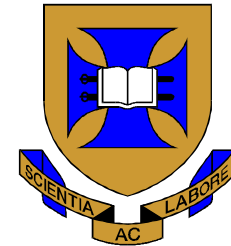


Nutraceuticals Found in Red Meat: Applications for Petfood

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Nutraceuticals

- Defined: non-drug substances that are extracted or produced in a purified form
- Used to improve health and well-being
- When used as adjuncts to conventional drug therapies, have the potential to decrease the dose which may decrease adverse side-effects of drugs

Nutraceuticals & Pets

- Average lifespan of pets has increased, predisposing them to old-age diseases
- Human-animal relationship is important - the majority of pet owners regard their pet as part of the family
- Increasingly, people are looking to nutraceuticals to improve their health
- Consequently, they expect that nutraceuticals will also be available for their pets

Common Pet Diseases & Red Meat Nutraceuticals

■ Osteoarthritis:

- 20% of dogs over 1 year old
- 90% of cats over 12 years old
- Causes joint pain, reduced activity, lameness
- Common cause of euthanasia in medium to large breed dogs when they can no longer get up from hip disease

Common Pet Diseases & Red Meat

Nutraceuticals: Osteoarthritis

Nutraceuticals used:

- Glucosamine
- Chondroitin sulphate
- Pentosan polysulphate
- Actions:
 - Aid in cartilage formation
 - Decrease inflammation
 - Retard progression of osteoarthritis

Common Pet Diseases & Red Meat Nutraceuticals

■ Obesity:

- ~40% of dogs
- ~40% of cats
- Shortens life of dogs by at least 15%
- Reduces life in cats

Common Pet Diseases & Red Meat Nutraceuticals

■ Obesity:

- Causes diabetes mellitus (cats), impaired immune function, skin disease, difficulty breathing, increased blood pressure, joint degeneration, increased anaesthetic deaths, urinary disease ...

Common Pet Diseases & Red Meat Nutraceuticals: Obesity

- Nutraceutical used:

- L-carnitine

- Action:

- Promotes the maintenance of lean body mass
 - Prevents lipid accumulation in cats undergoing rapid weight loss
 - Facilitates safe weight loss in cats

Common Pet Diseases & Non-Red Meat Nutraceuticals

■ Cancer:

- 50% of dogs older than 10 years
- Frequency in cats unknown but common

Common Pet Diseases & Non-Red Meat Nutraceuticals: Cancer

- Nutraceutical used:
 - **Omega-3 fatty acids**
 - Source: fish and fish oil
 - **Action:** Decrease the activity of enzymes (metalloproteases) - involved in tumour growth and metastasis
 - Decrease the vascular supply to solid tumours
 - Promotes programmed death of tumour cells (apoptosis)
 - Inhibit tumor growth and metastasise

Common Pet Diseases & Non-Red Meat Nutraceuticals

■ Chronic Renal Disease:

- 1% of dogs
- 1.6% of cats under 15 years
- 15% of cats over 15 years
- Nutraceutical used:
 - Omega-3 fatty acids
- Source: fish and fish oil

Common Pet Diseases & Non-Red Meat Nutraceuticals

- *Canine Aging and Cognitive Dysfunction:*
 - 50% of dogs over 11 years
 - Destructive behaviour, increased vocalisation, decreased social interactions, loss of housetraining
 - Nutraceutical used:
 - *Omega-3 fatty acids*
 - Source: fish and fish oil

Common Pet Diseases & Non-Red Meat Nutraceuticals

- Allergic Dermatitis:
 - 15 - 20% of all dog consultations
 - 15 - 20% of all cat consultations
 - Nutraceutical used:
 - Omega-3 fatty acids
 - Source: fish and fish oil

Red Meat Nutraceuticals Most Commonly Found in Premium Pet Foods

- Glucosamine
- Chondroitin sulphate
- Pentosan polysulphate
- L-carnitine
- Taurine
- Arginine

Red Meat Nutraceuticals Most Commonly Found in Premium Pet Foods

■ Taurine

- Essential amino acid
- Required for normal function of:
 - Heart
 - Retina
 - Reproductive system
- Added to all feline diets & in some canine diets (eg for heart and urinary disease)
- Deficiency causes blindness and heart disease (dilated cardiomyopathy)

Red Meat Nutraceuticals Most Commonly Found in Premium Pet Foods

■ Arginine:

- Essential amino acid
- Required for the elimination of toxic nitrogenous wastes from the body
- Added to diets for liver disease in cats

Potential Red Meat Sources of Nutraceuticals

- Glucosamine & chondroitin sulphate:
 - Cattle and sheep trachea
- Pentosan polysulphate:
 - Produced synthetically

Potential Red Meat Sources of Nutraceuticals

■ L-carnitine:

- Skeletal muscle:

- Sheep: 168mg/100g tissue

- Cattle: 62mg/100g tissue

- Heart

- Sheep: 59mg/100g tissue

- Cattle: 19mg/100g tissue

Potential Red Meat Sources of Nutraceuticals

■ Taurine:

- Cattle gall: 15g/L of gall

Potential Red Meat Sources of Nutraceuticals

■ Arginine:

- Skeletal muscle:

- Sheep: 1.8mg/100g tissue

- Cattle: 1.4mg/100g tissue

- Pig: 1.2mg/100g tissue

- Liver, heart, thymus, kidney:

- Sheep, cattle: ~1.0mg/100g tissue

Actual Pet Food Sources of Nutraceuticals

- *Glucosamine & chondroitin sulphate:*
 - Poultry meal
 - Mussel shells
- *Pentosan polysulphate:*
 - Produced synthetically

Actual Pet Food Sources of Nutraceuticals

■ L-carnitine:

- Produced synthetically
- Red meat used to produce the food
- Naturally-derived, purified product

Actual Pet Food Sources of Nutraceuticals

■ Taurine:

- Produced synthetically
- Red meat used to produce the food
- Naturally-derived, purified product

Actual Pet Food Sources of Nutraceuticals

■ Arginine:

- Red meat is source (sheep skeletal muscle)

Regulatory Requirements for the Inclusion of Nutraceuticals in Pet Foods

■ Australia:

- Regulated by the Australian Pesticides and Veterinary Medicines Authority (APVMA)
- Registration is only required if a claim is made to: "prevent, treat, alleviate or cure" a disease

Regulatory Requirements for the Inclusion of Nutraceuticals in Pet Foods

■ USA:

- Regulated by the Food and Drug Administration (FDA)
- Also by the Association of American Feed Control Officials (AAFCO)
- Pet food ingredients do not require registration so long as they do not make therapeutic claims

Summary

- Increasingly, people are using nutraceuticals as adjuncts to conventional medical therapies and expect the same options for their pets
- Pets are living longer and are thus more likely to develop old-age diseases such as osteoarthritis and obesity

Summary

- The most common canine and feline diseases for which red meat-derived nutraceuticals are used are osteoarthritis and obesity
- Many common diseases of cats and dogs are not managed using nutraceuticals

Summary

- The most common red meat-derived nutraceuticals in pet foods are:
 - Glucosamine
 - Chondroitin sulphate
 - Pentosan polysulphate
 - L-carnitine
 - Taurine
 - Arginine

Summary

- Nutraceuticals in pet foods are derived from :
 - Red meat used in the manufacture of the food
 - Synthetic production
 - Poultry meal
- Yields from red meat and by-products are potentially high

Summary

- Nutraceuticals included in pet foods do not require government registration in Australia or the USA, provided that no therapeutic claim to "prevent, treat, alleviate or cure" a disease is made.

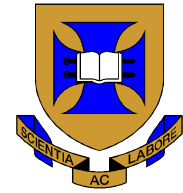
Conclusions

- The nutraceutical & bioactive area has great opportunities to develop
- Opportunities to increase production from red meat of commonly used nutraceuticals
- Opportunities to identify novel nutraceuticals and bioactives not currently used for pets

Conclusions

- Opportunities to identify novel nutraceuticals and bioactives not currently used for pets
 - Greatest opportunity but more costly to develop
 - Requires identification of potential nutraceuticals & bioactives from work in other species
 - Requires trials to demonstrate safety and clinical benefit (usually costly - \$100-350K/year)

Questions?



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