Dear UPAV members,

We continue on the topic of nutrition this issue, coinciding with the silly season where we tend to overdo our nutritional intake.

We have an avian nutrition article, as promised, written specially for us by nutritionist Christina Petzinger discussing dietary lipids and atherosclerosis. There is also a very useful feeding guideline for various species from Oxbow. This provides a mixing ratio of Oxbow Critical Care and Wombaroo products for these species to provide the best replacement for their natural diet. I found this extremely useful as I have been using a similar guideline for mixing Oxbow Critical Care with Oxbow Carnivore Care when I was practicing in the USA, but the latter is not available in Australia.

Jessica Talbot, a PhD student studying the epidemiology of aspergillosis in Australia, is requesting some samples, and have provided details of this and her project for us. Last but definitely not least, James Haberfield has once again provided an article describing his experience with the relatively new rabbit ‘V-gel’ product.

As I conclude my first year as editor of this newsletter, I would like to thank everyone for their support and feedback. Please keep these coming, and I wish everyone a merry Christmas and happy new year.

Till the next issue,
Shangz. (shangzhe.xie@adelaide.edu.au)
Atherosclerosis is a disease associated with chronic inflammation which results in plaque formation in the arteries (1). Atherosclerosis is well-known due to its occurrence in humans. Mammalian (and human) risk factors for atherosclerosis include elevated plasma cholesterol, increased amount of low density lipoproteins (bad cholesterol), decreased amount of high density lipoproteins (good cholesterol), elevated blood pressure, insulin resistance, and obesity. Mammals that spontaneously develop atherosclerosis are characterized as having low-density lipoproteins as the predominant cholesterol transporter in the body. Canines, felines, mice, and rats, which are resistant to spontaneously developing atherosclerosis, have high-density lipoproteins as the predominant cholesterol transporter in the body. This characteristic is commonly cited as a major reason for these species being resistant to spontaneously developing atherosclerosis (2-5). The predominant cholesterol transporter in avians is high density lipoproteins (6-7). Despite this, atherosclerosis occurs across many avian orders, though some avian orders appear resistant to the disease (8-9).

Additional factors for avians developing atherosclerosis may include hyperlipidemia, postprandial lipemia, endothelial inflammation, toxic substances, immune complex formation, reproductive disorders, species of avian (genetics), inappropriate long term diet (possibly high fat, cholesterol, or fatty acid imbalance/deficiency), and lack of exercise (10-13).

However, it is not well known if these risk factors, especially mammalian derived, pertain to avians that develop atherosclerosis. Plasma and serum total, free and ester cholesterol did not adequately reflect the severity of atherosclerosis in avians that consume non-animal protein, especially pigeons and chickens (14-15). It has been noted that the level of plasma total cholesterol varies by parrot species and those with higher plasma cholesterol levels tend to be more susceptible to developing atherosclerosis (16). Even though increased levels of high density lipoproteins are protective against atherosclerosis in mammals, many avian species still develop atherosclerosis. Additionally, since postprandial lipemia has been associated with the prevalence of atherosclerosis (10), it may be more beneficial to measure post-prandial lipoprotein concentrations rather than fasting levels (17).

Since atherosclerosis is a disease resulting from chronic inflammation and alterations in lipid metabolism, any dietary nutrient or factor that alters inflammation or lipid metabolism is likely to affect the prevalence and development of atherosclerosis. Atherosclerosis is an inflammatory disease resulting in part from problems with lipid metabolism. Many avian species, though not all, have been found to develop atherosclerosis in captivity. Many risk factors for atherosclerosis are well defined in mammals, but are not clear and likely differ in avians. Dietary nutrients can play a large role in reducing the severity and prevalence of atherosclerosis in both avians and mammals. The inclusion of cholesterol in the diet of avians that consume non-animal protein (even as low as 0.25% of the diet) dramatically increases plasma and serum cholesterol levels (18-21). Due to the cholesterol content of eggs, they should not be offered regularly to non-meat-eating avians.

Both the type and amount of dietary fat are commonly believed to affect the prevalence and development of atherosclerosis. Non-captive avian species that do not naturally consume animal proteins rely on α-linolenic acid as their source of omega-3 fatty acids. However, recent research suggests including fish oil or dried algae products in the diets of non-meat-eating avians may help reduce their risk factors for developing atherosclerosis (22-23). Cockatiels fed fish oil had lower plasma cholesterol and triacylglycerol levels than cockatiels fed flaxseed oil (high α-linolenic acid) or beef tallow (22). Additionally, the plasma cholesterol and triacylglycerol levels in cockatiels on the fish oil diet decreased from baseline over the eight week feeding trial (22). A decrease in plasma cholesterol and triacylglycerols was not observed for Monk parrots fed a diet containing a dried algal product (high in docosahexaenoic acid but with no eicosapentaenoic acid) compared to Monk parrots fed diets with linseed oil (high α-linolenic acid) and/or sunflower seed oil (23). However, both docosahexaenoic acid and eicosapentaenoic acid were enriched in the plasma phospholipids of avians fed the algal product (23). Thus, dietary fish oil (and possibly dried algal products) may be more beneficial than oils high in α-linolenic acid on reduc-
Recent Advances Concerning Dietary Lipids and Avians

The addition of fish oil and possibly dried algae products to the diets of avians in captivity should be considered.

Overfeeding and resultant obesity have been indicated as risk factors for developing atherosclerosis in mammals. Feed restriction and fasting have also been studied due to their ability to alter lipid metabolism. Moderate food restriction (80% of food consumed by ad libitum group) decreased the severity of atherosclerosis and overall mortality rate of chickens (15). Excess body fat may also reduce the activity and mobility of the animal, which can exacerbate the risk of developing atherosclerosis. Thus, feed restriction and maintaining avians at an ideal body condition may also be effective means of reducing the prevalence of atherosclerosis in avians.

References
15. Griminger P, Fisher H, Weiss HS: Food restriction and spontaneous avian atherosclero-
Recent Advances Concerning Dietary Lipids and Avians


23. Petzinger C: Lipid metabolism, learning ability and potential biomarkers for atherosclerosis in Monk parrots (Myiopsitta monachus) fed n-3 fatty acids. Dissertation. College Station, TX, Texas A&M University, 2012.

Author Bio

Christina Petzinger earned her PhD in Nutrition at Texas A&M University, USA. Her doctorate research focused on the role of omega-3 fatty acids in lipid metabolism, learning ability, and potential biomarkers for atherosclerosis in Monk parrots (Myiopsitta monachus). Christina also completed a post doc in the Nutrition Laboratory at the Smithsonian’s National Zoological Park in Washington, DC, USA.
Oxbow Species Feeding Guidelines

Feeding Critical Care Veterinary Patients
(For Australia & New Zealand Use Only)

Animals that are critically ill or recovering from surgery require a high quality diet that is nutritionally balanced, readily digested and easily administered. Nutritional requirements depend on digestive physiology, and vary for herbivores, carnivores and omnivores.

Oxbow Critical Care for Herbivores
Oxbow Critical Care is a premium recovery food for herbivores with poor nutritional status. This specially formulated product contains all the essential nutrients of a complete diet as well as high-fibre timothy hay to support proper gut physiology and digestion.

Applications
- Gastrointestinal stasis & gastric hair balls.
- Severe weight loss & appetite stimulant.
- Dental disease & geriatric patients.
- Pre- & Post-surgery & dental procedure.
- Medication carrier & receiving protocols.

Analysis
Crude Protein (min) 16%, Crude Fat (min) 3%, Crude Fibre (max) 26%
Contact
Specialised Animal Nutrition
Ph (07) 5525 1014
www.oxbowaustralia.com

Wombaroo Insectivore Rearing Mix
Insectivore Rearing Mix is a complete diet for carnivorous and insectivorous species. The high protein formula contains a balanced amino acid profile, including taurine, an essential nutrient for carnivores. Contains added omega-3 & 6 fatty acids, vitamins and minerals.

Applications
- Malnourished or underweight birds and animals.
- High protein dietary boost for all species.
- Nutritional support pre- & post surgery.
- Can be mixed with Oxbow Critical Care for omnivorous species.

Analysis
Protein (min) 52%, Fat (min) 12%, Fibre (max) 5%
Contact
Wombaroo Food Products
Ph (08) 8391 1713
www.wombaroo.com.au

Wombaroo Reptile Supplement
Reptile Supplement is a versatile high protein supplement for all reptiles. Contains high quality protein, with added omega-3 & 6 fatty acids, vitamins and minerals.

Applications
- Malnourished or underweight reptiles.
- Appetite stimulant for fussy eaters.
- Nutritional support pre- & post surgery.
- Can be mixed with Oxbow Critical Care for omnivorous species.
- Elevated levels of calcium and vitamin D3 to assist MSD patients.

Analysis
Crude Protein (min) 55%, Crude Fat (min) 14%, Crude Fibre (max) 6%
Contact
Wombaroo Food Products
Ph (08) 8391 1713
www.wombaroo.com.au
# Feeding Guidelines

These are meant as general guidelines. Individual requirements will vary with species, age, activity level and medical condition. Consult with a veterinarian for specific directions.

### Mammals

<table>
<thead>
<tr>
<th>Species</th>
<th>Oxbow Critical Care for Herbivores</th>
<th>Wombaroo Insectivore Rearing Mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guinea Pig</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Rabbit</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Rat</td>
<td>2 parts</td>
<td>1 part</td>
</tr>
<tr>
<td>Mouse</td>
<td>4 parts</td>
<td>1 part</td>
</tr>
<tr>
<td>Ferret</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kangaroo/Wallaby</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Possum</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Koala</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Wombat</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Bandicoot</td>
<td>1 part</td>
<td>2 parts</td>
</tr>
<tr>
<td>Echidna</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Carnivorous Marsupial</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Microbat</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

### Reptiles

<table>
<thead>
<tr>
<th>Species</th>
<th>Oxbow Critical Care for Herbivores</th>
<th>Wombaroo Reptile Supplement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turtle (Long/Short-Necked)</td>
<td>1 part</td>
<td>3 parts</td>
</tr>
<tr>
<td>Bearded Dragon (Adult)</td>
<td>2 parts</td>
<td>1 part</td>
</tr>
<tr>
<td>Bearded Dragon (Juvenile)</td>
<td>1 part</td>
<td>3 parts</td>
</tr>
<tr>
<td>Blue-tongued Lizard</td>
<td>1 part</td>
<td>2 parts</td>
</tr>
<tr>
<td>Water Dragon</td>
<td>1 part</td>
<td>2 parts</td>
</tr>
<tr>
<td>Gecko</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Goanna/Monitor</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Snake</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Land Tortoise (Exotic)</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

### Avian

<table>
<thead>
<tr>
<th>Species</th>
<th>Oxbow Critical Care for Herbivores</th>
<th>Wombaroo Insectivore Rearing Mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken</td>
<td>2 parts</td>
<td>1 part</td>
</tr>
<tr>
<td>Duck</td>
<td>2 parts</td>
<td>1 part</td>
</tr>
<tr>
<td>Goose</td>
<td>3 parts</td>
<td>1 part</td>
</tr>
<tr>
<td>Turkey</td>
<td>3 parts</td>
<td>1 part</td>
</tr>
</tbody>
</table>
Aspergillosis PhD Project

Request for samples

The following request for samples is for a PhD investigating the epidemiology of aspergillosis in Australia. This PhD will determine the type of fungal species causing aspergillosis in a range of animal species and humans. *Aspergillus fumigatus* is currently the most recognised cause of the disease for animals and humans. However recent studies have identified new *Aspergillus* species, often refractory to commonly used antifungal therapies, as causative agents in humans, dogs and cats.

We are requesting samples from clinical cases of aspergillosis in avian species. Please read on for more information on the project and samples required for this important research.

**Project title:** What causes avian aspergillosis? A molecular approach to species identification.

**PhD Candidate:** Dr Jessica Talbot

**PhD Supervisors:** A/ Prof Vanessa Barrs, A/ Prof Julia Beatty

**University:** University of Sydney

**Background:**

Following the introduction of molecular identification techniques, *Aspergillus fumigatus*-like fungal species are being increasingly recognised as causes of human and animal aspergillosis. Knowledge of the prevalence of these species is important as they are often refractory to treatment with commonly used antifungal therapies and associated with poor clinical outcomes.

In addition to humans, dogs and cats, avian species are highly susceptible to aspergillosis, with infection most commonly attributed to *Aspergillus fumigatus* and *Aspergillus flavus*. However this is largely based on non-molecular identification methods. Knowledge of the range of *Aspergillus* species infecting birds is of medical and epidemiological importance.

**Aims:** To use molecular techniques to identify the fungal pathogens that cause aspergillosis in humans and birds in Australia and the incidence of *Aspergillus fumigatus*-mimetics.

**What we need:**

Fungal cultures grown from birds that have been diagnosed with aspergillosis based on at least two of the following:

1. Clinical signs of respiratory tract disease
2. Radiographic findings consistent with pulmonary mycosis
3. Evidence of respiratory tract mycosis on post-mortem examination
4. Observation of filamentous fungi consistent with *Aspergillus spp.* on cytological and/or histological examination of post mortem lesions consistent with aspergillosis
5. Positive fungal culture from fungal plaques or tissue biopsies from the lungs or air sacs

**Fungal cultures of Aspergillus specimens from any other exotic species (e.g. rabbits) with clinically confirmed aspergillosis are also welcome.**

If you have any sample questions or submissions, please contact Dr Jess Talbot on 02 9351 3437 or by email at jessica.talbot@sydney.edu.au.

Please submit your samples to:

Dr Jessica Talbot
Veterinary Pathology Diagnostic Services
Faculty of Veterinary Science
**B14 - McMaster Building**, Room 149-151
The University of Sydney
NSW 2006 Australia
Rabbits V-gels — Are they worth the cost?

We have been using the rabbit ‘v-gels’ (supraglottic airway devices) for the last 12 months. They come in a range of sizes with R1 being the smallest and R6 being the largest. We bought ours directly from Docs Innovate in the UK however I believe Sound Veterinary Equipment are now stocking them.

We have found them to be a fantastic addition to our rabbit anaesthetic protocol being easy to use and reliable. They now form part of our standard rabbit anaesthetic protocol for most procedures.

After trying numerous anaesthetic dosing regimes our standard rabbit protocol for routine procedures in healthy rabbits is as follows:

- Premedicate/induce with 0.3mg/kg butorphanol, 8mg/kg ketamine, 0.06mg/kg medetomidine IM and 0.5mg/kg metoclopramide SC.
- Pre-oxygenate with a small nasal facemask while placing a marginal ear (most commonly) or cephalic IV catheter (we use 24G for most rabbits) and starting IVFT using hartmanns at 5ml/kg/hr.
- Once lightly anaesthetised place the v-gel by first lubricating it lightly (the company that make the v-gels sell a spray bottle of lubricant called “Vetlube” that works well however you could use any type of suitable veterinary lubricant) then gently pulling the tongue out and sliding the v-gel into position. There is a video online (www.docsinnovent.com/products) on how to place them however essentially you just slide them in until they reach the laryngeal area. This takes a few seconds and our nurses or vet students regularly place them. We use the capnograph on our surgivet to judge whether we are in the right position, this certainly makes it easier however you can also see condensation in the v-gel if you do not have capnography. We find them easiest to place if the rabbit is in ventral recumbency with the head slightly lifted however they can be placed in almost any position.
- We use our small animal ventilator (Vetronic Services, UK) if the rabbit becomes apneic or we are not happy with its ventilation. The v-gel is connected directly to this.
- We have used the “D-grip” to hold the anaesthetic circuit in place however found it a little tedious to position in some cases so most of the time we just use towels or small boxes to keep everything in the right position/angle.
- For maintenance of anaesthesia we use isoflurane as needed, generally we get 15-20 minutes of surgical anaesthesia using the above induction protocol however this varies from rabbit to rabbit.
- Monitor HR, RR, BP, SpO2, etCO2 +/- ECG and temp using mainly the surgivet (nicknamed “C3PO”).
- Perform the surgery as needed.
- Reverse the medetomidine with atipamezole (same volume as medetomidine) and provide additional analgesia as needed. We commonly use meloxicam at 0.2mg/kg SC +/- tramadol at 11mg/kg +/- buprenorphine at 0.03mg/kg.
- As the rabbit begins to wake up and start to make facial movements we remove the v-gel by sliding it out.

V-gel Pros:

- Easy to place, quick and provides reliable airway control
- Work well with the small animal ventilator
We don’t routinely autoclave them so we have had at least 150 uses out of the more popular sizes (R2 and R3) so far and they are yet to show any visible sign of damage.

We are yet to see any evidence of subsequent clinically evident laryngeal damage

V-gel Cons:

For some dental work we find it challenging to keep the V-gel in place and still get good visualization/access to the oral cavity. For these cases we either intubate with an non-cuffed ET tube or maintain by nasal facemask depending on the case.

If you are moving the patient position a lot the V-gel can move and not maintain the correct position

They are more challenging to keep in the exact position then an ET tube as they cannot rotate/bend like the ET tube can

They are harder to keep in position if the animal is in lateral recumbency

In summary they have been a fantastic addition to our clinics and I would highly recommend them to any practice doing a reasonable amount of rabbit work. We rarely use the R5 and R6 (the bigger sizes) and for those practices doing only a small amount of rabbit work the R1, R2 and R3 would probably cover 95% of the rabbits that you will see.

up and then securely and safely tie it up.
Unusual Pets and Avian Veterinarians (UPAV) special interest group (SIG) was formed in 2013, bringing together two separate veterinary groups which shared similar interests.

This new group specialises in the changing face of pets in Australia. The group promotes discussion about the medicine and surgery of pet species other than dogs and cats.

‘Unusual pets’ refers to snakes, lizards, turtles, frogs, native Australian mammals, rabbits, guinea pigs, rats and mice, ferrets and even tarantulas! Avian, of course, relates to all of our feathered friends.

With changes in licensing laws and people’s lifestyles, the choice of family pet might not be a dog or cat, but one of another dozen species. The increase in ownership of unusual pets has resulted in a corresponding need for veterinarians to feel competent with the treatment of pets not traditionally covered in the undergraduate curriculum.

Committee Members
President: Robert Johnson
Secretary: Tegan Stephens
Treasurer: Mike Cannon
Policy Councillor: Deborah Monks
Communications/education: Brendan Carmel
Avian representative: Alex Rosenwax
Newsletter editor: Shangzhe Xie