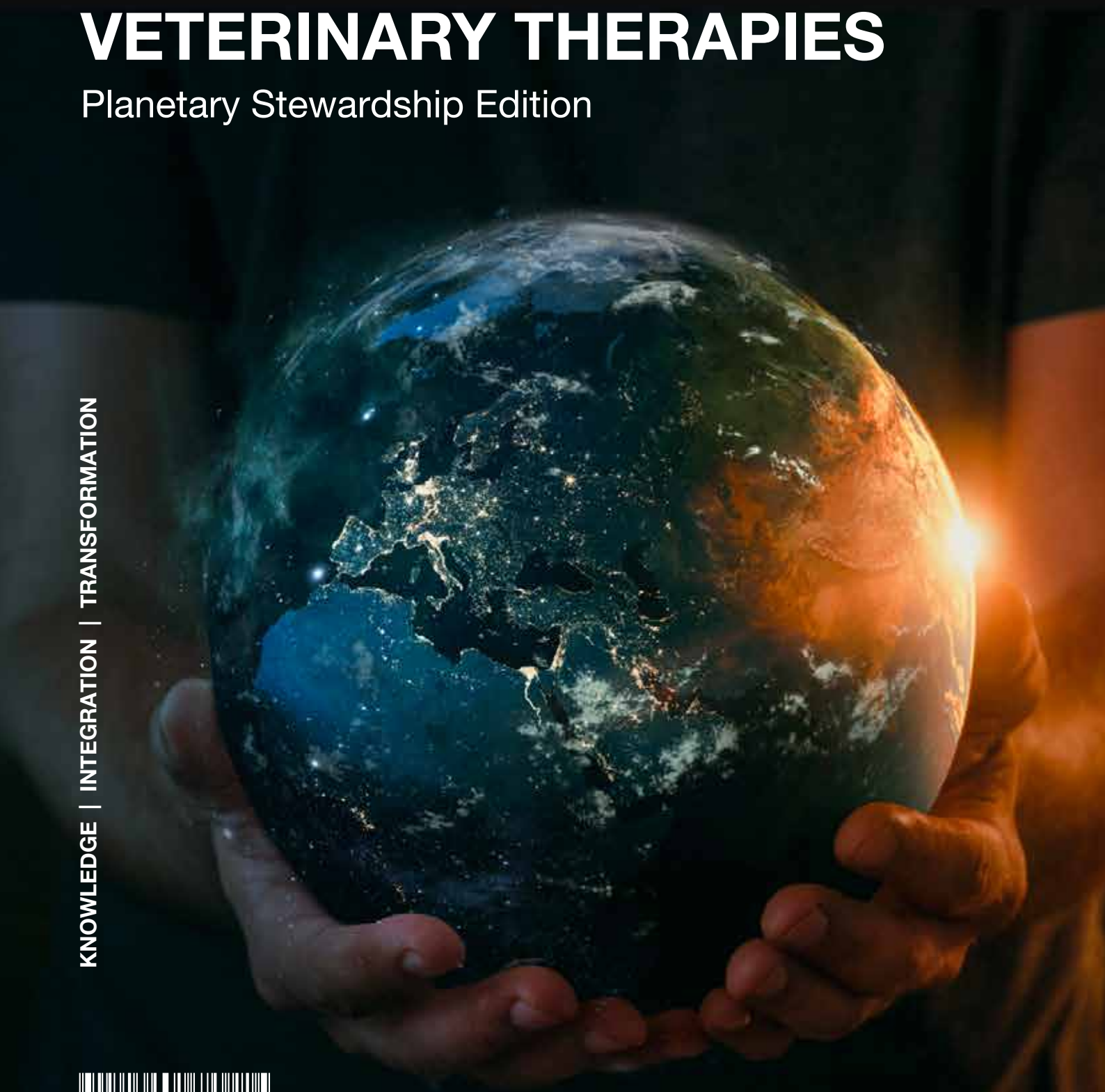
Planetary Stewardship Edition



KNOWLEDGE | INTEGRATION | TRANSFORMATION

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JIVT: An Introduction

The Journal of Integrative Veterinary Therapies (JIVT) is published twice a year by the College of Integrative Veterinary Therapies (CIVT). It contains papers on all aspects of integrative veterinary medicine, including Chinese and Western herbal medicine, acupuncture, rehabilitation, natural nutrition, environmental medicine, philosophy, history, clinical cases, and commentary.

CIVT was founded in 2006 and is the world's first distance education institution specializing in evidence-based natural medicine for animals. Our mission is to provide international leadership in the delivery of comprehensive, quality veterinary natural medicine education that is evidence-based.

CIVT aims to bridge science and tradition, to benefit animal health and wellbeing, by integrating the best of natural medicine and conventional healthcare practices. CIVT encourages an ecological and environmentally aware approach to the health of our animals, ourselves, our communities, and our planet.

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ARTICLE

Pet Food Ingredient Sourcing: Asking the right questions to keep animals and our profession healthy

Dr Barbara E. Royal *Co-authored by Sean Gies and Natasha Lilly, DVM*
Illinois, USA

Dr Barbara Royal is the principal of CIVT. She is also a professor and lecturer for CIVT's nutrition courses.

When I give a seminar about nutrition to veterinarians, I am grateful I do not need to continually convince my audience of the moral imperatives involved with animal welfare issues, habitat protection/habitat destruction, healthy soil regeneration, decreasing overuse of antibiotics and chemicals, climate change, and the broader issues of planetary welfare we face. As animal health professionals, we are all aware, perhaps to differing degrees, that these are not only globally relevant ecological health issues but are integral in many repercussions of health in our patients. Often, they seem beyond our control, far beyond our financial, logistical, or professional powers to remedy. We find ourselves stuck with what seems like overwhelmingly difficult choices between recommending what is right and what is possible.

Many ethical options that do fall within our jurisdiction are often more expensive financially. This makes it difficult to give ingredient sourcing the attention and scrutiny it deserves especially if we don't feel it helps us or our clients with the financial bottom line. We are further stymied by poor access to consistent data about ingredients, processing techniques, and the conditions under which products (especially animal products) are produced. This makes it complicated to be clear about our conclusions, even when money is not a primary consideration. Overall, I have both seen and experienced a great deal of confusion on this subject. However, as veterinarians, we really do still know what is right.

Confusion is exhausting, and we simply do not have time for exhaustion in this difficult profession, so it may feel as if our hand is forced. Part of veterinary medicine is being able to recognize when a problem is simply beyond your capacity to help. It may feel as if this situation falls within those boundaries. It does not. It turns out that making more informed sourcing choices has tangible benefits for everyone involved. Proper animal welfare and ethical animal product processing and management have been shown to have significant positive effects on the quality of those animal products, the biome diversity in the products as well as the soil where they are produced. We must define quality in food relative to its capacity to encourage health in the animals that eat it. An emerging reality of better quality from better conditions creating more vibrant health in our patients is good news not only for those patients and food animals, but also for the health and resilience of our profession.

We can begin with the issue of access to credible information. This is clearly a problem. The pet food industry is worth hundreds of billions of dollars and is projected by nearly all sources to continue growing at a rate outpacing most industries worth over a billion dollars (Technavio, 2022). This growth has been supported in part by a continuing stream

of relatively biased nutritional information flowing from the industry itself. Investment in product placement in veterinary schools and veterinary clinics nationwide opens opportunities for sales representatives of these companies to direct nutritional conversations in the veterinary world. Much of the literature surrounding pet nutrition is funded by at least one of these companies. Research in pet nutrition typically treats a standard ultra-processed dry kibble food as a control for animal health. For example, a report commissioned by the American Feed Industry Association's Institute for Feed Education and Research, the Pet Food Institute and the North American Renderers Association estimated that US pet food manufacturers purchase 6.9 billion pounds of animal protein per year, many of which are derived from rendered products. The report seems to confirm that rendering is inevitable and needed for kibble foods. It concludes that we should render more products to help decrease the number of food animals used for feed production. Proponents of this idea also proport that rendered products are better for the environment, essentially claiming that rendering can be likened to recycling. The fact that rendering is not the only way to recycle animal remnants is not our primary focus here.

The point is, are we certain that rendering is a process that retains and provides essential nutrients well? While it may very well make use of products that might otherwise go unused, these products may be less helpful to promoting optimal health as a direct consequence of the process used to create them and the lack of regulation regarding their contents. The health benefits of increased use of rendered ingredients for pet food are unclear at best (Pagliai et al., 2021; Thixton, 2022). There are many reasons we might want to think twice about rendering as it is currently managed. For human health, we have learned that it is best to avoid high-heat and ultra-processed foods (Gramza-Michałowska, 2020; Pagliai et al., 2021). But in pet food, the preponderance of reports from self-serving industry organizations continue to proclaim its virtues. It's no wonder we are still confused.

The American Feed Industry Association that commissioned this report is a nonprofit whose mission is "exclusively representing the business, legislative, and regulatory interests of the US animal food industry and its suppliers" (https://www.afia.org/). The Pet Food Institute is a frequent collaborator of the AFIA and has interests specific to the pet food section of the animal feed industry (https://www.petfoodinstitute.org/). The North American Renderers Association similarly exists to represent the interests of the animal rendering industry (https://nara.org/). These are lobbying organizations. It should not be a surprise that research commissioned by these organizations should result in findings that, were they to be accepted as fact, would be beneficial to the bottom line of the industry they support. It should be clear that such research should be treated with caution and even suspicion. Where possible, sources without clear conflict of interest should be sought out. It may be the case that credible research on a specific nutritional matter may not exist yet, and in these cases, we must use our judgement and medical expertise to plot the best course.

Plotting such a course starts with investigating the sourcing of the foods that our patients are being fed. This means asking questions beyond what kind of food it is or what the main protein source is – we are looking for information on where ingredients are coming from, what production methods are being used to create them, and under what conditions are they being produced. A lack of answers to any of these questions should be regarded as suspicious – if the manufacturer of a dog food responds that they do not know where the ingredients for their food are coming from, they may be trying to avoid or conceal some unsavory details.

The morality of animal welfare is not the only factor here. Questions regarding how animal welfare is related to the quality of animal products have been relevant for decades, and their answers can have serious implications for the quality of the food that is produced

from these animals. For example, current research on Vitamin D levels in eggs (Kühn et al., 2014) confirms data from as early as 1924 when experiments conducted under JS Hughes at Kansas State Agricultural College gave evidence that "eggs from strictly indoor farmed chickens not exposed to sunlight will be lacking in Vitamin D, and conversely put the chickens outdoors, running in the sun, their eggs are full of healthy Vitamin D levels as well as other nutrients."

Lending support for the argument that non-confinement-based agriculture results in higher quality products, research shows that "healthy" fats, particularly the much studied conjugated linoleic acids (CLA) in beef fat, are increased when animals are pasture raised, eating grasses and moving about freely. "Grass-based diets have been shown to enhance total conjugated linoleic acid (CLA) …and trans vaccenic acid (TVA), a precursor to CLA, and omega-3 FAs on a g/g fat basis" (Daley et al., 2010). The fatty acid CLA has been well researched for its role for many health benefits (Basak et al., 2020) including anti-carcinogenesis in mice (Pariza & Hargraves, 1985; Vanden Heuvel, 1999). It plays a role in decreasing obesity-related cancers (Moon, 2014), enhancing insulin sensitivity in Zucker obese rats (Mir et al., 2004), in decreased obesity in mice (Delany et al., 1999) and decreased blood cholesterol in hamsters (Nicolosi et al., 1997). Studies show that it is involved in the enhancement of immunity (Hayek et al., 1999; Viladomiu, Hontecillas & Bassaganya-Riera, 2016), in the alleviation of Crohn's disease, allergies and asthma (Bassaganya-Riera et al., 2012; Whigham, Cook & Atkinson, 2000), and has anti-atherosclerotic effects in rabbits (Kritchevsky et al., 2000).

Research supports the idea that the welfare of animals raised to feed our patients has a demonstrable effect on the quality of those animal products and their ability to nutritionally support health. So when we are investigating our sourcing, perhaps we ask about the level of exercise and sunlight these animals are getting (confinement essentially implying that there is no exercise or outdoor access). What are they being fed? Is food species-appropriate, and relatively free of inappropriate ingredients? What are the routine methods used to improve growth, protect them from parasites, disease and ensure that they themselves are living healthy lives (do these involve indiscriminate use of antibiotics, pesticides or other agri-chemicals)?

There are thousands of naturally occurring and health promoting nutrients that we are expecting to absorb in our food. When we alter the natural activities, foods or development of food animals and plants, we must consider the changes in the quality of our final food product. If we are expecting a certain amount of CLA or Vitamin D in a food, we need to know if it is really there. Questions regarding the welfare of feed animals and the methods by which they are being grown are justified when we understand that the answers to our questions will influence the health of our patients via the food that we recommend they consume. This puts those questions not only within the purview of responsible veterinarians but shows that asking them is a responsibility which should not be ignored.

Animal welfare is not the only issue we are concerned with in determining the quality of sourcing for a given product. We are interested in the manner in which any plant-based products are produced, whether for food animal feed or for inclusion as an ingredient in the final product to be fed to our

patients. Any inclusion, whether intentional or not, of preservatives, pesticides, herbicides, or other agri-chemicals whose effect on health is uncertain can be considered suspect as well. These are not unfounded concerns. There are many cases of both accidental or negligent health disrupting inclusion of such chemicals in pet foods and in foods intended for human consumption; caution in this regard is absolutely warranted.

Hummus eaters may be shocked to find conventionally farmed hummus typically contains alarming levels of glyphosate (a pesticide often implicated in health problems and cancer) due to harvesting methods (Temkin & Naidenko, 2020). The chemical glyphosate is often used in conventional intensive crop systems to optimize crop harvest time and production. Used as a drying agent for foliage it is sprayed over the crops so that harvesting the chickpeas is more efficient. Many pet foods are now (rightly or wrongly) incorporating chickpeas in their recipes. This is certainly one example of how organic ingredients may be a healthier choice. While we know a perfect diet will not cure all ills, an unhealthy diet will always cause problems.

Another important sourcing factor is the distance these ingredients and the finished animal food itself is traveling to its final location. Generally speaking, shorter travel distance can be better. Local sourcing can stand on its merits as a practice to be encouraged, but we must remain cautious. Whether a food is local or not has no real effect on the quality concerns mentioned previously. Poorly produced food can be made just as plausibly a block away as a world away. A food being “locally sourced” cannot be the only relevant fact in this discussion. Having said that, locally sourced food is inherently less ecologically taxing, may be subject to regulations that reflect the local population’s mandates, and may be less likely to suffer damage or spoilage on its way to a retail destination.

There are certainly many reasons we might be overwhelmed and discouraged from evaluating our patients’ food options. Many of our major health professional resources (nutrition guidelines, university programs, veterinary associations, online services, manufacturers’ labels, pet food textbooks, databases, even nutritionist advice) vary wildly in terms of recommendations and facts, disagree on methods and balance, and sometimes even participate in aggressive crossfire. In addition, for many nutrients in pet foods, manufacturers and nutritionists rely on antiquated data from the USDA’s nutrient database to provide accurate values to formulate a healthy food.

Unfortunately, the USDA’s nutrient database contains data on nutrients in pet food ingredients that are often either missing completely, decades old, and/or not substantiated by testing or science. We can agree that we have changed farming, husbandry, feed and harvesting protocols for our pet food ingredients over the years, so this data may be inaccurate and often simply missing (entered as zero). It is essential that we understand how these changes affect ingredients, contaminants and toxins in pet foods. We may not have time to be the researchers or even properly scrutinize the nutrients, but we can use our numbers to demand that updated and current data be used as the cornerstone of our approach to health. Working with developers, analysts and researchers for the Animal Diet Formulator software for over ten years, I have seen first-hand the usefulness of this type of careful data analysis, and how better data can positively influence the balance and quality of the foods we recommend.

The FDA is responsible for making sure food for both people and animals is safe, properly manufactured, and adequately labeled (https://www.fda.gov/). The agency is also responsible for ensuring that drugs for people and animals are safe, effective, properly manufactured, and adequately labeled and packaged. This would be fine if all pet food ingredients were appropriate, healthy, and nutritious to start. But unhealthy and unsafe are evidently very different terms.

Among the many reasons to pay attention to pet food, not the least could be how it affects the way in which we are exploiting our planet. Land use practices are a global concern today. Habitat destruction is rampant almost anywhere human development is happening, and agricultural practices which could viably share habitat either in the margins of production areas or even directly within them often choose to pursue a model of agriculture allowing only the crop to survive. This ecosystem destruction is often shown via the tragedies of charismatic species like orangutans or blue whales, but perhaps the most impactful areas of extinction for our purposes in this discussion are in the soil.

We are all aware that in using pesticides, we are not only leaving them on our produce, but likely and perhaps more devastatingly, putting them into our soil, damaging the natural microbiota there. Sadly over 200 million pounds of pesticides are still applied to factory-farmed crops used to feed food animals in American every year (https://www.biologicaldiversity.org/).

The health of soil microbiota is also pertinent to biological studies evaluating the biome of land used for production. The health of this biome has implications for the health of the plants and animals producing these ingredients, which in turn has an effect on the quality of those ingredients (Curran, 2016; Bitew & Alemayehu, 2017; Nandula & Tyler, 2016). Given the modern healthy concern for biome composition both in ecology and in animal health, this connection is a clear area of concern in any sourcing investigative efforts. Extensive connections exist between the nutritive quality of food products and the diversity and quantity of biomass in the surrounding soil ecology (Jie et al., 2002). The welfare of soil microorganisms is extremely valuable to the welfare of feed animals in creating a food product of superior quality. Our questions can be simple, and even if responses are unsatisfactory, it is still important to ask. For example: what, if any, guidelines do you have for land use practices that ensure a diverse and robust variety of soil microbiota? Large scale change is rarely immediate, but the industry will note that professionals are paying attention.

Habitat conservation also has benefits outside of the link between soil biology and food quality. Countless new medicines, therapies, and supplements have been discovered simply via the cataloguing of existing biodiversity. These may take the shape of herbs previously unknown to science, biological interactions that have not been sufficiently understood, or metabolic processes that may serve as a model for new therapies that only occur in specific environments (Newman & Cragg, 2020). We simply cannot know the wealth of medically useful information that exists outside of our understanding of biology, and the best teacher of that information has always simply been the continued existence of those habitats and the persistence of humanity's natural curiosity. If not for the sake of bettering the quality of our patients' health via the food they eat, we should be supporting the conservation of habitat for the sake of future advances in medicine.

Habitat destruction and land use policy may seem like issues too large for veterinarians or individuals in the veterinary industry to tackle. It may be the case that we lack the influence of the world leaders that we often look to regarding action on these issues. But our decisions on how to recommend animal foods to patients do not lose their impact because they are unable to solve these global issues in one fell swoop. The fact that these issues are global in scope does not make our responsibility to them less personal or less consequential. Acting on these moral ideals has positive effects on the health of our patients; this is becoming increasingly clear. Our clients know that nutrition plays a vital role in the health of their pets. Inaction on these issues may soon be less of a personal choice and more of a dereliction of needed duty as health professionals.

My practice is based on the idea that the single most important health decision we can make for our patients is what we put in their food bowls. It may be difficult to ascertain the details of what goes into those bowls beyond the claims of the companies that produce it, but the fact is, finding credible information regarding our patients' diets is a major component of our jobs as health professionals.

Put more directly, if you are a veterinarian, you are responsible for the health and welfare of the animals which feed your patients, just as much as you are the health and welfare of your patients themselves. If you are anywhere in the pipeline between farmer and retail store owner for pet food, you are just as responsible for the quality of your product as you are for how it was produced. It may be considered normal to absolve ourselves of responsibility for the things that either do not fall between the boundaries of our business' bottom line or the letter of the law of our patient care responsibilities. But the normalcy of bad practices does not make them less bad.

It was normal for a time to only feed our pets and our patients high-heat ultra-processed kibble foods. We now find this leaves them without the health benefits of fresh foods and more prone to health problems. Many of us found it difficult to change our thinking on that issue, and when we did it was likely due to the sheer undeniability of the results that a fresh, species appropriate diet brought to the health of our patients. Luckily for us, resolving the moral issues in sourcing seem to directly correlate to the quality of the products we source and the health of our patients. It is not only time we take responsibility for changing this paradigm, it is sensible and necessary as well.

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Beware of these more undefined, easy to misrepresent, vague labels:

- Ethically Raised, Responsibly Raised, Thoughtfully Raised
- Humanely Raised/Humanely Handled
- Natural
- Naturally Raised
- Free Range
- Cage Free
- Other unverifiable subjective terms

A few useful independent organizations help to evaluate farm animal ingredients for consumers. While not perfect, where available, they can help guide us. Certification comes with approval for their logo to be placed on a label, like: Organic certified, or Certified Animal Welfare Approved logos visible on food labels. Examples of independent organizations and their logos are below:

Certified Animal Welfare Approved by AGW

Certified Grassfed by AGW

Certified Humane

Global Animal Partnership

Regenerative Organic Certified

AGA Certified Grassfed

American Humane Certified

Organic Plus Trust Certified Grass-Fed Organic

Real Organic Project

Vegan/Certified Plant Based

USDA Certified Organic

ARTICLE

Sustainability in Veterinary Herbal Medicine

Dr Susan Leopold *PhD*
Virginia, USA

Dr Susan Leopold is an ethnobotanist and passionate defender of biodiversity. Over the past 20 years, Susan has worked extensively with indigenous peoples in Peru and Costa Rica. She is the Executive Director of United Plant Savers and Director of the Sacred Seeds Project.

Factoring sustainability into herbal medicine, whether we are using it in veterinary practice or for our own well-being, is increasingly important to the health of our planet and its ecosystems.

Introduction

The well-being of the planet, and thus ecosystem resiliency, is deeply linked to the sustainability of herbal medicine and the preservation of cultural traditions. Using herbs in either a holistic veterinary practice or on a personal level elevates our awareness not only of what the plants can do for an ailment, but more importantly, what we can do for the plants and the planet. The interconnectedness of human, animal and planetary well-being is

becoming more apparent than ever. The pathway of learning about herbal therapeutics and understanding how a plant grows, what part of the plant is used, where the plants are sourced, and the challenges they are exposed to in the supply chain brings about important questions to navigate. This article seeks to provide resources to help address those questions.

Supporting Sustainable Supply Chains

Conservation through cultivation is a path towards sustainability if a plant can be propagated easily. For example, in the 1980s Paul Strauss developed his herbal Golden Salve to treat his farm animals and himself. The founder of Equinox Botanicals, Paul was instrumental in encouraging United Plant Savers to establish a botanical sanctuary in Rutland, Ohio because the land had an established population of goldenseal that spanned several acres. A wonderful movie, *Sanctity of Sanctuary*, tells the story of how Paul became a self-taught herbalist, farmer, and land steward.

Goldenseal is an iconic American medicinal plant with a long tradition of use among numerous tribes; it is also part of the Eclectic Materia Medica. It can be propagated, but most of the goldenseal on the market today is wild harvested. United Plant Savers is working with farmers through the USDA Beginning Forest Farmer Coalition and the Plant Saver's Forest Grown Verification program to support a more sustainable supply chain for this popular herb.

Unfortunately, many at-risk plants cannot be easily propagated. The seeds may be difficult to germinate, or they may not propagate by cuttings, which means sustainable harvesting and management become critical to the plant's survival. The United States has no governance over plants harvested for trade. Choosing a company that you trust and has transparent practices is vital.

Why Does Biodiversity Matter?

We certainly want to be mindful of the conservation concerns surrounding the medicinal plants that go into the products we use, but why does the state of the world's biodiversity matter? In a recent *Nature* article entitled, "Why deforestation and extinctions make a pandemic more likely," Jeff Tollefson cites a recent study that helps reveal why: "While some species are going extinct, those that tend to survive and thrive—rats and bats, for instance—are more likely to host potentially dangerous pathogens that can make the jump to humans."[2] (See Figure 1.)

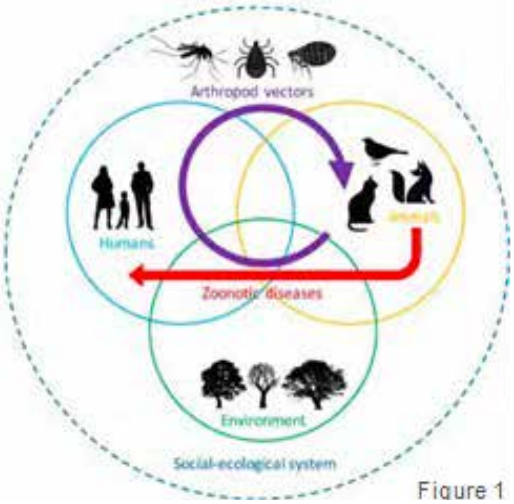

Figure 1

On September 17, 2020, the IUCN posted this call to members that now is the time to form a Global Wildlife Health Authority:

"The COVID-19 pandemic has revealed how vulnerable we are to emerging diseases, and exposed the lack of wildlife health oversight, surveillance and management across the world. Our disturbance of the natural world and growing human and domestic animal populations are increasing contact with wild species and novel emerging infections. To help prevent future emergence of novel pathogens and outbreaks of known zoonotic diseases, the global community should designate a global authority for wildlife diseases and strengthen capacities to monitor and manage disease risks, argue members of the IUCN SSC Wildlife Health Specialist Group."[3]

The IUCN also released a statement about the COVID-19 pandemic on April 8, 2020 stating that land use change is a key driver of emerging zoonotic diseases.[4] Deforestation rates have increased astronomically; in just the last 100 years, the world has lost as much forest as it did in the previous 9,000 years—that's nearly one-third of the planet's forests, according to OurWorldinData.org (https://ourworldindata.org/).[5] While it is difficult to grasp such numbers and concepts, what we do know is that trees are not only amazing at supporting biodiversity, providing oxygen, and cooling the planet, but they also produce forest volatile organic compounds that have numerous benefits to human and animal health.

All the benefits provided by trees and herbaceous plants and how they sustain life on the planet, along with the interconnectedness of human health and ecosystem health, are becoming more apparent as the concept of One Health gains momentum.

This article has been reproduced from the Journal of Medicinal Plant Conservation, Spring 2022 edition, with the permission of United Plant Savers and Dr Susan Leopold.

APPENDIX 1

Databases for conservation status

• NatureServe in the US manages a database of the conservation status of all plants. However, it is important to take into consideration that each state has limited resources, and the data provided is often decades old.

• The International Union for Conservation of Nature (IUCN) Red List is a global database of all species; that said, many medicinal plants have not been evaluated and their status is "unknown."

• The Kew Royal Botanic Gardens in the UK has recently started producing an annual report called *The State of the World's Plants*, which is a great resource for up-to-date information on plants.[1] The very first report, published in 2016, stated that of 391,000 known plants, 17,810 have known medicinal uses. It also stated that a staggering 21% of all plants around the globe are threatened by extinction, primarily due to deforestation and land use changes. In fact, we are in what many scientists are calling the Earth's sixth mass extinction. A mass extinction event is when species vanish faster than they are replaced.

APPENDIX 2

Planetary Health Alliance
www.planetaryhealthalliance.org

Through the IHS' Virtual Learning Center, United Plant Savers in collaboration with VBMA carries on the legacy of the Herbal Vet Track inspired by Juliette de Bairacli Levy and nourished all these years by Rosemary Gladstar.

The IHS brings people together from many diverse backgrounds and ways of working with plants. Learning from elders is at the heart of herbal traditions, and the heart of the symposium as well. The 2021 keynote address was delivered by Diana Beresford-Kroeger, a prolific author who has extensively studied forest volatile organic compounds. Featured online were Diana's film, *Call of the Forest*, A Force for Nature, about the life of botanist Lucy Braun; and the classic *Juliette of the Herbs*, highlighting Juliette de Bairacli Levy, an herbalist specializing in holistic veterinary medicine and one of the original IHS elders.

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CASE REPORT

The Use of an Herbal Formula for Support in Canine Hyperadrenocorticism

Dr Vicky Payne *BVetMed, MRCVS, GDVWHM*
East Essex, United Kingdom

Dr Payne is a graduate of CIVT's Graduate Diploma of Veterinary Western Herbal Medicine course.

Abstract

This paper presents a case of Hyperadreno-corticism (HAC) supported with a herbal formula when conventional treatment caused idiosyncratic hyperkalaemia. A brief review of diagnosis and conventional treatment of HAC in dogs is followed by a case report including a herbal formula and prescribing rationale.

Introduction

Hyperadrenocorticism, also called spontaneous hypercortisolism and Cushing's disease, affects 0.28% of dogs in the UK (O'Neill et al., 2016). The disease is more common in middle aged and older animals, females, and neutered dogs of both sexes (Carotenuto et al., 2019). Breeds reported to be at higher risk include Standard Schnauzers and Fox Terriers (Carotenuto, 2019), Miniature Poodles, Dachshunds, Irish Setters, and Bassetts (Hoffman, 2018), and Bichon Frise (O'Neill, 2016).

HAC can be caused by either a functional pituitary or adrenal tumour which cause high circulating levels of glucocorticoids (Schofield, 2020). Clinical signs include polyuria and polydipsia (PUPD), polyphagia, a pot-bellied appearance, lethargy and weakness, excessive panting, and bruising (Shaw, 1997).

Pituitary dependent HAC is the most common form in dogs, accounting for 80-90% of cases, with one in five dogs having adrenal dependant HAC (Schofield, 2020; Bruyette, 2016). Dogs under 20kg are more likely to have pituitary dependent HAC, with adrenal tumours more common in larger breeds (Shaw, 1997).

Diagnosis of HAC can be complex. Complete Blood Count (CBC) may show a stress leukogram, and serum biochemistry can show changes including raised cholesterol, triglycerides, and glucose, and decreased urea and phosphate. Liver enzymes may also be raised, and hepatomegaly may be apparent on abdominal palpation or imaging. Dynamic blood tests are used to confirm diagnosis. 80-85% of dogs with pituitary HAC will show an exaggerated response to ACTH stimulation tests, as will 60-80% of adrenal HAC cases (Shaw, 1997; Bruyette, 2016). The low-dose dexamethasone suppression test can pick up almost 100% of adrenal HAC and 90-95% of pituitary HAC. Suppression at four hours but not at eight hours is suggestive of pituitary HAC. Measurement of endogenous ACTH can also be used to differentiate the cause, but not as a screening test (Bruyette, 2016). Ultrasonography can be used to assess the adrenal glands, and CT or MRI can assess the pituitary and adrenal glands (Schofield, 2020; Bruyette, 2016).

Most dogs in the United Kingdom (UK) are treated medically with Trilostane (Vetoryl; Dechra), a competitive inhibitor of the enzyme essential for steroid production, 3β-hydroxysteroid dehydrogenase (Lemetayer, 2018). Vetoryl is the only authorised medication for treating canine Cushing's in the UK so must be used first according to the cascade. Trilostane has mild and usually transient side-effects including lethargy,

vomiting, and diarrhoea (Schofield, 2020). However, some dogs can develop iatrogenic hypoadrenocorticism during treatment which can have similar initial symptoms. Renal dysfunction and arthritis may be unmasked by treatment. Hyperkalaemia can develop if trilostane is used with potassium sparing diuretics or ACE inhibitors. Extensive monitoring of treatment is recommended with biochemistry, electrolytes, and ACTH stimulation test before treatment, and at ten days, four weeks, twelve weeks, and every three months during treatment (NOAH, 2014). Mitotane is an unlicenced cytotoxic drug which causes selective adrenal necrosis and may be used if trilostane is not effective (Schofield, 2020). Hypophysectomy and adrenalectomy are surgical options which can be considered in suitable cases (Schofield, 2020).

A literature search of PubMed and Google Scholar on the use of herbal medicines for HAC did not provide many papers. Vitex Agnus-Castus was discussed as a possible treatment for equine Cushing's with a preliminary study finding less depression but otherwise no improvements in clinical signs or endogenous ACTH (Menzies-Gow, 2014). Chinese herbal medicine and acupuncture were used in a twelve dog case series, with owners reporting improvement in clinical symptoms in all cases. Eight cases had pre- and post-treatment ACTH stimulation tests, with seven dogs returning to normal levels. Chinese formulas were used with Ophiopogon formula prescribed for all cases. Ophiopogon formula contained herbs which are not commonly used in western herbal medicine (Koh, 2017).

Case Report

Buddy is a neutered male Tibetan terrier. He was presented to his primary care veterinarian in 2018 aged eleven years with symptoms including PUPD and lethargy. Initial tests, including ACTH stimulation were inconclusive. Three months later symptoms were worsening, and ACTH stimulation test results were suggestive of HAC and treatment was started with trilostane at 2.2mg/kg (Vetoryl; Dechra). He responded well to treatment initially with an improvement in his demeanour and reduced PUPD, but successive dose increases peaking at 3.6mg/kg were required to maintain his improvement. ACTH stimulation and electrolyte tests were not done according to manufacturer's recommendations (NOAH, 2014) with pre-pill cortisol and urine specific gravity as the main tests used to decide on dosage changes (see Appendix). In February 2019 after a year of treatment, the dose was split twice daily. Monitoring blood tests in March 2019 showed hyperkalaemia but no dysrhythmia or signs of renal insufficiency or hypoadrenocorticism and there was no history of treatment with potassium sparing diuretics or ACE inhibitors. The referring vet was concerned about the hyperkalaemia and stopped treatment. By January 2020 Buddy had normal potassium levels, but symptoms of HAC returned. Treatment with Vetoryl was restarted, but hyperkalaemia returned. An internal medicine specialist was not able to determine the cause of the hyperkalaemia which seemed linked to trilostane, but without an obvious mechanism. At this point Buddy's owner sought holistic help with his treatment.

Buddy was assessed on a video call due to restrictions imposed by the Covid-19 pandemic. At the time of consultation Buddy was not on any medication. His drinking and urination were not considered excessive by

his owner. Although he drank freely from his water bowl which was topped up several times a day, he did not seek water from other sources. Water intake had not been measured. He was described as urinating frequently when outdoors but did not have accidents indoors. Buddy was keen to go on walks but was exhausted after a slow thirty minute walk. Buddy was described as coping better in cooler weather and seeking cold areas of the home. He had a pot- bellied appearance but no obvious thinning of the hair. Buddy made 'snoring' noises even when awake and occasionally passed a nugget of faeces indoors which he seemed unaware of. Muscle tone and mass were hard to assess from the video but appeared poor. Buddy was fed a grain free commercial complete wet food. Musculoskeletal examination and heart auscultation were obviously not possible, but a normal heart rate was described in recent clinical notes. No ECG had been done to assess cardiac effects of hyperkalaemia. No specific assessment of pain was mentioned in the clinical notes. No imaging had been done to diagnose pituitary versus adrenal hyperadrenocorticism. Surgical options were ruled out by Buddy's owner.

The treatment goals were discussed with Buddy's owner and were; support the hypothalamic-pituitary-adrenal axis, reduce the effect of high corticosteroids, support immunity, lower/ avoid raising potassium, support liver function.

The following formula was prescribed, to build up to 7mL in divided doses with food:

20% Vitex agnus-castus (Fruit, 1:2, 60% alcohol, Mediherb), 20% Ginkgo biloba (Leaf, 2:1, 50% alcohol, Mediherb), 20% Silybum marianum (fruit, 2:1, 69% Mediherb), 20% Rehmannia glutinosa (root, 1:2, 23%, Mediherb) and 20% Astragalus membranaceus (root, 1:2, 23%, Mediherb).

Rationale

Vitex agnus-castus

Most papers on Vitex discuss its use in human menstrual cycle and lactation disorders. Vitex contains dopaminergic diterpenoids which bind to dopamine receptors in the pituitary gland. This action has been linked to the prolactin inhibiting activity of Vitex (Heskes, 2018). However, dopamine receptors also play a significant role in HAC caused by pituitary tumours and adrenal tumours, with canine HAC being used as a model for human HAC (Boschetti, 2010) which may allow Vitex to have an impact on regulating the function of these tumours. The role of dopamine has been accepted in equine Cushing's for a longer time, with the dopamine receptor agonist Pergolide (Prascend; Boehringer Ingelheim) used as conventional treatment. Though trials of Vitex in equine Cushing's have had variable results (Menzies-Gow, 2014; Wynne, 2007) it seems reasonable to include it in a canine HAC formula.

Ginkgo biloba

This herb is a circulatory stimulant and improves cognitive function (Wynne, 2007), but may also reduce corticosteroid production in the body (Shah, 2003).

Silybum marianum

Silymarin from Silybum marianum is relatively well studied and has shown liver protective properties in a variety of chronic disease conditions in people, though more good quality research is always being sought (Tighe, 2020). Silymarin has also shown to reduce depression in chronically stressed mice (Thakare, 2018), so may help with the depression seen in HAC cases.

Taraxacum officinalis

I would normally add the root of this herb to

cases where liver support is required. However, Dandelion is high in potassium and has diuretic properties so was avoided in this case.

Rehmannia glutinosa

This herb is traditionally used to support normal adrenal function, maintain kidney function, and protect against corticosteroid damage (Zhang, 2008) and is considered an adaptogen.

Astragalus membranaceus

This herb has been shown to have immunomodulatory and restorative properties in vitro and invivo (Cho, 2007) as well as anti-tumour activity (Cho, 2007). It can support renal function in chronic disease such as diabetes (Kim, 2014) and can lower blood pressure in humans when given orally (Denzler, 2016).

The formula was felt to be safe with no significant risk of herb-drug interactions.

No dietary changes were recommended at this point. In human medicine there is often a recommendation to avoid high potassium fruits and vegetables such as bananas, leafy greens, and tomatoes in kidney patients at risk of hyperkalaemia. However, there is limited evidence that this is useful (St-Jules, 2016).

The referring veterinarian was sent a summary of the consultation and treatment plan and was asked to perform an examination for pain at Buddy's next examination. I recommended checking urine specific gravity and potassium after three weeks on the herbal formula. Buddy's owner was asked to monitor drinking, urination and general demeanour.

After six weeks on herbs Buddy was revaluated by his primary care vet. Electrolytes were within the normal range; urine was somewhat acidic and remained slightly dilute (Appendix).

Buddy was described by his owner as brighter but still slow on walks. No changes were made to the formula and a review was booked for six month's time.

At the next six month check, Buddy was felt to be uncomfortable from arthritic pain and treatment was started with Firocoxib (Previcox; Boehringer Ingelheim) and Yumove supplement. I recommended the addition of a half teaspoon of freshly grated ginger to Buddy's food. Ginger has a wide range of actions including circulatory stimulation, antioxidant, and anti-inflammatory (Mashhadi, 2013).

At the time of writing Buddy is due for his next six month review and is described as stable but showing his fifteen years.

Conclusion

Buddy's case demonstrates that a herbal formula can be used to support a patient with HAC which cannot be treated with conventional medications. Although ACTH stimulation tests were not carried out after trilostane therapy was withdrawn, these would be expected to remain abnormal. Herbal medicine provided an opportunity to support the whole patient instead of focussing on narrow treatment aims as conventional methods do. Treatment success in this case is judged by the owner's assessment of Buddy's quality of life, which has been maintained. Hyperkalaemia, which appeared to be an idiosyncratic reaction to trilostane, has not recurred during the period of herbal support.

APPENDIX

Summary of laboratory results and medication history as reported by primary care practice. The actual lab results were not forwarded, however clinical notes were good and numerical values are given where these were reported by the referring vet.

Date	Weight	ACTH/Pre-pill Cortisol	Urinalysis	Other	Treatment
2/2/2018	13.6kg		SG 1.008, pH 7		No treatment
8/2/2018			SG 1.021, SG 1.015		No treatment
23/2/2018		Borderline ACTH stim		Chem 17 NAM	No treatment
1/6/2018			SG 1.015		No treatment
6/6/2018		ACTH stim suggestive of Cushing's			Vetoryl 30mg SID
18/6/2018		Pre-pill cortisol normal	SG 1.022	Chem 17 NAM	Vetoryl 30mg SID
28/6/2018	13.65kg	Cortisol suggests poor control	SG 1.014 pH 7		Vetoryl 40mg SID
10/7/2018		Cortisol suggests poor control	SG 1.020 Trace protein		Vetoryl 50mg SID
23/8/2018	13.5kg	Cortisol improved	SG 1.023		Vetoryl 60mg SID
27/9/2018	13.2kg	Cortisol WNL	SG 1.028		Vetoryl 60mg SID
23/11/2018	13.1kg	Cortisol WNL	SG 1.023		Vetoryl 60mg SID
29/1/2019	13.1kg	Cortisol suggests suboptimal control	SG 1.017 pH 5.5	Chem 10 unremarkable	Vetoryl 30mg BID
14/2/2019			SG 1.018 pH5.5		Vetoryl 40mg am/ 30mg pm
7/2/2019	13.9kg	Cortisol suggests suboptimal control	SG 1.021		Vetoryl 40mg am/ 30mg pm
29/3/2019	14.3kg	Cortisol WNL	SG 1.021	Mild hyperkalaemia	Vetoryl 30mg BID
18/4/2019	14.7kg			Hyperkalaemia	Stopped treatment
2/5/2019	15.05kg	Cortisol WNL	SG 1.018	Hyperkalaemia	Raw diet
16/9/2019	14.65kg		SG 1.014 pH 6.5		
14/10/2019	14.8kg			Mild hyperkalaemia, kidney parameters normal	
24/1/2020	15.8kg	ACTH stim suggests Cushing's	SG1.016	Potassium WNL	Vetoryl 30mg SID
3/2/2020		Cortisol WNL	SG1.016	Hyperkalaemia	Stopped treatment
27/2/2020	15.75kg		SG1.015	Potassium WNL	Vetoryl 10mg BID
9/3/2020	15.8kg			Potassium WNL	Vetoryl 10mg BID
22/4/2020				Hyperkalaemia	Stopped treatment
24/4/2020		ACTH stim WNL T4/TSH WNL Aldosterone WNL		No cause for hyperkalaemia found.	Herbal treatment started 27/5/2020 On commercial wet diet
9/7/2020	16.76kg		SG 1.013 pH5.5	Na: 156 mmol/L (ref 144-160) K: 5.6 mmol/L (ref 3.5-5.8) Na/K ratio: 28 Cl: 112 mmol/L (ref 109-122)	Herbal treatment continued
22/6/2021	16.0kg			Chem 10 fine for age	Dental

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CASE REPORT

Acupuncture and Chinese Herbal Medicine for the Treatment of Separation Anxiety in the Dog

Dr Amanda Tenne *BVSc (Hons), GDVA*
Victoria, Australia

Dr Tenne is a graduate of CIVT's Graduate Diploma of Veterinary Acupuncture course.

Abstract

An adult female Staffordshire terrier cross with separation anxiety was treated with acupuncture therapy and Chinese herbal medicine Gui Pi Tang. Clinical manifestations of anxiety were reduced though not eliminated. Improvements in multiple separation anxiety related behaviors were seen including reduction of overgrooming, reduced fear of owner departure, reduced noise sensitivity, tolerance of children and reduced coprophagy.

Introduction

Separation anxiety is an excessive and recurrent distress associated with separation from home or major attachment figure (Herron, 2011). It is not a specific diagnosis, but a presenting complaint that describes a range of problems which occur when an animal is left alone (Mills, 2016).

Clinical manifestations of separation anxiety can be of varying severity and differing combinations of symptoms. While home alone vocalization, inappropriate elimination (urination and/or bowel movements), or destructive behavior may be seen. The dog may also exhibit departure anxiety or aggression followed by excessive greeting behaviors and difficulty settling down when owner returns home. In addition, escape behaviors, hypersalivation, self-injury, excessive grooming or anorexia may be exhibited (Herron, 2011).

A thorough clinical examination must be undertaken to rule out any possible underlying medical conditions that may be predisposing to the symptoms presented (e.g. renal failure with inappropriate urination) or other anxieties (e.g. noise phobias). The symptoms must occur or worsen when the dog is alone. The owner often reports that the dog is "perfect" when they are at home (Neilson, 2011).

Risk factors identified include acquisition from a shelter or pet store, living with a single human, social upheaval and living in an apartment/urban setting (Neilson, 2011).

In addition, shelter dogs with documented history of abuse exhibited problem behaviors after adoption more frequently than non-abused dogs (Voslarova, Vitulova & Vecerek, 2018).

Western treatment options have several components. Education of the owner in restructuring the Owner-Pet relationship, desensitization and counterconditioning of the pet to the leaving routine and also desensitization and counterconditioning of the pet to the departures using graduated departures (Neilson, 2011).

This provides the dog with structure and reduced sensitivity to the owner leaving. Another important aspect is medication. Commonly used drugs include Serotonin enhancing medication ("SSRI" medication) which may take one to four weeks to be effective (Neilson, 2011). They generally require to be continued till two to three months after the cessation of clinical signs. Examples of commonly used oral drugs include Fluoxetine or Clomipramine. Event medication may also be an option, using benzodiazepines

(e.g. Alprazolam) (Neilson, 2011) or another atypical antidepressant called Trazadone (Sherman & Gruen, 2010).

Pheromone therapy is another component of management and involves synthetic analogues of naturally occurring calming pheromones. These are readily available for the treatment of anxiety-related conditions. Pheromones are easy to use, have no known negative side effects and studies suggest that they can help reduce signs of separation anxiety (Gaultier et al., 2005).

Several authors acknowledge that there are other less evidenced base treatments available including herbal and nutritional supplements, body wraps and homeopathy (Neilson, 2011).

In traditional Chinese medicine (TCM) anxiety is perceived as a disturbance of the consciousness or Shen (Wynn & Marsden, 2003). Chinese medicine also considers the affect of emotions on the viscera of the body. There are seven kinds of emotional "transformations" including joy, anger, anxiety, thought, sorrow, fear and fright which all have different affects on internal viscera. The normal movement of the seven emotions do not cause disease but if the emotion is sudden and severe or prolonged and repeated then disease may be precipitated (Tietao Deng & Ergil, 1999). In the Su Wen it is stated that *"Anger damages the liver… joy damages the heart… thought damages the spleen… sorrow damages the lung… fear damages the kidney…"* (Tietao Deng & Ergil, 1999). The three most common patterns of disease involve the heart, liver and spleen. In addition, the emotions can have specific effects on the Qi. The Su Wen also states *"anger causes Qi to rise, joy causes Qi to slacken, sorrow causes Qi to disperse, fear causes Qi to descend… fright causes qi to become chaotic and anxiety causes Qi to bind"* (Tietao Deng & Ergil, 1999).

Dr Nell Ostemeier states that in *"practicing TCM, emotional and psychological signs of the patient are evaluated in more detail and greater importance is placed on non-pathologic changes in behavior than when practicing western Medicine alone"* (Ostermeier, 2019).

By undertaking a TCM evaluation of a separation anxiety case, which is by definition an emotion driven condition, a more thorough treatment plan can be provided for the patient. This in turn will improve both the quality of life for the patient and improve the human animal bond.

This case report presents a dog treated with acupuncture and Chinese herbs to support her management of separation anxiety. These techniques provide an adjunct to behavioral modification and therapy. Together they can improve the quality of life of the animal and owner.

Abstract

A female spayed seven year old American Staffordshire terrier presented for supportive treatment of her separation anxiety. Her parasite control and routine vaccinations were all current. She was on no medication. Her diet was Hypoallergenic Salmon and Sardine *Meals for Mutts*™ brand dry food with a raw bone monthly. Her ability to eat is inversely affected by her anxiety level. Her feces are formed, urination is normal with no vomiting seen. She snores and dreams one to two times a week. Her drinking is within normal limits. She is a friendly girl who will seek out affection.

She is heat seeking. She has mild halitosis without any evidence of dental disease. She is an occasional grass eater. She is not currently coprophagic for her own feces but does eat the cats' feces.

She has been in the owner's care from six months of age. Originally, she was from a rescue group who obtained her from a hoarder type environment. She was very stressed, housed in small quarters with large numbers of other dogs of which she was one of the most submissive.

As a puppy she was adopted with demodectic mange, conjunctivitis and was underweight. She was spayed after adoption. She also exhibited coprophagy as a puppy.

The separation anxiety had been present from the time of adoption. She is clingy to her principal owner and licks her paws when she is alone. Specific triggers for her anxiety are babies and children, going into the garden and folding washing. Calming activities include a dimly lit indoor room and the company of the owner's other dog, a male rescue Staffordshire terrier (who joined the household two years ago).

Over the previous years the owners were living in rental accommodations in which she exhibited her anxiety. Recently they moved to a new owned house. Her anxiety has increased and response to change has exaggerated, she was clingier to the owner and the owner was unable to touch her when she enters her state of panic.

She has no history of self-injury during her episodes. The owners have used extensive behavioral training and environmental modification to support her. Her separation anxiety has improved in response to this. Improvements have been seen in the reduction of severity of paw licking and reduction in coprophagy.

On physical examination there was sensitivity over T10 and T11. There was mild inflammation in the interdigital areas though her remaining coat was healthy with no dander. Her abdominal palpation was unremarkable with normal borborygmus detected. All other aspects of the examination were within normal limits.

TCM Examination

Her tongue was slightly thick with a lavender tinge with some phlegm lines. Her femoral pulse was slippery wide. The thickened tongue suggests damp, this is further supported by the phlegm lines while the lavender tinge suggests Qi stagnation. The slippery femoral pulse can be dampness or phlegm induced though can be healthy in some patients.

Sensitivity over T10/T11 is the Back Shu point of the Liver and Gall bladder suggesting stagnation within these meridians.

Western Diagnosis and Treatment

The western diagnosis of the patient was separation anxiety with noise sensitivity.

It should be noted that western medical treatment with Fluoxetine was discussed at the first appointment as an option, if anxiety did not reduce in the two weeks following initial treatment. This is to ensure the welfare of the animal and support the human animal bond. This option was declined at this stage with the owner wanting to pursue the acupuncture and herbal options.

TCM Diagnosis

This behavior case was given a traditional Chinese medical diagnosis of Shen disturbance with Spleen Qi deficiency and Damp precipitating some Qi stagnation though minimal heat. There is a suggestion of Liver Qi stagnation also. In addition, there is a degree of Kidney Qi and Essence deficiency secondary to her puppyhood illnesses.

Spleen Qi deficiency - coprophagy, grass eating, thick tongue with phlegm lines, dry food diet, halitosis

Shen Disturbance - anxiety

Damp - slippery pulse, thick tongue with phlegm lines, snoring, mild interdigital erythema

Kidney Qi deficiency - fear, puppyhood ill health, noise sensitivity, submissive

Liver Qi stagnation - sensitivity over T10/T11, lavender tinge to tongue

The chronic and prolonged excess "thought" of the anxiety has perpetuated injury to the Spleen. This has "knotted" her Qi precipitating Qi stagnation. On a mental level this stagnation can manifest as anxiety (Wynn & Marsden, 2003). In this case there is evidence to suggest the stagnation is flowing onto the Liver.

The Shen is housed in the Heart (Wynn & Marsden, 2003) The Spleen and Heart are interrelated through Blood. The Spleen is responsible for the production of Blood while the Heart governs Blood. Commonly Heart Fire is implicated in anxiety cases but this is not the case here. There are elements of early Blood deficiency though. Her clinical signs of coprophagy, grass eating, thick tongue with phlegm lines and halitosis combined with a dry food diet suggested her source of anxiety was from a Spleen Qi deficiency source.

Treatment

Acupuncture was given monthly for three sessions. Seirin j-type needles were used. A combination of 0.16mm (Chinese gauge 40, Japanese gauge 1) and 0.20mm (Chinese gauge 36, Japanese gauge 3) needle size were used. Treatment aims were to calm Shen, tonify Kidneys, mobilize Qi and support Spleen. Points were selected with an emphasis on calming the Shen and Spirit.

A tonifying technique was used and needling time was limited to 15 minutes.

Points used in treatment, besides BL12 are all points which have an affect on the Mind or Shen. On reflection BL12 was not a key point in the treatment.

GV20, GV14 and KI3 were used in each treatment. These points embodied the core of treatment - calm Shen, calm mind, tonify Kidneys and support Spleen.

LU7 *Lie Que* (missing row) was used as part of the first treatment to combat the patient's "worry" and regulate the Qi. In TCM of the five yin viscera the lung is closely related to anxiety. Anxiety continuously consumes the Qi (Huihe Yin & Xuezhong Shuai, 2010). This explains how while being the Master point for respiratory disorders, LU7 is also an appropriate point to treat anxiety.

As the treatment progressed a degree of Qi stagnation evolved, most likely stemming from the Liver. This was addressed indirectly by utilizing BL23 to improve Kidney function and increasing the production of Blood. Blood moves the Qi and in moving Qi stagnation can be relieved.

BL23 *Shen Shu* (Kidney association point) was used during the last two treatments to tonify Kidney Qi. In tonifying both Kidney Yang and Yin, Kidney Qi is produced which is the fire that warms the Spleen. This allows it to be utilized for long standing Spleen Qi deficiency (Matern, 2012) The Kidney is concerned with fear (Huihe Yin & Xuezhong Shuai, 2010). So, in tonifying Kidney Qi the fear is diminished.

TCM examination on the second visit revealed a wide wiry femoral tone. The tongue was thick, lavender tinged and had Phlegm lines. The tongue appearance still supported Damp with Spleen deficiency but the wiry wide pulse and lavender tinge to the tongue suggested more Qi stagnation possibly stemming from Liver Qi stagnation.

HT7 *Shen Men* (spirit gate) is indicated for anxiety and behavioral disorders (Matern, 2012) and was utilized to calm the Shen in treatment two.

TCM examination on the third visit revealed a wiry high femoral tone. The tongue had a thick appearance with a pink lavender tone with some moisture. The lack of phlegm on the tongue and increased pink coloring was seen

as an improvement in the status of Qi and Blood. The femoral tone supported further evidence of Qi stagnation though. This supported the use of PC6 in the third treatment.

PC6 *Nei Guan* (inner pass, inner gate) was utilized in the third treatment to mobilize the stagnated Liver Qi and further support the Shen.

Acupuncture point	Chinese Name	Anatomical location (Matern, 2012)	Reason for use	Used first visit	Used second visit	Used third visit
GV20 (Marsden, 2018)	*Bai Hui* (Hundred convergences)	On the dorsal midline of the skull on a line between the cranial edge of the base of the ears, in the notch between the sagittal crest and the frontal crest (Matern, 2012 p314)	Calms the Spirit, benefits the Brain, lifts the Mind, strengthen Spleen	X	X	X
BL12 (bilateral) (Marsden, 2018)	*Fen Men* (wind door)	1.5cun lateral to the caudal border of the spinous process of the second thoracic vertebra midway from the spinous process to the medial border of the scapula (Matern, 2012 p170)	Distribute Qi	X		
GV14 (Marsden, 2018)	*Da Zhui* (Great Hammer)	In the midline between the dorsal spinous processes of the last cervical and the first thoracic vertebrae (Matern, 2012 p310)	Calms the Mind, calms the Spirit	X	X	X
LU7 (bilateral) (Marsden, 2018)	*Lie Que* (missing row)	On the medial aspect of the forelimb proximal to the styloid process of the radius and medial to the tendon of the extensor carpi radialis, 1.5cun above the transverse crease of the carpus (Matern, 2012 p66)	Indicated for worry, Moves Qi and regulates movement of Qi, Moves Phlegm	X		
BL23 (bilateral) (Marsden, 2018)	*Shen Shu* (Kidney association point)	Lateral to the caudal border of the spinous process of the second lumbar vertebra, along the longitudinal line of the thoracic costal tubercula (Matern, 2012 p178)	Tonify Kidneys to produce Blood		X	X
HT7 (bilateral) (Marsden, 2018)	*Shen Men* (spirit gate)	On the caudal aspect antebrachium, immediately proximal to the accessory carpal bone, between the tendons of the flexor carpi ulnaris and the superficial digital flexor (Matern, 2012 p142)	"Shen Men", powerful calming point of the Mind, Calms the Mind		X	
PC6 (bilateral) (Marsden, 2018)	*Nei Guan* (inner pass, inner gate)	In the muscle groove caudal to the flexor carpi radialis and cranial to the superficial digital flexor muscles. 1/6 the distance from the carpus to the cubital fossa (Matern, 2012 p234)	Moves Liver Qi, calms the mind, moves Qi and Blood, helps stop the formation of Phlegm, regulates Qi and Blood			X

Chinese Herbal Prescription

As Spleen deficiency was suspected as part of the diagnosis Gui Pi tang was employed as the herbal formula. Black Pearl™ *Gui Pi Wan* tea pills were utilized (See Appendix 1). Four tea pills twice daily were administered. No adverse reactions were seen on administration of this formula.

A study in elderly human patients with depression showed *Gui Pi Tang* had good efficacy in treating depression and also showed a good efficacy in reducing symptoms of anxiety and improving life quality (HaiCong et al., 2014).

Dietary support was also suggested to the owner in the form of organ trophism. The owner added small amounts of lamb hearts and chicken giblets.

Results

Table 2 Results of treatment

Activity	First revisit	Second revisit
Escape behavior	Some improvement - single episode	No episodes
Reaction to change	Improved (new kitten)	Stable
Reaction to children and babies	Improved with two challenges	Stable with one challenge
Ability to go into garden on her own	Improved	Improved
Clinginess	Improved	Two-day episode -resolved
Noise sensitivity	Improved	Improved (sneezes)
Relaxation at visit	Improved	Improved
Paw licking when alone	Reduced	Stable

After three months the owner reported that the patient was improved. She was reported to have “more good days than bad days”. It was observed that several of her anxiety signs had improved with treatment. It should be noted that the paw licking, ability to go into the garden on her own and also reaction to children and babies had all improved. The clinical signs had not completely abated and a single escape event and a two-day period of clinginess occurred in the treatment window.

Discussion

In Traditional Chinese Medicine the body and mind are inseparable. Emotional distress injures internal organs, and pathology in internal organs can precipitate emotional disturbance. All emotional disturbance has repercussions on the Heart. Emotional disturbance in Essence disrupts the flow and direction of Qi further precipitating deficiencies and stagnation of Qi in associated viscera.

In this case study, the pattern of emotional distress and associated organ dysfunction is sourced in the Spleen with worry. Worry, over thinking and obsession all have the ability to injure the Spleen and Lungs. This slows the flow of Qi ("knots the Qi") resulting in stagnation of Qi. The worry and obsession precipitates Spleen Qi Deficiency which in turn gives rise to Heart Qi stagnation.

The point prescription used allowed the treatment of many of these aspects.

GV20 *Bai Hui* (Hundred convergences) has been well documented to provide a calming and sedation assisting effect (Pons et al., 2016).

PC6 *Nei Guan* (inner pass, inner gate) has also been documented as having therapeutic effect on chronic stress-related diseases such as depression and anxiety (Kim et al., 2009) and affecting heart rate (Wang et al., 2013).

In a study in rats maternally separated from their mother the acupuncture stimulation of HT7 *Shen Men* (spirit gate) was shown to relieve maternal separation-induced changes. It is purported that this is through regulating the expression of serotonin transporter (Park et al., 2012). This may account for one method of the effect of acupuncture of HT7.

It is important to note that behavioral training is a key component of management of separation anxiety. In this case the owners had undertaken tremendous efforts to train and support the patient behaviorally. At the time of presentation, they felt they were faced with the challenge of a new permanent home which was identified as a trigger factor for the patient.

The implementation of the acupuncture and herbal therapy allowed for an improved quality of life for the patient and owner. This allowed for a smoother transition into the new home and a reduction in sensitivity to numerous trigger factors (as seen in table 2).

The success of treatment allowed the patient to be managed without the addition of western medication, such as SSRI's as suggested in the initial visit.

Conclusion

In this case study, acupuncture and Chinese herbs provided an alternative approach to western medical treatment of separation anxiety. It should be noted that behavior modification is still a crucial step in the management of this condition. This case study suggests that acupuncture and Chinese herbs are an effective option to use for the management of this complex and debilitating condition in addition to other western medical and behavioral tools.

APPENDIX

Appendix 1 Sun Herbal Pty. Ltd. Gui Pi Wan Tea pills 200x200mg pills, Manufactured China

Active ingredients (Herb)	Each pill contains extract equivalent to dry:
Astragalus membranaceus, root	69.6mg
Ziziphus jujube var. spinosa, seed	69.6mg
Wolfporia cocos, fruit.	43.6mg
Codonopsis pilosula, root	43.4mg
Atractylodes macrocephala, rhiz	26.1mg
Glycyrrhiza uralensis, root	26.1mg
Angelica polymorpha, root	17.4mg
Dimocarpus longan, fruit flesh	17.4mg
Cyperus rotundus, rhiz	17.4mg
Polygala sibirica, root	17.4mg
Ziziphus jujuba, fruit	17.4mg
Zingiber officinale, rhiz	8.7mg

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CASE REPORT

The use of the Traditional Chinese Herbal Remedy Bu Gan Tang for Reducing Anxiety in a Dog

Dr Corinne Chapman *DVM, CVA, GDVCHM*
British Columbia, Canada

Dr Chapman is a graduate of CIVT's Graduate Diploma of Veterinary Chinese Herbal Medicine course.

Abstract

A traditional Chinese herbal formula, Bu Gan Tang, was successfully used to manage and relieve anxiety and panic disorder in a nine-year-old spayed female pug. Over the course of a one-year treatment, the patient's anxiety frequency and intensity significantly decreased. Attempts with conventional medications were unsuccessful while the use of Bu Gan Tang slowly gave her the confidence to live a normal life again.

Introduction

Anxiety and panic disorder in the canine are at an ever-increasing high and have become a big concern for pet owners who want to see their dogs live happy and comfortable lives. Chronic behaviour issues can be detrimental to the pet-owner relationship, and, in this regard, behavioural issues related to anxiety are among the top reasons that pet dogs are relinquished to shelters (Salman et al., 2000; Scarlett et al., 1999). In addition, there is evidence to suggest that highly anxious pets may have a shorter lifespan than more easy-going pets (Dreschel, 2010). Because of their high prevalence and their negative long-term consequences, pet anxiety disorders have become an important focus of interest. Until now, most anxiety and panic disorders have been treated with antidepressants and anti-anxiolytic medications with mixed results (Stewart et al., 2015; Johnson et al., 2014; Bighelli et al., 2018; Perna et al., 2015). Novel treatment strategies have included medications that act on GABA, glutamate, and other neurotransmitter systems (Perna et al., 2015). Unfortunately, no one pharmaceutical has been found to truly capture and correct for these behavioural disorders.

Clinical Signs: Western Diagnosis

The patient, an eight-year-old female spayed pug, was presented for chronic and progressive anxiety and panic disorder. Signs of anxiety first began as a young dog. She had lived with a different owner for her first six years of life where she was not well exercised due to the owner's disabilities. She had difficulty being alone, incessantly whining and crying anytime away from the owner. She was afraid of loud noises and would scramble to hide and thus was hyper vigilant and easily agitated. This behaviour persisted with her present owner and became progressively worse after a move.

By eight years of age, the symptoms evolved to include fear of going outdoors, especially at night, to the point where she would not evacuate outdoors and had starte eliminating in the home. If taken outside at night, the patient would tremble in fear and refuse to move in the dark. She also had separation anxiety when separated from the other dog in the home and would whine and pace until reunited.

A minimum database (CBC, chemistry and urinalysis) was performed with unremarkable results. Treatment with Fluoxetine (0.5mg/kg PO q24hr for seven days, then 1.0mg/ kg q24hr ongoing) and Alprazolam (0.02mg/kg q12hr) was started, which the patient initially responded well to. However, over the course of the next four months anxiety and panic episodes escalated again and increasing the dose and frequency of Alprazolam only made her more lethargic and dull but did not decrease her anxieties. Due to the unfavourable response of the medication and the growing concern about the patient's quality of life, the owner was eager to try holistic options.

Clinical Signs: An Integrative Perspective

On April 8, 2019, the patient was examined and found to be very alert, responsive, and normally hydrated. She was overweight with a body condition score of 7/9, panting excessively, anxiously whining and wiggly throughout the exam. Heart and lung auscultation was within normal limits. The remainder of the physical exam, including neurological exam, was considered unremarkable. The patient had a friendly but nervous personality. She enjoyed being inside, seeking out the warmth of the sun. Her favourite place to be was on the owner's bed and she enjoyed snuggling in blankets. She was noted to love most people and dogs.

She needed to be carried outside and placed on grass to evacuate, but would often tremble and freeze and not eliminate. Her diet was Rayne Urinary Control dry food. She typically had an exceptional appetite. Stools were reported to be formed and normal. She was prone to paddling and vocalizing in her sleep. On examination, the patient was agitated and had a nervous look on her face like a grimace. Her coat was soft, slightly dry, and she was shedding excessively. The tongue was lavender, pale, and on the dry side. There was no obvious tongue coating. Her femoral pulses were moderately toned, narrow, and slightly wiry. The TCM exam evidenced multiple signs of Liver Blood deficiency, including a narrow and wiry pulse, lavender and dry tongue, excessive shed and a dry coat, and anxiety and fear behaviours like noise phobia, fear of the outdoors, and separation anxiety.

A TCM diagnosis of Liver Blood and Yin deficiency with Liver Yang Rising was made and believed to be the result of several contributing factors. First, the initial lack of appropriate exercise and heavily processed diet weakened the Spleen and reduced its ability to transport Fundamental substances like Blood to the Lungs. With diminished Blood production and delivery, the Liver could not supply the Heart with sufficient Blood, contributing to a Shen imbalance.

The TCM treatment principles included nourishing and tonifying Liver Blood and Yin (to improve peripheral blood circulation to brain and skin), thereby tonifying Heart Blood and Qi to calm Shen. The patient was started on Bu Gan Tang, a pure Blood tonic, made by Natural Path Herbal Company, at 1/4 tsp twice daily with food.

Discussion

Blood, from a scientific and physiological standpoint, originates from the bone marrow and circulates in the body to nourish tissues and organs. From a traditional Chinese medicine (TCM) standpoint, Blood is formed when Essence, or Post-Heaven Qi, is made in the Spleen and sent to the Lungs where it is pushed to the Heart and finally transformed into Blood (Maciocia, 1989; Marsden, 2014). In TCM, Blood deficiency is described as a lack of adequate blood volume and consequently an impaired peripheral circulation or vasoconstriction such that tissues are not nourished and "moistened", including the mind (Maciocia, 1989; CIVT, 2019). If Blood is

deficient, there is not enough Blood to embrace the Mind and the Mind will become "unhappy or uneasy", resulting in anxiety, irritability, and restlessness (Maciocia, 1989).

The poor peripheral circulation can also lead to dry skin and coat as is seen with the patient's excessive shedding (Marsden, 2014; CIVT, 2019). The Heart in TCM is thought to house the consciousness or Shen which is a form of Yang energy. The Heart requires the Pericardium to deliver enough Blood to ensure a balanced Shen. When Blood and Yin are deficient, the Heart will become weak and unbalanced and Heart Yang will rise as Empty Heat as it becomes more uprooted (Maciocia, 1989). This takes the form of more intense mental activity exhibited as heightened noise sensitivity, vivid dreaming, anxiety and panic, as seen with this patient (Marsden, 2014).

Bu Gan Tang is a herbal tonic that contains White Peony root, Ligusticum rhizome, Chinese Angelica root, Licorice root, Ophiopogon root, prepared Rehmannia root, Chaenomeles fruit, and Zizyphus root.

Peony, Ligusticum, Angelica, and Rehmannia together constitute Si Wu Tang (Four Materials Decoction), a pure Liver Blood tonic. Peony, or Bai Shao, is a bitter, sour, and slightly cool root that tonifies and cools Blood and suppresses Liver Yang. White Peony has been found to have anti-PTSD effects in rats and can reduce freezing (panic) time, reverse stress hormone levels, and improve serotonin levels in stressful situations (Qiu et al., 2018). According to Marsden, Chuanxiong Rhizome (Ligusticum) activates and regulates blood circulation, and prevents the tonic herbs from causing Stagnation in the body. Ligusticum is an extremely common traditional edible-medicinal herb made up of 174 compounds, some of which have pharmacological activities like anti-cerebral, ischemia, blood vessel protection, anti-hypertensive, anti-spasmodic, and anti-inflammatory properties (Chen et al., 2018). These properties all appear to improve blood flow dynamics, ensuring smooth flow and normal blood viscosity.

Angelica (Dang Gui) bolsters the Blood, encourages blood circulation, and nourishes the Liver (Marsden, 2014). Dang Gui studies to date commend its neuroprotective and memory-improving effects and more specifically, its wide range of anxiolytic properties (Nogmai-Tara et al., 2018; Min et al., 2005). Rehmannia, the chief herb of Si Wu Tang, from a TCM perspective, tonifies Yin and boosts Blood production. Rehmannia has been proven to have antidepressant and anxiolytic effects on ovariectomized mice "which were possibly mediated via their modulation of brain neurotransmitters, and regulation of neurotrophins" (Zhou, 2019).

Chaenomeles fruit in Bu Gan Tang relaxes muscle spasms through increasing peripheral blood circulation and has proven hepatoprotective effects, anti-inflammatory properties, antioxidant actions, antimicrobial and neuroprotective effects (CIVT, 2019; Watychowicz et al., 2017). Sweet-tasting Licorice (Glycyrrhiza) alleviates palpitations by tonifying Heart Qi and has been shown to have anti-inflammatory, anti-oxidative, anti-cancer and neuroprotective pharmacological properties (Marsden, 2014; Hosseinzadeh et al., 2015). Sour-tasting Ophiopogon has been found to have strong antioxidant and anti-inflammatory properties (Wang et al., 2017; Chen et al., 2016). Sour-tasting Zizyphus, also known as the jujube fruit, has various biological effects, including immunomodulatory, antioxidant, anti-tumor, hepatoprotective, and hypoglycemic activities, as well as gastrointestinal-protective effects (Ji et al., 2017).

This demonstrates how these herbs promote blood circulation to increase blood flow to the brain and other organs. By tonifying Blood and bolstering blood circulation, Bu Gan Tang has helped to alleviate this patient's anxiety.

Conclusion

Using a holistic TCM approach, an anxious dog was successfully treated using the Blood tonic Bu Gan Tang and became less reactive to intense noise, more calm, and demonstrated less daily anxious behaviour. From both a behavioural and physiological standpoint, the herbal remedy Bu Gan Tang had an anxiolytic effect on this patient and could serve as a useful tool in the development of management plans to improve the well-being of dogs who suffer from anxiety.

Within One Month

The patient was able to go outside again for walks, and was even starting to play more. She had become increasingly more calm for walks during the day, but still had to be carried outside at night. She had stopped eliminating indoors and she no longer trembled or froze when outside.

One Year Later

The patient continues to take Bu Gan Tang, is off all Western medications, and is a much more resilient and well-adjusted dog. She now can go for walks both day and night without hesitation and the owner no longer needs to carry her outside as she follows willingly. She is able to rest and remain calm indoors and no longer pines for her dog housemate if separated.

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MONOGRAPH

Rehmannia and Peony Combination (Bu Gan Tang)

Dr Steve Marsden *DVM, ND, MSOM, GDVA. GDVCHM, Dipl.AC, AHGDr*
California, USA

This monograph is an excerpt from Dr Marsden's book, "Essential Guide to Chinese Herbal Formulas - Bridging Science and Tradition in Integrative Veterinary Medicine"

Alternate names: Tonify the Liver Combination (literal translation)

History

Bu Gan Tang (Tonify the Liver Decoction) has been in use for over 250 years since its original publication by Wu Qian in 1742 in Golden Mirror the Medical Tradition (Yi Zong Jin Jian). In Chinese medicine as in western medicine, the ability of the liver to do its job is contingent upon an ample blood supply.

Bu Gan Tang is a derivative of Si Wu Tang (Four Materials Combination), the quintessential core formula for building blood and enhancing circulation in Chinese medicine. Through the addition of a handful more herbs, the formula has added benefits in improving sleep, relieving irritability, calming agitation, and reducing muscle spasms. Modern research suggests all these problems have a circulatory component. Muscle spasm tendencies are a direct result of poor peripheral circulation.

From a Chinese medical perspective, Bu Gan Tang is a Yin tonic. According to Chinese medical theory, Yin balances Yang in the body. Without Yin's moist heavy cooling nature, Yang becomes exuberant, leading to a flushed complexion, headaches, dizziness, and tinnitus. Blood and Yin deficiency also causes photophobia, with the eyes becoming dry, and the vision blurring. These are not as important symptom indications for the formula in veterinary medicine but are listed as traditional indications for the formula in human medicine.

Chief Indications

Muscle Spasm and Spasticity

Bu Gan Tang can be considered for the management of any muscle spasm condition, since a prerequisite of a tendency to spasm is impaired peripheral circulation. As long as there is evidence of impaired peripheral circulation, such as a weak (yet toned) pulse, the formula may be effective.

Neck spasms are especially amenable, manifesting often as acute onset of severe pain in the middle of the night, due to unconscious and unguarded movements of the animal at a time when peripheral circulation is at low ebb. Example conditions range from temporary chiropractic disorders such as atlantooccipital joint fixation, to more serious enduring orthopaedic complaints like Wobbler's Syndrome.

A common sequela of neck pain and stiffness is forelimb lameness, which the relaxing effects of Bu Gan Tang can also remedy. Additionally, Bu Gan Tang can address triceps muscle spasms that can cause vague but persistent forelimb lameness in certain breeds, such as the Rottweiler. Scotty Cramp is another breed specific condition aided significantly by the circulation enhancing effects of Bu Gan Tang.

Enhancement of peripheral circulation increases over the first several weeks of use of

Bu Gan Tang, as its bone marrow stimulating effects gradually accrue. Some relief of pain occurs right away, however, due to the muscle relaxing effects of White Peony and Chaenomeles.

A final type of spasticity aided by Bu Gan Tang is in the chronically atrophied muscles left behind by masticatory myositis. After the inflammation has subsided, jaw muscles can become very tight, nodular and hard. Bu Gan Tang relaxes those spasms and probably also actively resolves any lingering inflammation with its circulation enhancing effects.

Alopecia, including Alopecia X

Bu Gan Tang is a first consideration for alopecia in dogs, particularly Alopecia X of Pomeranians. The benefits are very consistent, with most patients re-growing their hair completely after several months of use. Since the pathogenesis of Alopecia X is unclear, the mechanism of action of the herbal formula is likewise merely speculative.

One possibility is that the endothelial nitric oxide stimulating effect of the formula allows it to both:

• Prevent the apoptosis that transitions hair follicles from anagen (the hair growth phase) to telogen (the resting phase)
• Promote the return of follicles to anagen from telogen

Most hair follicles of true Alopecia X patients are in telogen.

Another possible mechanism of action may be conferred by Dang Gui's phytoestrogen content. In Alopecia X, heightened estrogen levels are linked to an interruption of hair growth. Phytoestrogens may share some of the same abilities as estrogen blockers in restoring hair follicle activity.

Many formulas enhance peripheral circulation and contain Dang Gui, yet may not aid Alopecia X. Research consistently shows that formulas will work best when suited to both the western and eastern dictates of the case.

The hair distribution of Alopecia X is unique, and calls for a formula that not only tonifies Blood but astringes Yang while nourishing Yin.

Thermal imaging of humans with Yin deficiency reveals a cool body core with a warm head and limbs. This circulatory pattern also appears present in Alopecia X patients, supporting hair growth on the extremities, but not the trunk.

The hair loss pattern is explained in Chinese medicine as stemming from Yin being too weak to hold Yang. Yang energy, which includes Wei Qi (a form of Qi that nourishes hair growth), escapes outward to the periphery and extremities, specifically the head and limbs, leaving the body core undersupplied. Bu Gan Tang is one of the only formulas containing the sour herbs needed to astringe Yang energy back inwards to the body core, while nourishing Blood and Yin with its other ingredients. It is this unique design which explains, at least from a Chinese medical perspective, the unique efficacy of this formula in Alopecia X.

Immune Thrombocytopenia

Lastly, the formula has been effective in immune thrombocytopenia, where symptoms and signs otherwise agree. Efficacy is likely in part to the formula's bone marrow stimulating effect.

Hypothyroidism

Animals receiving Rehmannia and Peony Combination may require lower doses of thyroid hormone supplementation. It appears that the formula improves thyroid circulation sufficiently to actively resolve lymphocytic thyroiditis, allowing the gland to begin functioning more normally.

Bu Gan Tang is compatible with the continued administration of thyroid hormone.

Formula Design

Liver Support Formula contains the following ingredients:

Bai Shao Yao active ingredients (Herb)	White Peony root
Chuan Xiong astragalus membranaceus, root	Ligusticum rhizome
Dang Gui Shen Ziziphus jujube var. spinosa, seed	Chinese Angelica root
Gan Cao Wolfporia cocos, fruit. Body	Licorice root
Mai Men Dong Codonopsis pilosula, root	Ophiopogon root
Shu Di Huang Atractylodes macrocephala, rhiz	Prepared Rehmannia root
Mu Gua Glycyrrhiza uralensis, root	Chaenomeles fruit
Suan Zao Ren	Zizyphus seed

The base formula of Bu Gan Tang is Si Wu Tang (Four Materials Decoction) developed almost six hundred years earlier as the quintessential formula to tonify Liver Blood. It contains Peony, Rehmannia, Angelica, and Ligusticum. Angelica (Dang Gui) nourishes Blood, while Rehmannia nourishes Blood and Yin. Sour Peony has an antispasmodic effect while contributing astringing effects on Yin and moving effects on Blood. Ligusticum provides an essential moving effect on Blood and Qi, since forward movement of the Blood column in Chinese medicine is required for Blood to be added in from behind.

Sour Chaenomeles relaxes muscle spasms by moistening the Tendons, but also supports the astringing action of Peony. Sour Zizyphus is astringing, too, but focuses its moistening effects on the Heart Blood and Yin to relieve insomnia, restlessness, and palpitations. It also stops added fluid loss from perspiration secondary to Yin deficiency. Sweet-tasting Licorice also aids the Heart by nourishing its Qi. Sour-tasting Ophiopogon was added in later versions of Bu Gan Tang to address insomnia, palpitations, and fearfulness arising from Heart Yin deficiency. Overall, the mixing of potent sweet and sour herbs with relatively sweet Si Wu Tang has a potent Yin-tonifying and nourishing effect.

Supporting Symptoms

Patients that benefit from Bu Gan Tang often exhibit spasm tendencies, manifesting as:

- Tight or bunched muscles
- Muscle twitches
- Fasciculation

These spasms are a product of reduced peripheral circulation, which can manifest additionally as:

- Seborrhea sicca
- Dry skin with fine powdery dander

• Low grade itch
• Alopecia, or failure of hair to re-grow following clipping

Circulatory benefits extend to the brain, where it can improve cognition to relieve:

• Noise sensitivity
• Separation anxiety
• Territoriality
• Timidity
• Mild fear aggression
• Insomnia
• Restlessness

Mild to moderate elevations of ALT, AST, bile acids, and ALP may also be present, along with normocytic, normochromic non-regenerative anemia.

The pulse is typically narrow diameter and toned (i.e. Thin or Wiry).
The tongue is typically pale or lavender.

Cautions and Contraindications

As with other Blood and Yin tonics, avoid use of Bu Gan Tang in animals with severe inflammation of the skin or digestive tract (e.g. colitis, moist dermatitis).

Ages and Breeds

Liver Support Formula is chiefly a dog formula, given that dogs are more prone to Liver Blood deficiency. Dog breeds that especially commonly benefit include:

• Dachshunds
• Rottweilers
• Dobermans

MONOGRAPH

Barberry (Berberis vulgaris)

Dr Neal Sivula *DVM, PhD, FAAVA, GDVWHM*
Ohio, USA

Dr Neal Sivula is a lecturer for CIVT's Advanced Certificate in Neuroacupuncture Course, a professor for CIVT and a tutor for CIVT's acupuncture and western herbal courses.

As herbalists, we not only have an obligation to our patients, but we also have an obligation to be stewards of the herbs we prescribe and our planet. Sometimes that presents us with challenges in prescribing. Goldenseal (Hydrastis canadensis) is listed as "At Risk" by United Plant Savers and is listed with The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Because of that designation, herbalists should consider substituting Goldenseal in formulas when appropriate. Alternatives to Goldenseal include Garlic (Allium sativum), Plantain (Plantago spp) and Barberry (Berberis vulgaris).

Common Name: Barberry (Berberis vulgaris)

Other names: European Barberry

Family: Berberidaceae

Parts Used: Root, root or stem bark

Distribution: Grows in hedgerows and scrub

Selected Constituents:

Bark: isoquinoline alkaloids- (Berberine, Chelidonic acid, Resin)
Berries: malic acid
Actions: Bitter tonic, cholagogue, alterative, anti-diarrheal, antibacterial, antifungal, antiprotozoal, diuretic, antiemetic, mild laxative, cardiotonic, cardioprotective,

anti-arrhythmic, vasodilatory, antihypertensive, anti-atherosclerotic.

Chinese Actions: Clears retained pathogens and Heat toxins. Clears Liver-Gallbladder Damp Heat. Clears Liver Heat, regulates and tonifies Liver Qi, moves Liver Stagnation. Clears Lung Heat. Regulates Liver invasion of the Lung. Regulates Heart Qi and Blood.

Energetics:
Bark: bitter, astringent, cool, dry
Berries: astringent

History and Traditional Use:

Stomatitis and sore throat. Berries used for fever, diarrhea, and stomatitis because of their astringent properties. Biliary disease with constipation and jaundice. Gastritis, ulcerative stomatitis, enteritis, dysbiosis, hepatitis. Generically to improve digestion, help with food intolerance and improve appetite. Endometritis. Heart failure from left ventricular origins (e.g., cardiac weakness, arrythmia). Acute bronchitis with cough.

Culpeper: Cleanses the body of choleric humors and treats choler disease (e.g., Yellow Jaundice, scabs, itch, boils). Clears heat from the blood and liver, so useful for bloody diarrhea, burns, and scalds.

Published Research:

The isoquinoline alkaloid berberine is the most studied constituent of Barberry. Research has shown that berberine can inhibit smooth muscle contraction, reduce inflammation, limit bacterial endotoxin formation, inhibit platelet aggregation, and stimulate bile and bilirubin secretion (Imenshahidi & Hosseinzadeh, 2008; 2016).

In both in vivo and in vitro studies, Barberry demonstrated anti-inflammatory effects through the shift of cellular immune response to Th2, T reg induction, inhibition of inflammatory cytokines (Interleuken-1, Tumor Necrosis Factor, and Gamma Interferon). It also stimulates Interleuken-4 and Interleuken-10. Another mechanism of immune effect is the induction of apoptosis in adenomatous polyposis coli tumor suppressor genes and other effector cells (Kalmarzi et al., 2019).

Other work has studied the effect of B. vulgaris on specific immune functions (Imenshahidi & Hosseinzadeh, 2019). There was a positive impact on cellular thiobarbituric acid reactive species (TBARS) formation, diphenyl-α-picrylhydrazyl (DPPH) oxidation, cellular nitric oxide (NO) radical scavenging capability, superoxide dismutase (SOD), glutathione peroxidase (GPx), acetylcholinesterase (AChE) and α-gulcosidase activities. Barberry extract showed potent antioxidative capacity through decreasing TBARS, NO and the oxidation of DPPH that is associated with GPx and SOD hyperactivation. This study demonstrated the potential of the barberry crude extract and its active alkaloid, berberine, on suppressing lipid peroxidation, suggesting a promising use in the treatment of hepatic oxidative stress. It was also shown to have inhibitory effect on the growth of breast, liver and colon cancer cell lines.

Barberry has also been investigated for use as an anti-coccidial in chickens Malik et al., 2014). It performed well compared to the standard drug treatment, Amprolium, and the authors suggest the use of berberine for treatment of severe diarrhoea, amoebiasis and intestinal infections as well as for treatment of haemorrhagic dysentery.

Finally, Barberry has been shown to have a positive impact on Metabolic Syndrome (Firouzi et al., 2018). Berberine suppresses adipocyte differentiation and decreases obesity. It also regulates glucose metabolism via decreasing insulin resistance and increasing insulin secretion. Other effects of berberine include antihyperlipidemic and antihypertensive activities and endothelial protection.

Suggested veterinary indications: Gastritis, enteritis, dysbiosis, cholecystitis, hepatitis, stomatitis, giardia, endometritis, left ventricular heart failure, leishmaniasis.

Contraindications: Pregnancy.

Toxicology and Adverse effects: Large doses could cause nausea, vomiting, and phototoxicity.

Drug Interactions: Berberine may inhibit some P450 enzymes. Caution with alpha-adrenergic agonists, anti-arrhythmic drugs, cardiac glycosides. May reinforce the

effects of drugs that displace the protein binding of bilirubin.

Dosage:

Human: Dried herb: 0.25-5.0 g q8h. Infusion and decoctions: 5-10 g per cup, give 0.5-1 cup of liquid q8h. Tincture: 1:2-1-3, 0.5-1.5 mL q8h.

Small animal: Dried herb: 25-300 mg/kg divided q8h. Infusion and decoctions: 5-10 g per cup of water, give 0.25-0.5 cup per 10 kg of body weight divided q8h. Tincture: 1:2-1-3, 0.5-1.5 mL per 10 kg of body weight divided q8h and diluted.

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MONOGRAPH

Acupuncture Point – GV 20 – Bai Hui (Hundred Convergences)

Dr Jodi Van Tine *MA, DVM, GDVA, GDVCHM*
California, USA

Dr Jodi Van Tine is a professor for the CIVT acupuncture and Chinese herbal medicine courses.

Location: On the dorsal midline of the skull where it intersects with a line between the rostral edges of the base of the ears, in a depression just rostral to the start of the sagittal crest (CIVT and IVAS).

In Matern, it continues to say "slightly caudal to the highest point on the head". In most of my patients, this puts it closer to the caudal base of the ears, consistent with the illustration. According to Robinson, GV20 (human) is located on the dorsal midline of the skull on a line drawn from the ear lobe to the highest point on the helix of the ear, "GV20 does not designate the highest point of the cranium". According to Xie, GV20 is on the dorsal midline of the skull between a line drawn between the ear canals.

Innervation: Branches from the greater occipital, auriculotemporal and supraorbital nerves. The occipital nerve treats occipital neuralgia and activates endogenous pain modulation pathways in the brainstem and spinal cord. Spinal nerves C2 and C3 innervate the scalp caudal to the ears and the caudal cranial fossa. The greater occipital nerve supplies sensory input from the caudal scalp. The auriculotemporal nerve provides sensory information to structures of the ear, the temporomandibular joint and the skin rostral to the ear. The supraorbital nerve, a continuation of the frontal nerve, innervates sinus mucous membranes, the upper ocular conjunctiva and the forehead (rostral skull/frontal area).

Effect: Strong effect on promoting Yang, strengthens the Spleen and promotes the Spleen function of raising Qi, calms Wind, supports the brain, clears and stimulates the spirit, and nourishes the Sea of Marrow. Helpful for Liver Fire, Liver Yang rising and Liver stagnation, Yang deficiency and collapse, and Blood exhaustion.

Indications: Rectal and uterine prolapse, brain problems, epilepsy, eye and ear problems, immune stimulation, incontinence, polydipsia, calming, cerebrovascular events, vestibular disease, tetanus and allergic shock.

Attributes: Crossing point of the GV and BL channels, some believe it is the ending point of the internal Liver meridian.

Comments: Although there is some discrepancy in the location of this point, CIVT locates this point in a depression just cranial to the sagittal crest at the rostral base of the ears.

Technique: Perpendicular or oblique insertion. This author prefers to needle obliquely, in a cranial to caudal direction for calming and sedation, and in a caudal to cranial direction for a stimulating effect (resuscitation).

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Research Updates Abstracts

Empowering Veterinarians to be Planetary Health Stewards Through Policy and Practice

Kiran D, Sander WE, Duncan C, 2022. 'Empowering Veterinarians to Be Planetary Health Stewards Through Policy and Practice'. *Frontiers in Veterinary Science*, Mar 3;9:775411. doi: 10.3389/fvets.2022.775411.

Abstract

Veterinarians are established public health professionals, committing to promote public health when they take their veterinary oath. The issue of climate change and its impact on planetary health is vital to public health, and therefore, it is critical that climate change is regarded as within the veterinary scope of practice. However, climate change is a multi-faceted issue which requires interdisciplinary collaboration and integrated stakeholder involvement in order to establish effective solutions and impactful policies. As a result, in this perspective, we discuss how policy is critical to support veterinarians in the climate change space and argue that more explicit support is needed for veterinarians to take an active role in climate change adaption, resilience, and mitigation. We address the discrepancies between the human health and veterinary professions with respect to providing policy support and capacity for practitioners to be stewards to promote planetary health and shed light on the lack of veterinary capacity in this area. We stress that veterinary professional societies are well equipped to bolster their policies, expand education for veterinary professionals and students in policy and advocacy, and establish calls to action to address climate change and planetary health issues. Ultimately, as public health professionals, veterinarians are uniquely poised to be contributors to climate change solutions, and they should be actively involved in policy decision-making and empowered to take active roles in interdisciplinary conversations surrounding this important issue.

Please click HERE to read the full research paper.

The Role of Nutrition in Canine Idiopathic Epilepsy Management: Fact or fiction?

Verdoodt F, Watanangura A, Bhatti SFM, Schmidt T, Suchodolski JS, Van Ham L, Meller S, Volk HA, Hesta M, 2022. 'The role of nutrition in canine idiopathic epilepsy management: Fact or fiction?' *The Veterinary Journal,* Oct 28:105917. doi: 10.1016/j.tvjl.2022.105917. Epub ahead of print.

Abstract

In the last decade, nutrition has gained interest in the management of canine idiopathic epilepsy (IE) based on growing scientific evidence. Diets can serve their functions through many pathways. One potential pathway includes the microbiota-gut-brain axis, which highlights the relationship between the brain and the intestines. Changing the brain's energy source and a number of dietary sourced anti-inflammatory and neuroprotective factors appears to be the basis for improved outcomes in IE. Selecting a diet with anti-seizure effects and avoiding risks of proconvulsant mediators as well as interference with anti-seizure drugs should all be considered in canine IE. This literature review provides information about preclinical and clinical evidence, including a systematic evaluation of the level of evidence, suggested mechanism of action and interaction with anti-seizure drugs as well as pros and cons of each potential dietary adaptation in canine IE.

Please click HERE to read the full research paper.

Perioperative Analgesic Efficacy of Yamamoto New Scalp Acupuncture for Canine Mastectomy Combined with Ovariohysterectomy: A Randomized, Controlled Clinical Trial

Bacarin CC, Nicácio GM, Cerazo LML, Peruchi LG, Cassu RN, 2022. 'Perioperative Analgesic Efficacy of Yamamoto New Scalp Acupuncture for Canine Mastectomy Combined with Ovariohysterectomy: a Randomized, Controlled Clinical Trial'. *Journal of Acupuncture and Meridian Studies,* Apr 30;15(2):121-129. doi: 10.51507/j.jams.2022.15.2.121.

Abstract

Background: Yamamoto New Scalp Acupuncture (YNSA) is a therapy based on the stimulation of points on the scalp and applied to treat different states of pain.

Objectives: To investigate the analgesic efficacy of YNSA for dogs undergoing radical unilateral mastectomy with ovariohysterectomy.

Methods: Twenty-four dogs were randomly distributed into two treatments (n = 12, per group): bilateral stimulation of basic B, D, and E points (YNSA group) and no application of acupuncture (control group). All dogs were sedated with morphine; anesthesia was induced with propofol and maintained with isoflurane. Fentanyl was intraoperatively administered to control cardiovascular responses to surgical stimulation. Postoperative pain was assessed using an interactive visual analog scale (IVAS) and the short-form of the Glasgow Composite Pain Scale (CMPS-SF). Morphine was administered as rescue analgesia. Data were analyzed using t-tests, Fisher's exact test, Mann–Whitney U test, and Friedman test ($p < 0.05$).

Results: Intraoperatively, the number of dogs requiring supplemental analgesic and the number of doses of fentanyl were lower in the YNSA group than in the control group ($p = 0.027$-0.034). The IVAS pain scores recorded from 0.5 h to 1 h post-extubation in the YNSA group were lower than those in the control group ($p = 0.021$-0.023). Postoperative rescue analgesia and CMPS-SF pain scores did not differ between the groups.

Conclusion: YNSA decreases intraoperative fentanyl requirements and provides minimal postoperative analgesic benefits to dogs undergoing unilateral mastectomy with ovariohysterectomy.

Please click HERE to read the full research paper.

Equine Placental Extract Supplement as a Night Barking Remedy in Dogs with Cognitive Dysfunction Syndrome

Amano T, Ikeda T, Yamaguchi M, Kakehi N, Hanada K, Watanabe T, Tahara K, Hirano E, 2022. 'Equine placental extract supplement as a night barking remedy in dogs with cognitive dysfunction syndrome'. *Veterinary Medical Science,* Sep;8(5):1887-1892. doi: 10.1002/vms3.893.

Abstract

With the aging of pet dogs, there has been an increasing trend in senility-related diseases; additionally, cognitive disorders accompanied by abnormal behaviours are a major burden for owners. Recently, there have been a series of consultations regarding the fact that night barking, which is an abnormal behaviour, remarkably interferes with the owner's sleep and adversely affects the owner's quality of life. However, there has been no effective solution to this problem. In this study, three aged pet dogs diagnosed with dementia were administered an equine placental extract (eqPE) as a pet supplement, which has been shown in laboratory models to improve cognitive function. Consequently, night barking ceased one week after the administration of eqPE in case two and it was observed to decrease in the other two dogs.

Furthermore, night barking disappeared two and three weeks after the administration of eqPE in cases one and three, respectively. No recurrence or exacerbation of night barking was observed in the three cases treated with the eqPE, and no adverse events were observed. These results suggest that eqPE may be useful for improving night barking in pet dogs with dementia, and it is expected to be a new treatment method.

Please click HERE to read the full research paper.

Veterinarians in a Changing Global Climate: Educational Disconnect and a Path Forward

Kramer CG, McCaw KA, Zarestky J, Duncan CG, 2020. 'Veterinarians in a Changing Global Climate: Educational Disconnect and a Path Forward'. *Frontiers in Veterinary Science*, Dec 17;7:613620. doi: 10.3389/fvets.2020.613620.

Abstract

Objective: To synthesize the beliefs, knowledge and interest of veterinarians on the relationship between veterinary medicine and climate change, with the intent to identify any educational gaps and opportunities.
Sample: Responses from 560 U.S., and 54 non-U.S. veterinarians.

Procedures: An anonymous, online survey of veterinarians was distributed through electronic media, state and professional associations, and a veterinary magazine advertisement. The survey was conducted between July 1st and December 31st of 2019.

Results: Overall, veterinary respondents were confident that climate change is happening, is caused by human activities, and is impacting both human and animal health. Veterinarians also agreed that the profession should have an advocacy role in educating the public on climate change and its health impacts, particularly in clinical practices where environmental sustainability promotion can be shared with clients. Although veterinarians agreed the profession needs to be involved with climate change advocacy, most reported having had no educational opportunities within their veterinary medicine curriculum or access to continuing education on climate change.

Conclusions and Clinical Relevance: The results highlight the need for the development of educational opportunities on the topic of climate change such that veterinarians are equipped to address their concerns about current and future animal health threats.

Please click HERE to read the full research paper.

Age-Related Digestibility of Nutrients Depending on the Moisture Content in Aged Dogs

Kim KH, Seo K, Cho HW, Jeon JH, Kim CH, Jung J, Chun JL, 2021. 'Age-related digestibility of nutrients depending on the moisture content in aged dogs'. *Journal of Animal Science and Technology*, Nov;63(6):1355-1361.doi: 10.5187/jast.2021.e116.

Abstract

Digestibility of pet food can affect the health of dogs, especially in aging animals. To maintain the dogs in an overall good health status it is necessary to provide nutritionally balanced food. For example, the digestion capability of dogs is known to decrease with aging. In addition, losing teeth is common in aging dogs, which can make it difficult for them to eat a large size dry pet food. Nonetheless, little detailed information is available on the most suitable feeding strategies for aging dogs. As part of the nutritional study of food for aging dogs, tests were used to determine whether food type impacts the digestibility on adult versus senior dogs. Sixty-five dogs were used in the study; 24 adult beagles (aged 2 years) and 9 senior beagles (aged 10 years) made up the experimental breed group, along with 26 small breed senior dogs (aged 10 years), and 6 small breed adult dogs (aged 4 years). The chosen methodology to measure the digestibility of nutrients was the index method using chromium oxide. The dogs were fed the same commercial dry or wet diets for at least one year, the diets were supplemented with 0.5% chromium oxide. The wet food was prepared by adding twice the volume of water in the dry food prior and incubated overnight (14–16 hours) at room temperature. After five days, the dogs' feces were collected up to a total weight of > 200 g which was the amount required to analyze undigested nutrients in feces as three repeats. In the apparent total tract digestibility analysis of the experimental

breed group, no difference in the digestibility of crude protein, crude fat, crude fiber, ash, and energy was observed regarding the moisture content of the food. Notably, the digestibility of nitrogen free extract was significantly increased in senior dogs fed dry dog food compared with adult dogs fed the same diet, whereas no difference was observed between senior and adult dogs fed wet food. The small breed dogs showed similar results to the experimental breed dogs. However, the digestibility of crude fat was additionally affected by age and food type, unlike the experimental breed dogs. This finding suggests that the food moisture content affects the digestibility of nutrients in dogs with aging. Hence, it may be helpful to determine the nutrient contents in foods for senior dogs depending on the food type.

Please click HERE to read the full research paper.

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Contact CIVT

College of Integrative Veterinary Therapies
PO Box 352, Yeppoon
QLD 4703, Australia

Email

susiewillis@civtedu.org

Website

www.civtedu.org