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Stopping illegal trade of Australian lizards

COVID-detecting dogs offer hope

Reduce stigma around mental health in the veterinary industry



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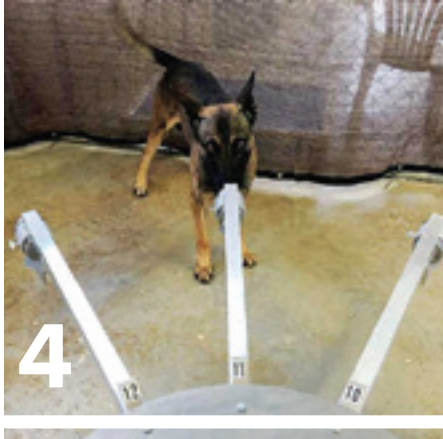
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Fortuna Villa, 22 Chum Street, Golden Square VIC 3555 Australia
 P: 03 5441 8166 E: info@theaustralianagronomist.com W: www.theaustralianagronomist.com

Publisher

Paul Banks
 Email: paul@regionatreachpublishing.com
 Phone: 03 5441 8166

Administration & Advertising

Caitlyn Hamilton
 Email: caitlyn@regionatreach.com
 Phone: 03 5441 8166

COVID-DETECTING DOGS OFFER HOPE

AS THE WORLD STRUGGLES TO FIND A WAY TO GET BACK TO NORMAL LIFE AMID THE PANDEMIC, SPECIALLY TRAINED DOGS MAY BE ABLE TO HELP. THE U.S. ARMY'S COMBAT CAPABILITIES DEVELOPMENT COMMAND CHEMICAL BIOLOGICAL CENTRE HAS BEEN WORKING TO TRAIN NINE DOGS TO DETECT THE PRESENCE OF THE COVID VIRUS IN HUMANS.

Indeed, recent research being conducted by the army at Aberdeen Proving Ground, Md., in conjunction with the University of Pennsylvania School of Veterinary Medicine Working Dog Centre, has shown dogs can be trained to detect the presence of the novel coronavirus in the human body. The dogs are taught to recognise proteins created by the human immune system when it responds to a COVID infection.



The training aid delivery devices (TADD) attached to each arm of the wheel allow the dog to safely detect the substance inside without being exposed to the substance. Photos courtesy United States Army

The dogs involved

Eight Labrador retrievers and one Belgian Malinois are currently enrolled in the study, which trains dogs to detect the presence of the virus before a person starts showing symptoms of infection.

“The science behind a dog’s ability to conduct tasks such as tracking and trailing missing persons and detecting ovarian cancer in human urine samples is based upon the dog’s olfactory acuity and proficiency in analysing a volatilome,” says Patricia Buckley, PhD, research scientist at the centre. “The volatilome is comprised of the entire set of volatile organic compounds (VOC) produced by an organism. The VOC profile emanating from the body is loaded with information, reflecting the unique metabolic state of an organism, and can even be diagnostic of a disease.”

Dr. Buckley explains exploiting the VOC signatures of a single organism or a population can provide information on health status, biosecurity, biosurveillance, and disease transmission.

“The use of detection dogs is well established as a rapid and mobile technology for the detection of VOCs from drugs, explosives, and humans,” she says. “However, the next frontier is harnessing their olfactory abilities for disease detection in order to address a global public health pandemic.”

In the case of detecting COVID, the dogs never actually have any exposure to the live virus, but are instead trained to detect the biomarkers associated with the disease in humans.

TADD

This highly specialised training is being taught by a Hagerstown, Md.-based working dog trainer, who specialises in training dogs for tactical work. The training began in May 2020 using a training aid delivery device (TADD), a specialised containment vessel that has a gas-permeable membrane. The TADD allows dogs to train on potentially hazardous material, like human saliva and urine from infected patients, by letting the odour of the training aid out, but not the actual training aid.

The TADD itself was first developed by the army centre in 2013 as a laboratory device. It was designed to contain hazardous substances needed for testing and evaluation of new detection equipment. Five years later, it was redesigned so it could be used in field settings without fear of breaking it if it was dropped or roughly handled.

The TADD is essentially a container, ranging in size from one to eight ounces. A membrane covers its mouth and allows VOCs emitted by a hazardous substance to flow out of the container while the hazardous substance remains inside. This makes the TADD safe for dogs being trained on live substances because explosive powders and narcotics stay under the membrane and do not go up into a dog’s nose.

Another feature of the TADD is its actual components emit very little odour.

“Plastic and rubber materials can be very stinky to dogs and interfere with their detection of the substances we’re looking for,” says Michele Maughan, PhD, a researcher at the centre. “We knew the TADD would be perfect for containing COVID-19 patient samples of saliva or urine because we knew this odour profile would be quite nuanced and require the dogs to key in on some really low VOC molecules. It’s important the containment system, the TADD, doesn’t compete with the target odour.”

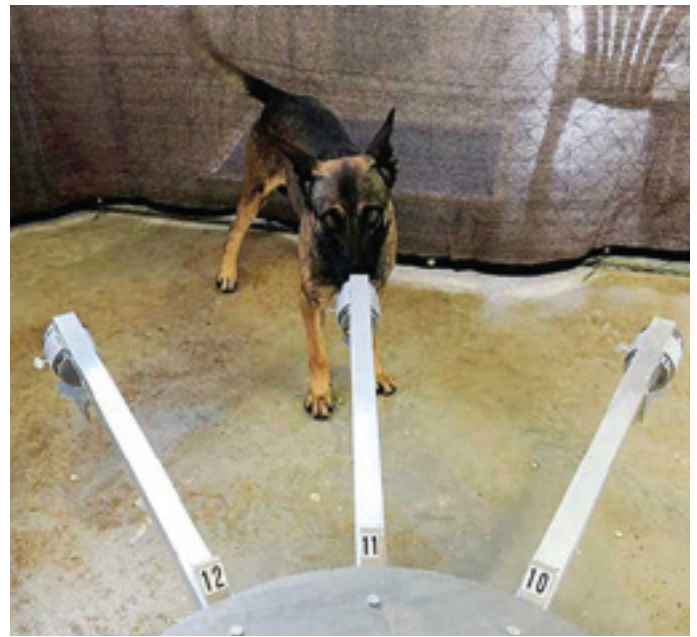
For the COVID detection training, the TADD was attached to a specialised wheel, and the dogs were taught over six to nine weeks not only to detect the scent of COVID human biomarkers, but to keep searching for hours at a time. Dogs have to be able to detect in the parts per trillion range, so they must have a strong drive to stay interested.

Army researchers are getting close to becoming able to test the dog's abilities on actual humans with the virus.

"The human screening portion of the study will occur at the University of Pennsylvania," Buckley says. "We are still recruiting volunteers to be a part of this important work, specifically people who have been tested in the past 48 hours or are going to be tested."

The study involves eligible participants wearing a cotton T-shirt for one night that has been shipped to them.

The ultimate goal for specially trained COVID detection dogs is to provide screening at the entrances to crowded public places such as at airports, sports stadiums, or at border control checkpoints. If the study is successful, these detection dogs may become a part of our regular lives as we fight to defeat this virus.



A canine COVID detection candidate investigates scent from a TADD.

Dogs Needed for Trials of Improved B-Cell Lymphoma Treatment

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MOUSE PLAGUE – POISONING UP 300%

With the recent mouse plague running rampage around regional Australia, Pet Insurance Australia is urging all pet lovers to ensure the safety of their pets.

“We’ve seen a 300% increase in claim payments in the past three months compared to the same months in 2020 for rat bait poisoning,” Nadia Crighton from Pet Insurance Australia says. “It’s really important that if pet owners are utilising rat baits to take extra precautions when it comes to their pets.”

For a dog, or cat rat bait can seem like a delicious find to a curious nose. However, it can cause deadly consequences for many pets. As it destroys the ability to make vitamin K, it can cause serious internal haemorrhaging and stop the body’s ability to clot.

• Symptoms of poisoning include:

- Lethargic & general weakness
- White gums
- Cough
- Blood nose
- Bloated abdomen
- Blood in mucus
- Blood in urine or faeces

Symptoms can begin 2-4 days after the ingestion. Commonly the pet will begin to cough and blood could be present.

“Commonly the first area to be affected is the lungs that can cause difficulty in breathing,” Crighton says. “The pet may

then also show symptoms of bloating in their abdomen.”

Treatment involves intravenous Vitamin K, in some severe cases, blood transfusions may be necessary.

“Recent common breeds claiming for ingestion of rat bait included Australian Terriers, Australian Kelpie Sheepdogs, Cattle Dogs, and Australian Shepherds,” Crighton says. “You can tell by the breeds affected that they are mainly working dogs that are currently coming into contact with masses of rat baits.”

Prevention is key when utilising any type of poison in the home. Using a dog-proof bait station is paramount if you have pets in the home. Always ensure your baits are stored in a sealed waterproof container and kept away from pets. Do not allow your pets to investigate or be off-leash near any areas that have had mass rat bait drops. Keeping cats indoors and dogs on leash are the best way to preventing your pet from coming into contact with any poison.

“Ensuring you are only utilising pet-proof bait stations can help prevent your pet from suffering from severe poisoning,” Crighton says. “If you suspect your pet has ingested any bait, or you notice blue or green granules in your dog faeces, you must seek veterinary treatment quickly.”

Pets can also suffer from secondary poisoning if they have ingested a mouse/rat that has been poisoned. However, the pet would need to have ingested a sufficient amount to become to show any symptoms or become affected.

PIA has noticed claims of up to \$11,000 for rat bait poisoning.



STOPPING ILLEGAL TRADE OF AUSTRALIAN LIZARDS

Australian reptiles face serious conservation threats from illegal poaching fuelled by international demand and the exotic pet trade.

In a new study in *Animal Conservation*, researchers from the University of Adelaide and the Monitor Conservation Research Society (Monitor) investigated the extent of illegal trade in a well-known Australian lizard: the shingleback, also known as the bobtail or sleepy lizard.

Using government records, media reports, and online advertisements, the researchers found clear evidence that many shinglebacks have been illegally poached from the wild and are smuggled overseas to be traded as pets.

Author and PhD Candidate Adam Toomes from the University of Adelaide says: "While shinglebacks are a protected species in Australia, and can only be exported legally under a federal permit, there is little to no regulation of international trade once the animals have been smuggled out of the country.

"Not only are our findings concerning from a conservation and animal welfare perspective, but they also highlight a major loophole in our legislation which is being exploited."

While under Australian law it is illegal to export native live species, the import to many countries is not, along with trade once the animals have entered the country. It is left to each importing country to address the issue on an individual basis, such as changing their legislation to regulate both the trade and import of species native to other countries.

In the study, the researchers found all four subspecies of shingleback lizard are in trade across Asia, Europe and North America. This includes the threatened *Tiliqua rugosa konowi* subspecies, only found in the wild on Rottnest Island, Western Australia.

The lifestyle and characteristics of the shingleback makes them particularly vulnerable to poaching.

"They don't tend to travel far from where they live and their defences, which include a slow retreat when approached and opening their mouth and sticking their tongue out, are not all that daunting. So they can be easily captured even by unskilled people," Mr Toomes said.

Examining seizure data from 2015 to 2018 from the Australian Government's Department of Agriculture, Water and Environment, and additional seizure data from 2009 to 2020, the study shows more than 260 shinglebacks were destined for illegal exportation to countries including Hong Kong, China, Japan, Thailand, Malaysia, Singapore and Sweden.

A further 236 shinglebacks were seized in Western Australia but it was uncertain as to whether they were destined for international or domestic trade.

To protect Australian shinglebacks and curtail global trade, the researchers recommend they be listed in Appendix III of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which provides other countries with the legal means to confiscate illegally exported species.

CITES Appendix III lists species that are protected in their native country for which the country has requested assistance from others to regulate trade. New species can be added to the lists by notifying the CITES secretariat.

Co-author, Phill Cassey, with the University of Adelaide's School of Biological Sciences says: "Surprisingly, this piece of legislation is seldom used in comparison to other Appendices in CITES, and yet it could contribute to substantially reducing international trade of threatened reptiles, providing other countries with a legal basis to seize illegally imported species.

"While stronger international regulations and improved legislation are urgently needed to curb the illegal wildlife trade globally, until such legislation exists, CITES Appendix III is a legal tool that can help us protect at-risk native species, like the shingleback, right away."



Journal Reference:

S. Heinrich, A. Toomes, C. R. Shepherd, O. C. Stringham, M. Swan, P. Cassey, Strengthening protection of endemic wildlife threatened by the international pet trade: The case of the Australian shingleback lizard. *Animal Conservation*, 2021; DOI: 10.1111/acv.12721

ENDANGERED WALLABY POPULATION BOUNCES BACK AFTER FERALS FENCED OUT

A population of bridled naitail wallabies in Queensland has been brought back from the brink of extinction after conservation scientists led by UNSW Sydney successfully trialled an intervention technique never before used on land-based mammals.

Using a method known as 'headstarting', the researchers rounded up bridled naitail wallabies under a certain size and placed them within a protected area where they could live until adulthood without the threat of their main predators -- feral cats -- before being released back into the wild.

In an article published today in *Current Biology*, the scientists describe how they decided on the strategy to protect only the juvenile wallabies from feral cats in Avocet Nature Refuge, south of Emerald in central Queensland, where they numbered just 16 in 2015.

Article lead author Alexandra Ross says juvenile wallabies under 3kg -- or smaller than a rugby football -- are easy prey for feral cats.

"Previous studies have shown that more than half of these young bridled naitail wallabies were killed by feral cats before they could reach adulthood," Ms Ross says.

"But when you look at the numbers of adults, the survival rate goes up to 80 per cent -- which shows that size is a good predictor of survival.

"So we figured if we can just get them through that tough period -- when they're still little and an easy size for a cat to prey on -- by

putting them in feral-free protected areas, then we could make a positive difference to the population numbers."

The results more than confirmed the scientists' hunches. Of the 56 bridled naitail wallabies that were raised within the headstart enclosure between 2015 and 2018, 89 per cent survived to be large enough to be let back into the wild. The 11 per cent that didn't make it included one that needed to be euthanised due to injury, two found dead from accidents or unknown causes and four killed by birds of prey.

LESS EXPENSIVE, MORE EFFECTIVE

Professor Mike Letnic, a co-author on the article, says headstarting is a cost-effective intervention when compared to other more complex strategies involving the creation of large nature reserves after complete eradication of feral animals, like the one created in Sturt National Park in 2019.

"Aly's [Ms Ross's] headstarting project involved fencing off an area about 10 hectares which was big enough to hold about 30 or 40 wallabies at a time," Prof. Letnic says.

"We're basically growing them from football size to medicine ball size before releasing them back into the wild, which can take anywhere from a few months to a year.

"For the most part they're fending for themselves in the headstart enclosure just like they do in the wild, except without the threat of feral animals. But they're not completely protected -- they can still get eaten by eagles which means there is still some predator recognition."

Double the size

Ms Ross says the population of the bridled naitail wallabies more than doubled following the three years of headstarting in Avocet Nature Refuge, which is the largest increase that had been observed in this particular population since monitoring began in 2011.

"Before we started the headstarting strategy, we estimated the core Avocet population at 16 individuals. When we did a recount in 2018 after three years of gradually releasing headstarted wallabies that had reached the right size, the estimate of the total population of bridled naitail wallabies -- both inside and outside the headstarting enclosure -- was 47.

"This clearly demonstrates the effectiveness of the headstart enclosure as a conservation strategy."

Worryingly, when Ms Ross and her fellow researchers crunched the numbers on how the population would fare without, or with varying lengths of headstarting scenarios -- none, five years, 10 years, 20 years and 50 years -- the projections found that extinction resulted once headstarting ceased -- within a timeframe of two to 52 years.

"What this tells us is that until we find a way to eliminate feral cats in the wild, headstarting may be the only way to keep this population at a sustainable level."

But the team's implementation of the first headstarting project for a land-based mammal raises new hope for other potential endangered species in Australia -- and potentially around the globe -- where size of young may be factor in population survival.



“One of the great things about headstarting is it’s relatively cheap, doesn’t interfere too much with animals’ awareness of predators, and can get good results in a short time,” Ms Ross says.

“And there are plenty of other mammal species around the world that could benefit. Any species that is particularly vulnerable in the early life stage could potentially thrive under a headstarting strategy.”

Up until now, headstarting has been used with some success with birds, fish, reptiles, and seals, and there’s no reason why it shouldn’t also be implemented for terrestrial mammals, Ms Ross and Prof. Letnic argue.

PREDATOR AWARENESS

Prof Letnic says one of the drawbacks with separating animals for longer periods in feral-free enclosures is that they unlearn their fear of predators on the outside. “After only a few years of being in a protected zone, evolution kicks in and animals start developing new ways to compete with one another. They tend to become bolder in an attempt to be first to the food. If they were then to be released back into the wild among feral animals, the bold ones end up getting eaten because they’ve lost that cautious awareness of predators.”

However, Ms Ross believes that headstarting could avoid this problem, as animals are only separated from predators for a few months or a year at the most. There is also minimal human interaction and the animals are still preyed upon by their natural predators, like eagles and snakes, ensuring they retain some predator awareness.

Journal Reference:

Alexandra K. Ross, Jasmin C. Lawes, Andrew Elphinstone, Sally Stutsel, Mike Letnic. Headstarting as a cost-effective conservation strategy for an endangered mammal. *Current Biology*, 2021; 31 (10): R465 DOI: 10.1016/j.cub.2021.04.017

Her next study will examine the behaviour of the bridled naitail wallabies once released from the headstarting enclosure and the length of time it took for them to fully integrate back into the wild.

BRIDLED NAILTAIL WALLABY -- VITAL STATS

The bridled naitail wallaby is a small macropod that grows up to a metre in length, half of which is the tail. It takes its name from the white ‘bridle’ line that runs down the back of the neck and shoulders and a tail spur about 3 to 6mm in length.

Bridled naitail wallabies live mostly on succulent grasses, can grow to a weight of 8kg, with an average life-span of around six years in the wild.

Once the most common macropods at the time of European settlement, these nocturnal animals are now in critically low numbers in the wild after being hunted extensively for their fur in the early 1900s, and more recently, preyed upon by feral cats and foxes.

The species was even believed extinct from 1937 until 1973. It was only when a fencing contractor reported he’d seen a population of the wallabies living on a property near Dingo, Queensland – after reading about it in an article published in *Woman’s Day* – that the species was rediscovered.

After the Queensland Parks and Wildlife Service confirmed its existence, the property near Dingo eventually became a nature reserve to ensure its ongoing survival.

There are believed to be only 500 of the animals living in the wild, and more than 2000 in captivity.

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THE ABCS OF VETERINARY DENTISTRY: E IS FOR ENAMEL DEFECTS

**TRACEY SMALL BA (SOC SC), VN, DIP VN (DENTISTRY)
DR DAVID E CLARKE BVSC DIPLOMATE AVDC FELLOW AVD
REGISTERED SPECIALIST, VETERINARY DENTISTRY AND ORAL SURGERY
WWW.VDEC.COM.AU**

We are well on our way into the dental alphabet now and this issue brings us to the letter E. In this article we continue our journey of the tooth and look at Enamel defects.

Introduction.

Enamel is a mineralised tissue largely composed of hydroxyapatite crystals and covers the dental crown¹. Enamel is generated by ameloblasts, in a coordinated process including presecretory, secretory, transition, and maturation stages^{2,3}, termed amelogenesis^{4,6}. Amelogenesis produces ameloblasts that create an enamel matrix that is laid over primary dentine prior to tooth eruption^{4,7}. Amelogenesis begins at the cusp of the crown and progresses down the tooth to end at the cemento-enamel junction⁵. The purpose of enamel is to provide protection from physical, temperature and chemical trauma to the underlying tooth structures^{4,6}. With uniquely hard properties it offers insulation and resistance to fractures and wear¹.

Development of the teeth is initiated during embryonic formation. At the 25th day of development, rudimentary signs of tooth development, termed dental lamina, begin to occur. The enamel organ, which eventually is responsible for enamel formation, arises from several invaginations of the dental lamina and develops through a series of stages known as the bud, cap and bell (Figures 1-4). The bud stage is the initial budding at the

areas corresponding to the deciduous dentition. Each layer of the enamel organ has specific functions to perform. The inner enamel epithelium (IEE), on the outer portion of the cap, being responsible for actual enamel formation⁸.

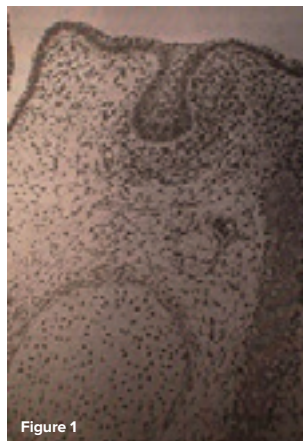


Figure 1. Enamel organ development: bud stage of tooth germ in 16mm, 24-day-old cat embryo (Courtesy of Dr Ayako Okuda, Tokyo, Japan).

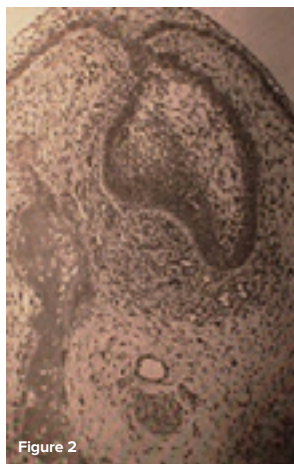


Figure 2. Enamel organ development: cap stage of tooth germ in 24mm, 28-day-old cat embryo (Courtesy of Dr Ayako Okuda, Tokyo, Japan).



Figure 3. Enamel organ development: bell stage of tooth germ in 40mm, 33-day-old cat embryo (Courtesy of Dr Ayako Okuda, Tokyo, Japan).

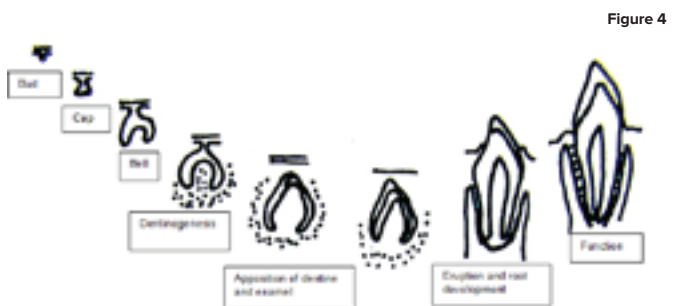


Figure 4. Diagram representing the stages of tooth development and eruption sequence.

The dental lamina buds that form the deciduous teeth develop lingual extensions that eventually form the successional adult

dentition. During the bell stage, the IEE cells evolve into a taller form and become preameloblasts. A polarity shift in the preameloblasts then occurs and the cells become ameloblasts and begin to produce enamel matrix. The enamel matrix is laid down at the end of the bell stage which is known as 'the mineralisation stage' of calcification of the enamel rod. It is during this stage the crystals grow in size, becoming tightly packed together within the enamel rod. In a healthy tooth, enamel is the hardest body substance comprising 96% inorganic composition formed by millions of hydroxyapatite crystals, as well as other ions, and 4% water and fibrous organic material⁸. Enamel in dogs and cats is much thinner than that found in humans, where the thickness is 2 - 4mm compared to 0.1 - 0.3mm in cats and 0.1 - 0.6mm in dogs⁹.

Enamel formation in adult teeth is generally laid down between the ages of 2 weeks to 3 months¹⁰. This process is highly sensitive to trauma and systemic illness^{5-7,10,11}. If an assault occurs during this period, ameloblasts can temporarily cease producing enamel until the assault is resolved, then enamel formation can recommence^{5,12}. Consequently, teeth erupt with deficient, defective enamel and exposed dentine^{5,7,10}. Furthermore, once enamel maturation is complete, it cannot repair itself nor replace deficiencies left during amelogenesis⁴⁻⁷.

Enamel defects are categorised by the quality and quantity of existing enamel¹⁰.

Enamel hypomineralisation has an inferior quality enamel due to insufficient mineralisation of the enamel matrix^{5,10-12}. It is characterised by soft, flaky enamel with pitting on the surface and having a stained appearance^{6,7,10,11}. It usually affects multiple teeth and enamel that is present is quickly worn away thus exposing dentine to external forces^{5-7,11,12}.

Enamel hypoplasia has defective and/or missing enamel caused by ameloblasts temporarily ceasing to produce enamel for a period of time^{5,11,12}. It is characterised by areas with missing or dysplastic enamel adjacent to areas with healthy enamel^{5,12}. Local enamel hypoplasia is usually attributed to trauma from external forces to the face or iatrogenic trauma caused by extraction of deciduous teeth and inflammation^{5-7,10-12}. Generalised enamel hypoplasia is associated with systematic illness such as fever, viral infection, poor nutrition and inflammation and is characterised by a band of missing enamel on multiple teeth^{5-7,10-12}.

Amelogenesis imperfecta (AI), also known as familial enamel hypoplasia refers to a genetically and clinically heterogeneous group of inherited disorders affecting the structure, composition, and quantity of tooth enamel. Non-syndromic AI occurs spontaneously in dogs with known recessive variants in ENAM and SLC24A4 genes¹³. We have seen AI in Italian Greyhounds and Standard Poodles, which is relatively mild and the affected teeth function in a near-normal fashion. However, a severe form of the disease we see in Akitas and Samoyed dogs which appear to have small teeth due to the lack of enamel and exposure of the dentine. They often have a small area of enamel on the cusp.

Without the protection of enamel, affected teeth are susceptible to bacteria entering the endodontic structures of the tooth and potentially causing pulp necrosis^{5,10}. In addition, exposed dentine is sensitive, especially when first erupted due to the dentine tubules being wider^{5,6,10,11}. Pitting confirmation associated with dysplastic enamel creates a surface for accelerated plaque and calculus to establish resulting in early periodontal disease^{6,7,11}.

Treatment is imperative as affected teeth are unprotected from external forces and painful due to the sensitivity of exposed dentin tubules^{6,7}. Treatment is based on consideration of multiple factors such as: the number of teeth affected and importance of these teeth, location and severity of enamel defects, owners' resources

and compliance to long term treatment and lastly, the ability to perform treatment or refer to a dental specialist⁵.

The goal is to remove diseased dentine and unsound enamel, protect exposed dentine and create a smooth surface to prevent calculus build up^{7,10,11}. Enamel defects often accompanies malformed roots which are subject to exfoliation and or periodontal disease therefore radiographs are essential^{6,7,10}. Minor or focal lesions can be treated with glass ionomer or composite restoration^{6,7,10,11}. Non-strategic teeth that are severely affected or teeth that have malformed roots may need to be extracted^{6,11}. To preserve strategic teeth metal crowns may be considered^{6,10}. Extensive enamel hypoplasia/mineralisation may be best treated by a dental specialist where more advanced treatments can be performed to preserve and protect affected teeth¹⁰.

Treatment is lifelong commitment as restoration placement creates a surface prone to developing plaque and calculus. Hypomineralised enamel is prone to wear and repeated bonding and further restorations may be required¹¹. Owners are required to perform regular oral homecare and prevent their pet from chewing on hard objects to protect fragile enamel and restorations placed^{10,11}. In addition, regular dental revisits, professional dental cleaning and treatment is expected^{10,11}.

Case Study

Yuri, a 7-month-old, 36.6kg, entire male Black-Russian Terrier was diagnosed with enamel hypoplasia by his family veterinarian and referred the patient for further diagnosis and treatment by a veterinary dental specialist.

Yuri was found to be in good health, well hydrated, heart rate 104 bpm, respiratory rate 30 bpm, body temperature 39°C. Pre-anaesthetic blood chemistry and haematology profile was performed, and results were within normal limits. A conscious oral examination revealed a class 1 malocclusion and enamel defects with dark discolouration on the labial aspect mid crown on both mandibular canine teeth (304, 404). The recommended treatment of restoration was discussed with the owner, and he was admitted for treatment.

A 22g intravenous catheter was placed aseptically in the right cephalic vein aseptically to administer intravenous fluids (Hartmanns) at 5ml/kg/hr. A pre-anaesthetic of Acepromazine/Atropine/Buprenorphine combination was administered subcutaneously. An induction of Diazepam/Ketamine was given intravenously via the catheter, a size 10.5 cuffed endotracheal tube was placed, inflated, tied, and connected to the anaesthetic machine. Anaesthesia was maintained with a combination of 2% isoflurane in 100% oxygen. Anaesthetic monitoring included visual assessment, reflex activity, oxygen saturation, end tidal CO₂, heart rate, respiratory rate, ECG and blood pressure.

Once Yuri was stabilised, a comprehensive oral examination was performed, involving assessment of each tooth, and recording the findings into a dental chart (www.vetdentalcharts.com). Yuri had healthy teeth with focal areas of calculus accumulation and attrition. Enamel hypoplasia affected both mandibular canines on the labial aspect. Lesions measured 7mm from mid crown to cusp and 4mm mesial to distal on tooth 404 (Figure 5) and 4mm from mid crown to cusp and 4mm mesial to distal on the tooth 304 (Figure 6).



Figure 5. Enamel hypoplasia on labial surface of tooth 404.



Figure 6. Enamel hypoplasia on labial surface of tooth 304.

Dental radiographs were taken of affected canines with the Acteon XMIND xray generator and a size 2 SOPIX digital DR sensor plate. Radiographs of tooth 304, 404 revealed no gross abnormalities other than the focal area of missing enamel mid crown (Figure 7,8). The periodontal ligament appeared to be intact, uniform with a closed apex and healthy bone support surrounding the apices (Figure 9).



Figure 7. Radiograph of 404 showing the extensive loss of enamel on the labial surface.

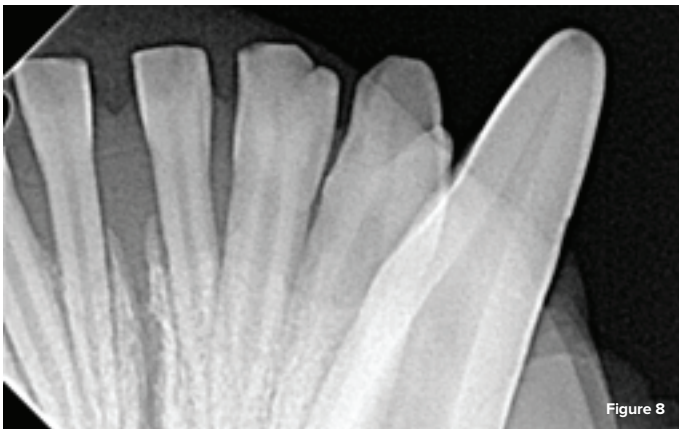


Figure 8. Radiograph of tooth 304 showing a small enamel defect on the labial surface.

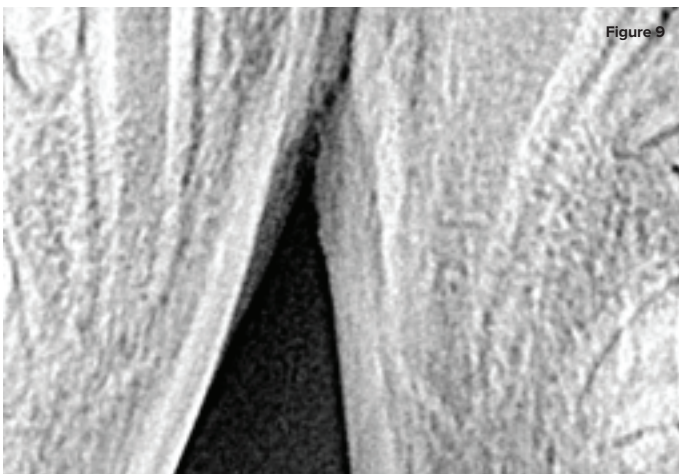


Figure 9. Radiograph of the root and apices of 304,404 showing healthy periodontal and periradicular tissues.

A local nerve block was placed by injecting Mepivacaine™3% (1.2mg) into right and left middle mental foramina. The whole mouth was scaled and polished to remove all plaque and calculus present. All soft discoloured enamel from the enamel lesions were removed using a size 2 round diamond bur in a high-speed handpiece. Any further unsupported enamel edge was removed using a universal curette (Figure 10,11).



Figure 10. Cavity preparation of 404 after removal of diseased and unsupported enamel.



Figure 11. Cavity preparation of 304 after removal of diseased and unsupported enamel.

Acid etch (37% phosphoric acid) was applied to the tooth surface with a preloaded syringe and tip and left on the tooth for 15 seconds. The etch was then removed with a microbrush, washed with water and then gentle air dried. The surface area after etching should appear chalky white but not desiccated. A thin layer of adhesive Opti-bond™ was applied to the prepared area with a microbrush, air dried gently to ensure a thin, even layer is present and to the evaporate alcohol before light curing for 10 secs with a LED curing gun. Using a plastic filling hand instrument, a flowable composite Herculite Ultra flow Kerr™ shade A1 was placed over the bond into the cavity preparation and light cured for 20 secs. The restoration was shaped to cover the cavity and form a functional tooth.

The restorative was smoothed using soft flex disks attached to a mandrill and low-speed handpiece. Soft flex disks were used in sequence from coarsest to finest while the dental assistant cooled the tooth with water to prevent overheating from friction. A final layer of adhesive Otibond™ was applied over the restorative, air dried and light cured. A photo was taken of completed restorations (Figure 12,13).



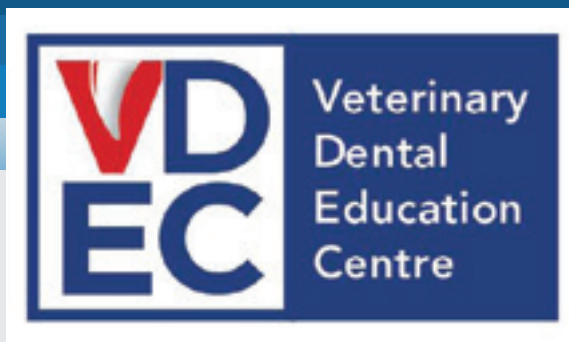
Figure 12. Completed composite restoration of 404.



Figure 13. Completed composite restoration of 304.

Yuri was recovered from anaesthesia, IV fluids were reduced to 2.5ml/kg/hr and monitored in a recovery cage until he was entubated on swallowing. One hour post- surgery, meloxicam 7.2mg was administered by subcutaneous injection. Half hour prior to discharge, IV catheter was removed, and a bandage placed over the site to assist with haemostasis.

At discharge the client was instructed to avoid Yuri from chewing on any hard objects that may fracture restorations. Medication was explained, oral meloxicam to give the 36kg mark once daily with food for 5 days. Maxiguard™ oral gel (chlorhexidine free zinc and Vitamin C formula) was advised to use daily by placing a pea sized drop on both upper canines for regular oral hygiene. Yuri returned 2 weeks later, oral examination revealed restorations were intact and smooth. The owner was given a tooth brushing demonstration and advised to continue daily oral hygiene with Maxiguard oral gel and tooth brushing to remove any plaque accumulation.



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RENT WITH PETS PROGRAM SET TO CHANGE THE STATUS PAW ON RENTAL LAWS

Australia is home to 29 million pets with two thirds of households experiencing the joys and health benefits of having a companion animal. Yet, less than 10% of rental properties are advertised as pet friendly, contributing to thousands of animals being surrendered every year.

As Australia faces a rental crisis (even before the pandemic), Companion Animal Network Australia's new Rent with Pets program is set to change the 'status paw' on rental laws to allow more renters to experience the joy of the human-animal bond and prevent beloved pets from becoming homeless.

“The Rent with Pets program aims to increase awareness around the surrender of pets to shelters due to difficulty finding pet friendly rental properties, and how we can all help to stop this,” said Trish Ennis, National Executive of Companion Animal Network - Australia (CANA).

“We want to work toward better rental laws in each state to support responsible pet owners and create a national law similar to what Victoria brought in this year.”

CANA is a registered charity representing the companion animal welfare work of member organisations across the country, including Animal Welfare League QLD, Animal Welfare League SA, Lort Smith (VIC), Sydney Dogs and Cats Home, Dogs' Homes of Tasmania and Saving Animals From Euthanasia Inc (WA).

The charity celebrates the human-animal bond and promotes responsible pet ownership through national campaigns, partnerships and initiatives, such as the Rent with Pets program.

Rent with Pets provides information, advice and resources to support tenants and landlords to be responsible pet owner tenants and welcoming landlords, and encourage pet friendly rental laws.

“The Rent with Pets program aims to change attitudes towards pets and renting and increase awareness about responsible pet ownership and landlord/ property managers' understanding of the opportunities the responsible pet owner can bring to a rental property,” said Ms Ennis. “We can help animal loving Australians create more pet friendly homes by connecting responsible pet owners with pet friendly landlords and property managers. After all, a house isn't a home without a pet.”



Photo Credit: Chewy



Photo Credit: Drew Coffman

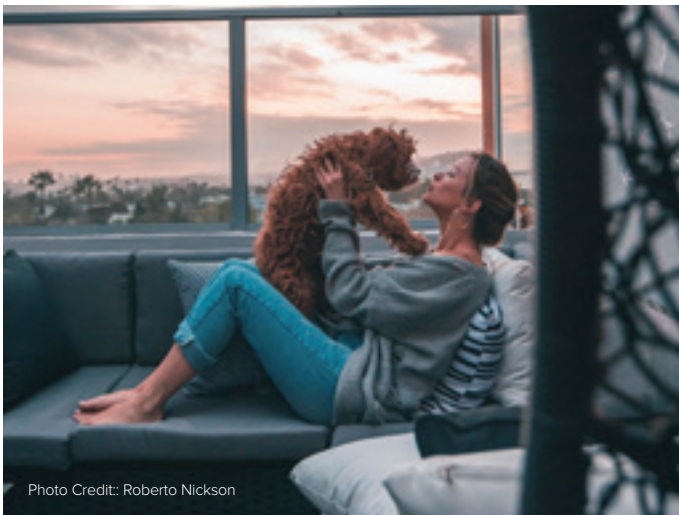


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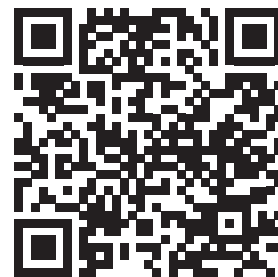
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PETCLOUD PARTNERS WITH WYNDHAM DESTINATIONS TO HELP PET PARENTS ENJOY STRESS-FREE TRAVEL

Australia's leading pet services platform PetCloud has teamed up with resort company and hospitality giant, Wyndham Destinations Asia Pacific to make it easier for pet parents to 'holiday here this year'.

With more Australians owning a pet and more Australians holidaying at home, PetCloud has partnered with Wyndham Destinations to ensure pets can enjoy a holiday as much as their owners while also educating pandemic pet parents about the services available to them when they want to get away.

For pets who are joining the trip, PetCloud's nationwide network of pet sitters, dog walkers and pet taxis are available to assist when pet owners need some help looking after their fur baby on holiday, while a National Pet Directory uses GPS to locate pet-friendly beaches, parks, pubs and cafes nearby.

For pets who are staying at home, PetCloud offers everything from house visits and house sitting to pet sitting, doggy day care and dog walking. Services vary depending on the animal's needs and how long their owners will be away.

The pandemic saw more Australians than ever welcoming a pet into their home and PetCloud CEO Deb Morrison said she wanted pet parents to know that there were services available that allow them to have their pet and holiday too.

"Australia already has one of the highest rates of pet ownership in the world with animals in around two-thirds of households and when the pandemic hit, we saw a surge in pet adoptions, sales and fostering. It's wonderful to see so many animals in loving homes and that's where we want them to stay so we'd love to see all pet parents take advantage of services such as pet sitting, dog walking and house visits to ensure their pet is safe and well whether they stay or go on vacay," Ms Morrison said.

Lorna Groves, Director Customer Experience & Lifestyle, Wyndham Destinations Asia Pacific said the timely collaboration between Wyndham Destinations and PetCloud would help travelling pet owners save money while also reducing any travel anxiety.

"Pet resorts and kennels can be more expensive than a hotel room. At selected Club Wyndham vacation club resorts, we offer pet-friendly accommodation across the country from Hobart to Dunsborough, the Gold Coast and the Victorian Alps, which welcome families and their pets," Ms Groves said.

"With vaccinations underway and borders reopening, Australians are eager to plan their next getaway and thanks to PetCloud's range of accessible and affordable pet services, pet owners can more easily care for their pets at home or on the great Australian road trip."

PetCloud's network of more than 30,000 sitters, drivers and walkers is the largest and most trusted in Australia. All PetCloud sitters have had police checks, are trained in animal handling, insured, and have the backing of RSPCA Queensland, which is a proud partner of PetCloud.

"Australians are as obsessed with travel as they are with their animals, so partnering with Wyndham Destinations, especially while we're all holidaying at home this year, makes perfect sense. Our mission is to make responsible pet care easy and this collaboration is all about making it easier for pet owners to travel with or without their pet," Ms Morrison said.

"Club Wyndham's pet-friendly resorts allow travelling pet parents to easily accommodate their pets and when they want to head off on a sightseeing activity that isn't pet friendly, PetCloud can step in and offer peace of mind with easy, trusted, local pet care."

To celebrate the partnership, PetCloud is offering a \$30 credit* to Lifestyle by Wyndham members to use on their first pet service.

*The promotional offer of \$30 credit is available only to new PetCloud customers and Lifestyle by Wyndham members having a qualified stay at any participating Club Wyndham vacation club resorts. Travellers must book and complete their stay by December 31, 2021. Pet policies vary by hotel and may include certain restrictions on the type, size, and number of pets allowed. Additional hotel fees may apply. Learn more at <https://www.lifestylebywyndham.com/petcloud-pet-care-services-30-off>

Download the PetCloud App from the App Store or Google Play or visit www.petcloud.com



NEW CANCER TREATMENT FOR AUSTRALIAN DOGS WITH APVMA APPROVAL OF QBIOTICS' STELFONTA®

QBiotics Group Limited (QBiotics), an Australian life sciences company developing novel small molecule anticancer and wound healing pharmaceuticals, is pleased to announce the Australian Pesticides and Veterinary Medicines Authority (APVMA) has approved* its lead veterinary product STELFONTA® (tigilanol tiglate). This approval represents Australia's first pharmaceutical treatment available for all grades of canine non-metastatic MCT.

STELFONTA® is indicated for the treatment of non-metastatic (WHO staging), cutaneous MCT (located anywhere on the body, legs or head in dogs), and non-metastatic subcutaneous MCT located at or distal to the elbow or hock in dogs. Tumours may be of any cytological grade, must be less than or equal to 10 cm³ in volume, and must be accessible to intratumoral injection.

QBiotics' CEO and Managing Director, Dr Victoria Gordon said "APVMA approval of STELFONTA® marks an important milestone for QBiotics. As an Australian company with a strong heritage in discovery, research and development, we are proud that our lead molecule will now be available to treat cancer in Australian dogs."

Approval for STELFONTA® is based on a QBiotics sponsored, pivotal, US multi centre, randomised, blinded and untreated controlled study in 123 canine patients with MCT. In this study, a single injection of STELFONTA® induced a 75% Complete Response (where the tumour is completely destroyed), compared to untreated control dogs ($p=0.001$). An 88% Complete Response was achieved with two injections. There was no tumour recurrence in 89% of evaluable cases 12 months post-treatment.

Australian regulatory approval follows the marketing authorisation of STELFONTA® by the US Food and Drug Administration

(FDA-CVM), European Medicines Agency (EMA), the Veterinary Medicines Directorate (VMD) in the United Kingdom and Swissmedic, with subsequent sales in all major markets.

STELFONTA® will be available to all Australian veterinarians, including oncologists and general practitioners, in October this year through QBiotics' marketing and distribution partner, the global animal health company, Virbac.

Dr Gordon said "QBiotics is also currently investigating tigilanol tiglate, the active pharmaceutical ingredient in STELFONTA®, in a series of human Phase I and Phase II clinical trials targeting head and neck squamous cell carcinoma, and melanoma as both a monotherapy and in combination with pembrolizumab, an immune checkpoint inhibitor. Plans for a human clinical trial in soft tissue sarcoma are also underway.

QBiotics develops products simultaneously for the human and veterinary markets. Results from tigilanol tiglate canine studies not only underpinned the registration of a new veterinary anticancer product, they also inform our human clinical program. In addition, revenue from sales of STELFONTA® financially supports our human product development," said Dr Gordon.



DETECTING WILDLIFE ILLNESS AND DEATH WITH NEW EARLY ALERT SYSTEM

From domoic acid poisoning in seabirds to canine distemper in raccoons, wildlife face a variety of threats and illnesses. Some of those same diseases make their way to humans and domestic animals in our increasingly shared environment.

A new early detection surveillance system for wildlife helps identify unusual patterns of illness and death in near real-time by tapping into data from wildlife rehabilitation organisations across California. This system has the potential to expand nationally and globally. It was created by scientists at the University of California Davis' School of Veterinary Medicine with partners at the California Department of Fish and Wildlife and the nonprofit Wild Neighbours Database Project.

The Wildlife Morbidity and Mortality Event Alert System is described in a study published today in the journal *Proceedings of the Royal Society B*.

"Human-induced disturbances are contributing to a wide range of threats -- habitat loss, invasive species introductions, pollution, disease, wildfires," said co-lead author Terra Kelly, a wildlife epidemiologist at the UC Davis One Health Institute and its Karen C. Drayer Wildlife Health Centre within the School of Veterinary Medicine. "It speaks to the need for a system like this where we can better understand the threats facing wildlife populations and respond to them in a timely way so there's less harm to wildlife."

FRONT-LINE RESPONDERS FOR WILDLIFE

Wildlife rehabilitation workers are the front-line responders of the free-ranging animal world. They are the first to receive and tend to sick and injured wild animals. Their clinical reports carry a wealth of information that, when shared, can indicate broader patterns.

Until recently, such clinical reports were stored primarily on paper or isolated computer files. In 2012, Wild Neighbours Database Project co-founders Devin Dombrowski and Rachel Avilla created the Wildlife Rehabilitation Medical Database, or WRMD, a free online tool now used by more than 950 rehabilitation organisations across 48 states and 19 countries to monitor patient care.

Dombrowski and Avilla brought the tool to CDFW, which connected with long-standing partners at UC Davis to pilot an alert system using the database as its foundation.

"I'm thrilled that WRMD is not only useful for thousands of wildlife rehabilitators but that the data collected by them is used for morbidity and mortality monitoring," co-author Dombrowski said. "To witness the WMME Alert System identifying data anomalies and alerting investigators is incredible."

The CDFW is using the system to help identify and prioritise wildlife needs and conservation efforts.

"The near real-time information this system provides has allowed us to quickly follow up with diagnostic testing to identify the problem," said Krysta Rogers, senior environmental scientist at the CDFW's

Wildlife Health Laboratory. "This system also has been instrumental in determining the geographic range and severity of the threat."

HOW IT WORKS

To test the system, the scientists analysed 220,000 case records collected between early 2013 to late 2018 to establish thresholds for triggering alerts. The dataset included records from 453 different species, from the common to the rare.

The authors emphasise the alert system is pre-diagnostic. It alerts agencies to unusual patterns that may warrant further investigation to determine specific health threats.

The system detected several key events, including large admissions of:

- Marine birds along the central and southern California coast in late spring 2016. Post-mortem examinations confirmed they were starving.
- Marine birds in April 2017. Domoic acid toxicity was later confirmed as the cause of death.
- Invasive Eurasian collared doves in 2016 with encephalitis and kidney disease. Investigations revealed pigeon paramyxovirus-1 as the cause of the event. This was the first detection of the virus emerging in Eurasian collared doves in this region of California.
- Rock pigeons in the San Francisco Bay Area in 2017 with an emerging parasite.
- Finches in 2016 and 2017 with seasonal conjunctivitis due to infection with *Mycoplasma* bacteria.

HUMAN CONNECTIONS

Kelly notes that being able to monitor and rapidly detect such events is important for all species, humans included. For example, domoic acid intoxication is caused by harmful algal blooms, which are increasing in coastal and freshwater systems and threaten both wildlife and human health. Another example is West Nile virus, where bird deaths can serve as a sensitive indicator for risk to domestic animals and people.

The alert system is a complementary, inexpensive and efficient tool to add to state wildlife agencies' toolbox of surveillance efforts. It combines machine-learning algorithms, natural language processing, and statistical methods used for classifying cases and establishing thresholds for alerts with the ecology and distribution of wildlife within California, said co-leading author Pranav Pandit, a researcher in the UC Davis One Health Institute and its EpiCenter for Disease Dynamics.

"The wildlife rehabilitation organisations' data is making such valuable contributions," Pandit said. "That's all coming together in this highly adaptable surveillance system."

Journal Reference:

Additional partners and co-authors on the study include Christine Kreuder Johnson and Michael Ziccardi of UC Davis; Nicole Carion, Stella McMillin, and Deana L. Clifford of the CDFW Wildlife Health Laboratory; Anthony Riberi of web development company Y3TI; and Erica Donnelly-Greenan of Moss Landing Marine Laboratories and the BeachCOMBERS Program.

PERSONALISED MEDICINE FOR CATS WITH HEART DISEASE

Veterinarians at the University of California, Davis, have found that a cat's DNA alters how it responds to a life-saving medication used to treat hypertrophic cardiomyopathy, or HCM, a heart disease that affects 1 in 7 cats. The study was published in the Nature Portfolio journal, Scientific Reports.

HCM causes a cat's heart muscle to thicken. As the condition worsens, cats can form blood clots in their hearts that may later dislodge and cause extreme pain, distress and even sudden death. Clopidogrel, or Plavix®, is one of the most commonly prescribed medications used to prevent blood clots in cats with HCM.

"We were consistently seeing cats that despite being on clopidogrel, were still forming blood clots," said corresponding author Josh Stern, professor of veterinary cardiology and geneticist with the UC Davis School of Veterinary Medicine.

This led Stern and the research team to begin research in this area and identify mutations in the drug pathway that looked important. Data showed that nearly 20% of cats had resistance to the clopidogrel therapy, which is widely used by practitioners all over the world.

"This study was about figuring out why some cats weren't responding as expected to clopidogrel therapy and leading us towards a more effective prescription," Stern said.

SIMPLE GENETIC TEST

Researchers began a clinical trial on cats with HCM. They first

tested the cats' ability to form blood clots. The cats' owners administered clopidogrel for 14 days, and the cats were tested again. Researchers were then able to test whether genetic mutations that they had identified within the drug pathway were responsible for reducing the drug's effectiveness.

"The end result is the ability to use a simple genetic test to make an educated decision about which drug therapy may be best for preventing blood clots in cats with HCM," Stern said.

While testing like this is not yet commercially available, researchers hope that eventually veterinarians will be able to rapidly test cats with HCM for these mutations as they are making prescribing decisions.

"We are very excited to be approaching this era where personalised or precision medicine in animals can catch up to precision medicine in humans," said co-author Ronald Li, an assistant professor of veterinary emergency and critical care and coagulation researcher, whose lab conducted much of the functional testing of the anticoagulant therapies. "Just as we can't expect every human to respond to medication in the same way, we can't expect all cats to respond the same way either."

Researchers are hoping that in the future, personalised medicine for cats would allow veterinarians to test kittens for a whole host of genetic variants that would help inform medical decisions and treatments as they grow and require veterinary care.

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AUSSIE PET OWNERS URGED TO TAKE A BITE OUT OF PET DENTAL DISEASE

Oral health is not only essential to overall health and wellbeing for humans, but also for our animal friends as figures show four out of five dogs and cats over the age of 3 have some form of dental disease.

In fact, research also points to bad teeth as the biggest problem for pet Greyhounds, with 39 per cent of the breed suffering from dental issues, far higher percentage than for any other dog breed.

During Pet Dental Month in August, Australia's leading innovator in animal health and welfare Vetafarm, highlights the need for proper dental care to reduce the number of Aussie pets that are unknowingly suffering.

"Many pets suffer in silence with periodontal disease. Dogs are great at hiding pain and generally have a strong appetite drive. They can eat whilst avoiding a painful place in their mouth and give the impression they are healthy," said Veterinarian Dr Tony Gestier, Director at Vetafarm.

"It's common for periodontal disease to be picked up at later stages when pain and symptoms become apparent to the owner. Unfortunately, at this point veterinary treatment and even surgery may have become necessary and it's clear the dog has been in considerable discomfort for quite some time".

Vetafarm's Lovebites range of functional chews and meal toppers now includes DentaShield chews to help improve general oral health. DentaShield contains Norwegian brown kelp to assist in the reduction of plaque and gingivitis and SHMP, which aids in tartar control and reduces dental calculus.

"We understand the difficulties of brushing a dog's teeth, but we also understand the risks of poor dental care, so our mission is to provide a tool to combat the plaque and tartar that leads to Periodontal Disease that is simple and even enjoyable to use, for both dogs and their owners," said Dr Tony.

Rescue Greyhounds receiving the DentaShield treatment

Vetafarm 'pawtnered' with Greyhound Rescue earlier this year, providing the charity's 'Kennel Kids' with DentaShield chews and contributing to the health of their beautiful hounds.

Veterinarian Dr Matt Buchanan-Pascall from Sydney's Macquarie Veterinary Hospital has been treating Greyhound Rescue hounds for many years.

"We see about 10 to 20 Greyhounds per month and 90% of them have some degree of dental disease, from minor plaque and staining to severe disease needing several extractions," said Dr Matt. "I find adopters of Greyhounds to be the most engaged in the health and wellbeing of their dog, yet some don't realise their dog has dental disease. When their Greyhound receives treatment, they say they have a new dog on their hands, happy and bursting with energy."

When Sydneysiders Issa Paulino and partner Trevor Mizzi adopted Mako over a year ago, they were concerned to learn so many Greyhounds had dental problems due to neglect during their racing career.

"Mako had some teeth extracted just after she came to Greyhound Rescue, and we know that this happens to most Greyhounds that are rescued. We think that prevention is key and in the long run it can save us thousands of dollars on vet fees and, of course, is important for her overall wellbeing," said Issa.

As part of Mako's oral hygiene routine, her teeth are brushed once a week and fed DentaShield a few times a week. For her breakfast and dinner, she gets oral care dry food along with her meal to ensure she cleans her teeth, said Issa.

Signs of dental disease in pets

Signs of dental disease in dogs and cats include:

- bad breath
- reduced appetite
- behavioural changes around eating and drinking
- broken or loose teeth
- lumps or bleeding in the mouth
- discolouration or build-up of plaque
- tartar on teeth
- redness of inflammation of the gum
- drooling
- chattering of the teeth
- pawing at the mouth

Tips to maintain good oral health

As Periodontal Disease can go undetected for long periods of time, prevention is preferred to cure.

- Brush your pet's teeth with a toothbrush and toothpaste formulated for pets.
- Provide your pet safe bones that assist in mechanical plaque removal.
- Feed dental treats and chews, like Lovebites DentaShield.
- Visit your vet at least once a year for a dental check-up to catch any early signs of disease and ask for advice about a dental care routine for your pet.



CATS MAY CATCH COVID-19 FROM SLEEPING ON THEIR OWNER'S BED

New research being presented at the European Congress of Clinical Microbiology & Infectious Diseases (ECCMID), held online this year, suggests that people with COVID-19 frequently pass it on to their pets. Cats that sleep on their owner's bed seem to be at particular risk of infection.

Previous studies have shown that cats and dogs can catch COVID-19 from their owners but it wasn't clear how susceptible they were and what, if anything, increased their odds of becoming infected. Answering these questions is important from both a public health and animal health point of view.

To find out more, Dorothee Bienzle, a professor of veterinary pathology at the University of Guelph, Ontario, Canada, and colleagues studied cats and dogs of people who had had COVID-19.

The animals, 48 cats and 54 dogs from 77 households, were tested for antibodies to COVID-19 - a sign of past infection. Their owners were surveyed about how they interacted with their pets, including whether they petted them and kissed them and allowed them to sit on their lap or sleep in their bed. They were also asked if they allowed their pet to kiss them or lick them on the face and how long they spent with their pet each day.

Other questions included whether their pet had become ill around the time they had COVID-19 and what sort of symptoms the animal had.

75 dogs and cats living in an animal shelter and 75 stray cats that had been seen at a low-cost veterinary clinic were also tested for antibodies.

67% (32/48) of the owned cats and 43% (23/54) of the owned dogs tested positive for antibodies, showing they had had COVID-19. This compares to just 9% (7/75) of dogs and cats from the animal shelter and 3% (2/75) of the stray cats.

20% (11/54) of the dogs had symptoms, mainly lack of energy and loss of appetite. Some animals had a cough or diarrhoea, however all symptoms were mild and quickly cleared up.

27% (13/48) of the cats had symptoms, with a runny nose and difficulty breathing the most common signs of COVID-19. Although most cases were mild, three were severe.

The amount of time an owner spent with their dog and the type of contact they had with them did not affect the animal's chance of getting infected.

Cats that spent more time with their owners, however, seemed to be at higher risk of infection. And cats that slept on their owner's bed were more likely to have COVID-19.

The study's authors say that cats' biology, including their viral receptors, the "locks" the virus unpicks to enter cells, make them more susceptible to COVID-19 than dogs. Cats are also more likely to sleep near their owner's face than dogs, increasing their exposure to any infection.

They add that the higher rate of infection in animals with owners than in those from the shelter and the strays, coupled with results of previous genetic studies, means that the most likely route of transmission is from human to pet, rather than the other way round.

Professor Bienzle concludes: "If someone has COVID-19 there is a surprisingly high chance they will pass it on to their pet. Cats, especially those that sleep on their owner's bed, seem to be particularly vulnerable. So, if you have COVID-19, I'd advise that you keep your distance from your pet - and keep it out of your bedroom.

"I'd also recommend that you keep your pet away from other people and pets. While the evidence that pets can pass the virus on to other pets is limited, it can't be excluded. Similarly, although pets have not been shown to pass the virus back to people, the possibility can't be completely ruled out."



Journal Reference:

European Congress of Clinical Microbiology & Infectious Diseases (ECCMID 2021)

PLASTIC CREATES 'EVOLUTIONARY TRAP' FOR YOUNG SEA TURTLES

Plastic pollution creates an "evolutionary trap" for young sea turtles, new research shows.

The study, led by the University of Exeter, found plastic inside small juvenile turtles along both the east (Pacific) and west (Indian Ocean) coasts of Australia.

After hatching on beaches, sea turtles travel on currents and spend their early years in the open ocean.

But these currents now accumulate vast quantities of plastic and -- feeding near the surface -- many young turtles swallow it.

The research team included Murdoch University, the Department of Environment and Science (Queensland) and the Department of Biodiversity Conservation and Attractions (Western Australia).

"Juvenile turtles have evolved to develop in the open ocean, where predators are relatively scarce," said Dr Emily Duncan, of the Centre for Ecology and Conservation on Exeter's Penryn Campus in Cornwall.

"However, our results suggest that this evolved behaviour now leads them into a 'trap' -- bringing them into highly polluted areas such as the Great Pacific Garbage Patch.

"Juvenile sea turtles generally have no specialised diet -- they eat anything, and our study suggests this includes plastic.

"We don't yet know what impact ingesting plastic has on juvenile turtles, but any losses at these early stages of life could have a significant impact on population levels."

Researchers examined juvenile sea turtles (from hatchlings to a shell measurement of up to 50cm) that either washed up or were accidentally caught by fishers on the Australian coasts.

In total, the study included 121 sea turtles from five of the world's seven species: green, loggerhead, hawksbill, olive ridley and flatback.

The proportion of turtles containing plastic was far higher on the Pacific coast: 86% of loggerheads, 83% of greens, 80% of flatbacks and 29% of olive ridleys.

On the Indian Ocean coast, 28% of flatbacks, 21% of loggerheads and 9% of green turtles contained plastic.

No plastic was found in hawksbill turtles on either coast, but only seven hawksbills were found so this sample size was small.

Plastic in the Pacific turtles was mostly hard fragments, which could come from a vast range of products used by humans, while Indian Ocean plastics were mostly fibres -- possibly from fishing ropes or nets.

The polymers most commonly ingested by turtles in both oceans were polyethylene and polypropylene.

"These polymers are so widely used in plastic products that it's impossible to pin down the likely sources of the fragments we found," Dr Duncan said.

"Hatchlings generally contained fragments up to about 5mm to 10mm in length, and particle sizes went up along with the size of the turtles.

"The next stage of our research is to find out if and how plastic ingestion affects the health and survival of these turtles.

"This will require close collaboration with researchers and veterinarians around the world."

The study was funded by the Sea Life Trust and the National Geographic Society.

The paper, published in the journal *Frontiers in Marine Science*, is entitled: "Plastic pollution and small juvenile marine turtles: a potential evolutionary trap."



Journal Reference:

Emily M. Duncan, Annette C. Broderick, Kay Critchell, Tamara S. Galloway, Mark Hamann, Colin J. Limpus, Penelope K. Lindeque, David Santillo, Anton D. Tucker, Scott Whiting, Erina J. Young, Brendan J. Godley. Plastic Pollution and Small Juvenile Marine Turtles: A Potential Evolutionary Trap. *Frontiers in Marine Science*, 2021; 8 DOI: 10.3389/fmars.2021.699521

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NO HORSING AROUND: SUPER-FAST HENDRA TEST DEVELOPED

University of Queensland vets are diagnosing the deadly Hendra virus in horses faster than ever, developing a diagnostic point-of-care kit that can detect the pathogen in under an hour, rather than days.

Veterinarian Professor Ben Ahern said a rapid point-of-care diagnostic test to detect Hendra infections in horses has been sorely needed for decades.



(L-R) UQ's Prof. Ben Ahern with a LAMP Genie III diagnostic machine, veterinary nurse Gabriella Doxey with horse Cartouche and veterinary researcher Lyndal Hulse holding the Hendra diagnostic sampling kit.

"Hendra virus kills humans and horses alike – the virus spreads to horses from flying foxes, with an infected horse occasionally passing the infection on to humans," Professor Ahern said.

"Without vaccination, the virus has a case fatality rate of 57 per cent among humans and 79 per cent among horses – it's incredibly deadly.

"Rather than sending samples off to a lab, which risks an outbreak in the meantime, our testing protocol takes routine samples from a possibly infected horse and inactivates any virus that may be present in those samples.

"Following a heat treatment step of samples to inactivate the virus, these non-infectious samples are then tested using a handy molecular diagnostics machine – known as a LAMP Genie III – which is about the size of a box of tissues and is battery powered and completely portable.

"This process gives us results in under one hour, which is incredibly fast when compared to the many days it may take from collection of samples, getting them tested at an external lab and obtaining results.

"Horses aren't suffering in the interim and humans giving care to them can avoid becoming exposed."

Development of the point-of-care Hendra virus LAMP test has now advanced to the manufacturing stage and commercial kits are currently being produced.

Pending final approval from the Queensland Chief Veterinary Officer, the Genie machine and associated Hendra virus LAMP kits

will be available for veterinarians to purchase and use.

"Due to the cost and technical training required, these tests will likely be performed by veterinarians or large equestrian bodies with veterinarian assistance," Professor Ahern said.

"However, with the mobile capacity of this testing system, they can go directly to a farm to diagnose a suspected case, expanding treatment options for horses."

Annelies McGaw, AgriFutures Australia Manager, Research – a key partner involved in funding the development of the kits – said the project was a big win for horse and human health.

"AgriFutures Thoroughbred Horses Program invests in research and development that improves the profitability and sustainability of the Australian thoroughbred industry, meaning the health of our farmers, stablehands, farriers and horses is critical," Ms McGaw said.

"This research has resulted in timely and tangible solutions for the thousands of people working in horse-related industries across the country, and we're thrilled to see these tests becoming a reality.

"We're extremely proud of the research and development we get to work on, not just within the thoroughbred horse industry, but across the Australian agricultural landscape."



A ready-to-go Hendra virus test kit, along with a LAMP Genie III diagnostic machine, which together can diagnose Hendra virus in horses in under an hour.

Equestrian NSW CEO Bruce Farrar said that, as a significant funder of the project, they were delighted with the progress made by Professor Ahern and his team.

"We look forward to the roll out of the testing kits, to provide a safer and faster diagnosis of suspected Hendra viruses cases."

This University of Queensland project has been supported by AgriFutures Thoroughbred Horses Program, Equestrian NSW, the Department of Agriculture and Fisheries Queensland's Biosecurity Sciences Laboratory, GeneWorks, Equine Veterinarians Australia, the Australian Veterinary Association, and five private veterinary practises in Queensland and New South Wales.

PRE-PAY FAREWELLS FOR FURRY FAMILY MEMBERS GATHERING PACE

A rising number of Australian pet owners are planning ahead by pre-paying for their beloved fur baby's farewell costs, so they can reduce their emotional and financial stress when the time comes to say goodbye.

National home vet visit booking service, Pawssum Mobile Vets, has begun offering services on the back of a booming demand.

Australia has one of the highest rates of pet ownership in the world, with 6 out of 10 households nationally owning a pet.

Pawssum Vets Operational Manager Kiri Brandlisa said that pet owners were increasingly seeking out pre-paid end-of-life service plans for their furry family member.

"Saying farewell to a pet, who may have been with your family for a very long time, is incredibly emotional and, with greater financial stress hitting many people on the back of the pandemic, we were getting more and more requests to add a pre-pay option to the home-based euthanasia care we offer," she said.

"People just don't want to be in a position where they won't be able to afford to help their fur baby peacefully cross the rainbow bridge. By planning ahead and pre-paying, they will have peace of mind that they are able to give their pet the farewell they deserve, when the sad time arrives."

Pawssum's pre-paid end-of-life service includes compassionate at-home euthanasia by an experienced veterinarian and supportive aftercare services, including the return of a pet's ashes to the

owner's home.

"The level of grief experienced after the loss of a pet is becoming better understood and many people are now seeking out counselling, as losing a fur baby can be significant and traumatic for some time," said Ms Brandli.

"Given how traumatic it can be, taking the right steps now to reduce the amount of stress you experience as your pet gets closer to passing away, can be very helpful.

"And being able to say goodbye at home in a peaceful, calm, private and familiar space is now very much the norm."

Pawssum offers its end-of-life services in all major Australian cities.

Pawssum Mobile Vets are available 7 days a week until late and pet goodbyes can be planned for weekends and evenings to suit all family members who may wish to be with their beloved pet.

Telehealth vet video conferencing with a Pawssum veterinarian who specialises in end-of-life care can also offer guidance to help owners figure out if their pet can still be treated to stay comfortable or if they are too unwell for quality-of-life care to continue.

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REDUCE STIGMA AROUND MENTAL HEALTH IN THE VETERINARY INDUSTRY



An increase in workload and workflow is contributing to burnout, ill health and loss of wellbeing for Australian veterinarians and their nursing staff, according to Dr Natasha Wilks, a veterinarian and Beyond Blue volunteer.

Dr Wilks has experienced first-hand the challenges COVID-19 has had on businesses and their teams over the past 14 months and says, “the need for mental health support has never been more important.” Worryingly, research shows that on average, an Australian takes their own life every twelve weeks, four times the rate of the general population.

“There are so many things which weigh on our minds; the long hours, financial struggles, and the difficult situations veterinarians are placed in such as delivering bad news to pet owners, emotional responses from clients unable to afford bills and even violence at the hands of customers,” continues Dr Wilks, who is also a veterinary career coach helping veterinary staff cope with the challenges of the profession and improve their wellbeing.

While other industries might have experienced a decrease in work, vet practices were busier than ever during the pandemic, and continue to be. An increased number of people working from home, pandemic puppy purchases and pet owners spending more time at home with their animals have led to increased clinic visitation.

“While hugely rewarding, the veterinary profession also entails numerous challenges to mental health that necessitate the need for proactive management. Currently, the increase in workload is exceeding capacity all day, every day. Vets are exhausted and overwhelmed. It is like running an ultra-marathon. There is currently a huge demand for vets and nursing staff, and with everyone in the practice being so busy, there can be breakdowns in team dynamics,” says Dr Wilks.

Dr Wilks is supporting the partnership between leading Animal Health company Zoetis and Beyond Blue, which is in its sixth year, with an on-demand webinar, Wellbeing for Vet Practices, with

practical strategies for maintaining mental wellbeing in practice for vets and clinic staff.

Zoetis, who works closely with vet practices around Australia, supports the mental health challenges faced by the veterinarian industry through its crucial mental health partnership with Beyond Blue. Over the past five years, Zoetis has helped raise \$500,000 by donating \$5 from products sold during the campaign period. In 2021, Zoetis aims to once again reach its \$100,000 fundraising target by the end of the year.

“Zoetis is proud to once again be supporting Beyond Blue and the important work they do,” says Lance Williams, Zoetis Senior Vice President and Cluster Lead, Australia and New Zealand. “We knew that supporting vet mental health was critical when we first embarked on this support campaign, but we didn’t know then just how important the partnership would be. Together we have made strong progress in supporting the mental health and wellbeing of veterinarians, practice staff and nurses, and we are passionate about helping again this year.”

“All funds raised by Zoetis go towards the Beyond Blue Support Service. To date, Zoetis’ donations across veterinary and rural farming initiatives have allowed over 8,000 people, including vets, to get the help they need through the Beyond Blue Support Service and we are hoping to help more people this year,” he adds.

Beyond Blue CEO Georgie Harman said the Beyond Blue Support Service continued to experience increased demand since the beginning of the COVID-19 pandemic.

“This year has brought its challenges and people have got in touch with us for many reasons. They might be feeling worried, lonely, concerned about their mental health or the mental health of friends and loved ones, finances or job security,” Ms Harman said.



“Whatever the reason, Beyond Blue wants people to know that no problem is too big or small to reach out. Sometimes, just talking to someone can make a difference, and support is always available.

“We are very grateful to have the ongoing support of Zoetis and look forward to working together so our Australian vets can access support. They help so many of us and our animals, now let’s help them,” said Ms Harman.

The Beyond Blue Support Service offers free and immediate counselling, advice and referrals via phone, webchat or email. In addition to the Support Service, Beyond Blue’s online resources can help people take steps towards recovery and feel less alone. Beyond Blue’s online forums tap into a peer network that gives people connection and support from others who have been through similar experiences. The forums are safe and welcoming, monitored by a specially trained team.

Beyond Blue’s NewAccess for Small Business Owners is a free and confidential mental health coaching program. Delivered over six telehealth sessions, coaches who themselves have a small business background, help small business owners experiencing stress and worry. Coaches operate with oversight from clinicians and are trained to refer participants to specialist services if required. For more information visit www.beyondblue.org.au/newaccess-SBO

For more information about depression and anxiety, visit www.beyondblue.org.au. To talk to a mental health professional for free, contact the 24/7 Beyond Blue Support Service on 1300 22 46 36.

Free web chat is also available from 3pm until midnight at beyondblue.org.au/getsupport and you can join the forums for free and download the safety planning BeyondNow app from the website.

For more information on how you can help Zoetis to raise vital funds to encourage mental health through its partnership with Beyond Blue please visit zoetis.com.au



Dr Natasha Wilks, a veterinarian and Beyond Blue volunteer.

AUSTRALIA'S PANDEMIC PET BOOM – MORE DOGS AND CATS, CLOSER BONDS THAN EVER BEFORE

Australia's most authoritative pets survey has revealed a record boom in pet ownership during the COVID-19 pandemic, with massive numbers of Australians either acquiring or thinking about acquiring a brand-new pet since March 2020.

Animal Medicines Australia's new Pets and the Pandemic study found that pet numbers have exploded across the country. Nationally, 69% of households now have a pet, significantly higher than 61% only two years ago. This means there is an estimated 30.4 million pets across the country, up from an estimate of 28.5 million in 2019.

This has been led by a surge in dog ownership, with a whopping 47% of all households now having at least one dog (up from 40% in 2019). Of Australia's estimated 4.6 million pet dogs, an astounding one in five have been acquired since the pandemic began.

Meanwhile, cats are now found in 30% of Australian households (compared to 27% in 2019) – with a quarter of all pet cats obtained during the pandemic. Beyond this, there have also been increases to the share of households with pet fish (13%, up from 11%) and birds (14%, up from 9%).

Pet ownership is a way of life for most Australians, and almost three in four survey participants (73%) would like to add a new or additional pet to their family – with current pet owners far more open to the idea compared to non-owners (84% vs. 47%), having already overcome concerns such as on-going responsibility and unsuitable living arrangements.

However, while non-owners are far more likely to point to unsuitable living arrangements (34% vs. only 13% of owners), this was less pronounced than in 2019 (52%) – likely due to the greater ability of many office workers to work from home.

Many new pet parents spoke of how the pandemic had allowed them to finally get and 'on-board' the pet they have always wanted, and 53% of new dog and cat owners were experienced owners – contrary perhaps to media portrayals of impulse purchases by irresponsible 'pandemic pet parents'.

When asked to reflect on the pandemic, 70% of owners said their pets have had a positive experience on their lives – with key pluses including the companionship provided, mental health benefits, and having a constant source of affection.

When it comes to pet health, veterinarians remain the top source of information for pet owners, with the majority (71%) of pet owners visiting a vet at least once since the pandemic began. Some pet owners experienced difficulties in accessing veterinary care, predominantly related to social distancing restrictions, increased wait times, not being able to stay with their pet or lockdown or curfew restrictions.

Overall, pet owners were near-unanimous in their advocacy for others to experience the joys of pet ownership. Our research found strengthened relationships between people and their pets through the pandemic – with one in two pet owners spending more quality time with their pets than ever before.



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SCIENTISTS SEEK POMERANIAN DOGS FOR NEW GENE STUDY



Veterinarians and scientists from the School of Animal and Veterinary Sciences are investigating methaemoglobinemia (MHb), a disorder that causes the blood to carry less oxygen around the body than normal. It causes a blue tongue and reduced exercise ability in Pomeranians, but may pose more serious complications for a dog under anaesthesia.

A free and simple mouth swab from a Pomeranian or PomX will provide enough DNA for researchers to perform a DNA test to check for the genetic variant.

“Our project aims to discover whether or not the defective gene is widespread in the Australian population of Pomeranian dogs. We are recruiting Pomeranian dog breeders and owners to provide cheek swab samples for DNA, “ says project lead Associate Professor Anne Peaston

Associate Professor Peaston says veterinarians recently diagnosed a mild form of congenital methaemoglobinemia in an adult Pomeranian dog.

“Our index case was detected because her blue tongue turned almost black under stress. Genetic investigation showed that the dog indeed had a mutant CYB5R3 gene, and had inherited identical defective gene alleles from both parents,” she says.

The same genetic defect has been reported in a family of

Pomeranian dogs in Japan, indicating that this could be an international problem in the breed.

Associate Professor Peaston says the gene variant may be carried silently by a dog.

“The low oxygen supply to the body caused by MHb is variable, and dogs may appear normal, or have relatively mild signs, such as tiring rapidly with exercise, excitement or stress, and development of a blue-brown tinge to the tongue. These can sometimes be overlooked by veterinarians and pose a problem for general anaesthesia.”

“Our initial findings suggest that the MHb variant may be more widespread in the Australian Pomeranian breed than the single case confirmed so far. By participating in this study, your dog’s results will help us to determine the prevalence of the variant gene within the wider breed population.”

If researchers find that the CYB5R3 mutation is common in Pomeranian dogs in Australia, the results will assist the development of a DNA test to detect carriers of the variant gene and potentially restrict their participation in the breeding population to help eliminate the gene.

“In addition, information on the carrier status of dogs may be valuable information for veterinarians if general anaesthesia is required for any reason during treatment,”

“The gene’s elimination would greatly benefit the welfare of this delightful little dog breed,” says Associate Professor Peaston.



SMART DEVICE ACCURATELY MONITORS YOUR CAT'S DRINKING BEHAVIOUR

Sure Petcare the leading pet technology specialist, has announced today the launch of its latest product in its connected range, FELAQUA® CONNECT - a unique water delivery and drinking monitoring system for cats. FELAQUA CONNECT, designed in collaboration with leading veterinary behaviourists, allows cat owners to keep track of their cats' daily water intake via the SURE PETCARE™ App, while the smart water delivery system provides the cat with a source of fresh water.

Each cat is registered to FELAQUA CONNECT via their microchip. FELAQUA CONNECT integrates with the SURE PETCARE app via a Hub, which allows the App to "talk" to the device and record the registered cat's drinking behaviour such as which cat drank, what time it drank, and how much it drank. It also provides reports on the cat's overall drinking patterns on a daily, weekly and monthly basis. With this information, cat owners can easily detect any changes in their cat's drinking patterns. The SURE PETCARE app also sends reminder notifications to fill the reservoir of FELAQUA CONNECT when the water is low, and water freshness reminders to encourage cleaning of the device.

FELAQUA CONNECT has several cat-friendly features, including a wide, shallow bowl that mimics a natural puddle and presents water in a way that is more appealing and easier to drink than from a conventional bowl. The bowl is also water repellent causing the water to bead - in the same way that water stands up on a newly polished car - making it reflect and glisten and be more attractive to cats.

The water is kept fresh in an air-tight, gravity-fed reservoir that releases water into the bowl as it is needed. Because the device

is battery powered, there are no cables or need for an electrical power source, so the device can be located in any part of the home to best meet the cat's drinking needs.

Dr. Jon Bowen and Dr. Jaume Fatjó, leading veterinary behaviourists, were involved in the design and development of FELAQUA CONNECT. Dr. Bowen said, "FELAQUA CONNECT provides a window into your cat's health and reaffirms the importance of hydration as a health indicator. A change in water consumption is the most concerning health indicator in middle-aged and senior cats. Fluctuations in intake can be a sign of illnesses such as diabetes or kidney disease, and the sooner we intervene the better the outcome. Proper hydration is essential to maintain a cat's health.

"In a recent survey we found that 65 percent of cat owners didn't know that kidney disease is the most common cause of death in cats of five years of age or older. Only 3.4 percent of cat owners recognised all of the main signs of dehydration and, even more alarmingly, over half of owners were not aware that an increase in thirst was a sign of dehydration. Sixty percent of cat owners in our survey said they couldn't give the vet an accurate answer about how much their cat drinks each day. Given that an increase in drinking is the primary indicator of kidney disease, and accurate information is essential for a speedy diagnosis, it's likely that a lot of kidney disease is going undetected for too long.

"A device like FELAQUA CONNECT tells you if your cat is drinking more or less than usual. It's this insight that is invaluable and provides peace of mind that they are drinking regularly," Dr. Bowen said.



MAN'S NEW BEST FRIEND: WHAT CATS CAN TEACH US ABOUT HUMAN GENETICS AND PRECISION MEDICINE

Although cats have lived alongside humans for millennia, it remains a dogs' world. This bias has historically bled into science as well. It's time for cats to get their day, argues veterinary medicine expert Leslie Lyons in a Forum published July 28 in the journal *Trends in Genetics*. Cats, she says, have the potential to be a valuable model organism for geneticists, as the feline genome is ordered similarly to humans.

"Using cats in research is really overlooked, since people don't realise the advantages," says Lyons, of the Department of Veterinary Medicine & Surgery at the University of Missouri.

"The dog or mouse genome have rearranged chromosomes that are quite different than humans, but the domestic cat has genes that are about the same size as humans, as well as a genome that, like humans, is very organised and conserved."

Lyons writes that cats could be an asset for helping researchers better understand our genetic "dark matter." Although making up 95% of our DNA, it has long been considered filler information of little to no consequences, yet approximately 10% of the noncoding regions within the dark matter of the genome are conserved across mammals, suggesting that it has an important, misunderstood role. Cats have been found to have genetic diseases related to dysfunction of their genetic dark matter, making them a potential model organism for this type of research.

"As we discover that perhaps animals have more similar spacing

between genes and the genes are in the same order, maybe that will help us to decipher what's going on with humans," Lyons says. "Working with a primate is on the expensive side, but a cat's affordability and docile nature make them one of the most feasible animals to work with to understand the human genome."

Another reason why cats could enlighten the human genome is that we have the technology to clone cats and make transgenic cats. The first cat clone, Cc, short for CopyCat, was generated in 2001. Her cell donor was a typical calico cat with black, orange, and white fur, but Cc didn't turn out to have any orange on her coat, defying Mendel's laws and other basic genetic principles. This was a clue that something was happening in Cc's genes that researchers are just now beginning to understand.

Cats could also play a role in precision medicine for genetic diseases, in which instead of treating the symptoms, researchers fix the actual gene and what the gene does. For example, certain breeds of cats are prone to the genetic illness polycystic kidney disease, which also afflicts humans. Lyons writes that if we could treat this disease with precision medicine in cats, we could apply those learnings to us.

"So, if you and your cat walk in the vet's door and there is not a trauma, there is not a feeding problem, there might be a genetic problem with the cat. Vets could sequence the genes and potentially more quickly find the cause of what's going on and then develop a treatment that is more appropriate than just treating the symptoms," Lyons says. "We can provide a more tailored healthcare program for our pets, and more funding would put all the different pieces into place."



Journal Reference:

Leslie A. Lyons. Cats – telomere to telomere and nose to tail. *Trends in Genetics*, 2021; DOI: 10.1016/j.tig.2021.06.001

PIONEERING TECHNOLOGY TO VETERINARY PRACTICE ACROSS AUSTRALIA AND NEW ZEALAND

Medovate and its Australian distributor, LTR Medical, have signed an agreement which will allow LTR Medical to assess the potential for distribution of SAFIRA™ for veterinary use across Australia and New Zealand.

SAFIRA™ - a revolutionary new technology that transforms regional anaesthesia into a one-person procedure - was originally developed for human patient use in hospitals, but there is huge potential for its unique benefits to be extended to veterinary regional anaesthesia.

Over the coming months LTR Medical will work to engage with veterinary practices to secure evaluations of SAFIRA™ for veterinary applications. The studies will complement the UK studies that are already underway providing further insights and evidence of the potential for SAFIRA™ in small animal anaesthesia.

SAFIRA™ incorporates a unique safety solution that limits injection pressure, helping to reduce the risk of nerve injury. In current regional anaesthesia procedures, two operators are often needed, including a second operator (an assistant) who injects the anaesthetic solution at the required pressure, which relies on 'feel'. This means anaesthetic solutions can be injected at unsafe pressures.

Another huge benefit for animal care is that the device enables a slow, controlled release of local anaesthetic, enabling the lower amounts of anaesthetic to be used to achieve a successful nerve block.

Danny Zanardo, VP of Commercial for LTR Medical commented: "There are a significant number of regional anaesthesia nerve blocks performed on animals every year and LTR Medical are excited to introduce SAFIRA™ into this market throughout Australia and New Zealand. Use of SAFIRA™ can lead to less anaesthetic being used on animals and improved quality of recovery."

Regional anaesthesia is an important part of small animal care and is used for many reasons in veterinary medicine, including improved quality of recovery. The use of ultrasound guided regional anaesthesia is becoming more common practice today, with the technique – which can help provide a higher level of visualisation for the practitioner – increasingly seen as a 'gold standard'.

Chris Rogers, Sales & Marketing Director at Medovate, commented: "This is a very exciting opportunity to assess how SAFIRA's unique safety benefits can be translated into small animal regional anaesthesia and thus introduced into wider veterinary practice. We look forward to the evaluations which will hopefully add to the growing repository of evidence for the application of SAFIRA™ in veterinary care."

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TUCKERED OUT: EARLY ANTARCTIC EXPLORERS UNDERFED THEIR DOGS

It's one of the iconic images of early Antarctic exploration: the heroic explorer sledging across the icy wastes towed by his trusty team of canine companions.

But new research analysing a century-old dog biscuit suggests the animals in this picture were probably marching on half-empty stomachs: early British Antarctic expeditions underfed their dogs.

In a paper just published in *Polar Record*, researchers from Canterbury Museum, Lincoln University and University of Otago in New Zealand analysed the history and contents of Spratt's dog cakes, the chow of choice for the canine members of early Antarctic expeditions.

Lead author, Canterbury Museum Curator Human History Dr Jill Haley, has researched the lives of dogs in Antarctica and curated the Museum's 2018 exhibition *Dogs in Antarctica: Tales from the Pack*.

"The early explorers valued their dogs, not just for pulling sledges but for their companionship in the bleak isolation of Antarctica," she says.

"Our analysis of a partially crumbled Spratt's dog cake, one of four cared for by Canterbury Museum, found that the contents of the cakes weren't that different to modern dog biscuits. However, the quantity dogs were fed on the expeditions didn't provide enough fuel for their high-energy activities."

Pet food was a relatively new invention in the early twentieth century and seen as superior to older practices of feeding dogs table scraps or letting them scavenge for themselves.

Early polar explorers were particularly keen on Spratt's dog cakes because they were easy to transport, took no effort to prepare and did not perish.

The cakes were used on two Arctic polar expeditions before they were taken south by Captain Robert Falcon Scott's *Discovery* expedition (1901-1904). The expedition's 18 sledge dogs were fed the biscuits alongside dried fish from Norway; all the animals died after consuming rancid fish on a sledging expedition.

Perhaps wanting to avoid a repeat of this episode, the handlers on Scott's *Terra Nova* expedition (1910-1913) fed the animals on Spratt's alone. On rations of 0.3 kg of biscuits each per day the dogs became desperately hungry, even eating their own excrement. They recovered when seal meat was added to their diet.

Ernest Shackleton took Spratt's on his *Nimrod* (1907-1909) and *Endurance* (1914-1917) expeditions, where they were part of a doggy diet that also included seal meat, blubber, biscuits and pemmican, a high-energy mix of fat and protein.

University of Otago researchers Professor Keith Gordon, Dr Sara Fraser-Miller and Jeremy Rooney used laser-based analysis to determine the composition of the materials in the cake down to micron resolution, identifying a number of constituents including wheat, oats and bone.

Lincoln University Associate Professor of Animal Science Dr Craig Bunt compared the cakes with similar foods, including modern dog food, and calculated how many kilojoules of energy each biscuit would have provided.

To match the energy intake needed by modern sledge dogs, the dogs on the early Antarctic expeditions would have needed to eat between 2.6 and 3.2 kg of Spratt's dog cakes a day.

However, historic accounts suggest daily dog rations on some expeditions were only around 0.5 kg of biscuits and were sometimes as low as 0.3 kg.

The researchers concluded that Spratt's dog cakes were probably a suitable complete food for dogs in Antarctica; dogs on the early expeditions just weren't fed enough of them.



Journal Reference:

Sara J. Fraser-Miller, Jeremy S. Rooney, Keith C. Gordon, Craig R. Bunt, Jill M. Haley. Feeding the team: Analysis of a Spratt's dog cake from Antarctica. *Polar Record*, 2021; 57 DOI: 10.1017/S0032247421000103

CATTLE LOSING ADAPTATIONS TO ENVIRONMENT



As a fourth-generation cattle farmer, Jared Decker knows that cattle suffer from health and productivity issues when they are taken from one environment -- which the herd has spent generations adapting to -- to a place with a different climate, a different elevation or even different grass. But as a researcher at the University of Missouri, Decker also sees an opportunity to use science to solve this problem, both to improve the welfare of cattle and to plug a leak in a nearly \$50 billion industry in the U.S.

"When I joined MU in 2013, I moved cattle from a family farm in New Mexico to my farm here in Missouri," said Decker, an associate professor and Wurdack Chair in Animal Genetics at the College of Agriculture, Food and Natural Resources. "New Mexico is hot and dry, and Missouri is also hot but has much more humidity. The cattle certainly didn't do as well as they did in New Mexico, and that spurred me to think about how we could give farmers more information about what their animals need to thrive."

In a new study published today in PLOS Genetics, Decker and his team have uncovered evidence showing that cattle are losing important environmental adaptations, losses the researchers attribute to a lack of genetic information available to farmers. After examining genetic material stretching back to the 1960s, they identified specific DNA variations associated with adaptations that could one day be used to create DNA tests for cattle -- tests that could tell farmers whether their cattle are suited for one environment or another.

"We can see that, for example, historically cows in Colorado are likely to have adaptations that ease the stress on their hearts at high altitudes," Decker said.

"But if you bring in bulls or semen from a different environment, the frequency of those beneficial adaptations is going to decrease. Over generations, that cow herd will lose advantages that would have been very useful to a farmer in Colorado."

Decker's team, including then-doctoral student Troy Rowan,

analysed six decades worth of bovine DNA data from tests of cryo-preserved semen produced by cattle breed associations. They found that over time, while genes associated with higher productivity and fertility improved due to careful selection by farmers, many genes connected to environmental adaptations have faded.

Decker noted this is not the fault of farmers, given that there is currently no cost-effective genetic test they can use to determine whether their cattle are suitable for a particular environment. In other words, the study demonstrates a need for user-friendly cattle DNA tests that can look for the specific adaptations identified in the study. These adaptations include resistance to vasoconstriction -- a narrowing of the blood vessels that occurs at high elevations and puts undue stress on the heart -- resistance to a toxin in grass that can also cause vasoconstriction, and tolerance for high heat or humidity, all of which tend to recede over generations when cattle are removed from the associated environments.

"Sometimes, natural and artificial selection are moving in the same direction, and other times there is a tug of war between them," Decker said. "Efficiency and productivity have vastly improved in the last 60 years, but environmental stressors are never going to go away. Farmers need to know more about the genetic makeup of their herd, not only for the short-term success of their farm, but for the success of future generations."

The first broadly adopted genetic test for cattle was invented at the University of Missouri in 2007, and Decker and Rowan hope to tell the next chapter of that story. Both grew up on farms and share a passion for using research to help farmers balance America's farming traditions with the need for environmentally friendly business practices.

"As a society, we must produce food more sustainably and be good environmental stewards," Decker said. "Making sure a cow's genetics match their environment makes life better for cattle and helps farmers run efficient and productive operations. It's a win-win."



Journal Reference:

Troy N. Rowan, Harly J. Durbin, Christopher M. Seabury, Robert D. Schnabel, Jared E. Decker. Powerful detection of polygenic selection and evidence of environmental adaptation in US beef cattle. PLOS Genetics, 2021; 17 (7): e1009652 DOI: 10.1371/journal.pgen.1009652

DOGS MAY NOT RETURN THEIR OWNERS' GOOD DEEDS

In experiments, dogs did not reciprocate food-giving nor act more favorably towards helpful humans

Domestic dogs show many adaptations to living closely with humans, but they do not seem to reciprocate food-giving according to a study, publishing July 14 in the open-access journal PLOS ONE, led by Jim McGetrick and colleagues at the University of Veterinary Medicine in Vienna, Austria.

The researchers trained 37 domestic dogs to operate a food dispenser by pressing a button, before separating the button and dispenser in separate enclosures. In the first stage, dogs were paired with two unfamiliar humans one at a time. One human partner was helpful -- pressing their button to dispense food in the dog's enclosure -- and one was unhelpful. The researchers also reversed the set-up, with a button in the dog's enclosure that operated a food dispenser in the human's enclosure. They found no significant differences in the dogs' tendency to press the button for helpful or unhelpful human partners, and the human's behavior in the first stage did not affect the dog's behavior towards them in free interaction sessions after the trials.

Previous studies have demonstrated that dogs are capable of directing helpful behaviors towards other dogs that have helped them previously -- a behavior known as reciprocal altruism -- and research suggests dogs are also able to distinguish between cooperative and uncooperative humans. However, the present study failed to find evidence that dogs can combine these capabilities to reciprocate help from humans. This finding may reflect a lack of ability or inclination among dogs to reciprocate, or the experimental design may not have detected it. For example, the authors suggest that the dogs may not have understood the experiment because humans are typically the food-giver in the relationship, not the receiver, or because the dogs failed to recognize the connection between the human's helpful behavior and the reward.

The authors add: "In our study, pet dogs received food from humans but did not return the favour."

Journal Reference:

Jim McGetrick, Lisa Poncet, Marietta Amann, Johannes Schullern-Schrattenhofen, Leona Fux, Mayte Martinez, Friederike Range. Dogs fail to reciprocate the receipt of food from a human in a food-giving task. PLOS ONE, 2021; 16 (7): e0253277 DOI: 10.1371/journal.pone.0253277



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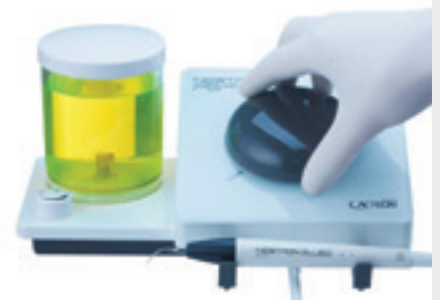
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ANTIMICROBIAL RESISTANCE (AMR) AND ITS PIVOTAL PARTNERSHIP WITH DISINFECTANTS

In 2015, the Australian government published a strategy stating that, “Antimicrobial resistance (AMR) is one of the biggest threats to human and animal health today”¹. In 2019, the AVA published their own paper, “Antimicrobial Resistance Strategy – 2020 and beyond”². One of their key objectives was to “improve infection prevention and control measures across human health and animal care settings to help prevent infection and the spread of resistance”.

AMR occurs when microorganisms such as bacteria, viruses or fungi become resistant to antimicrobial medicines. The three main classes of antimicrobials are ANTIBIOTICS, ANTISEPTICS & DISINFECTANTS.

In order to successfully implement antimicrobial stewardship, it is essential to include best practice infection prevention and control (IPC). This is why the proper use of approved disinfectants (as AMR's) require greater understanding and acceptance as partners in the AMR battle. Thousands of suppliers around the world sell “unregulated and unproven” products based simply on the name “disinfectant”.

In 2018, the American Society for Microbiology published a paper “Widely used Benzalkonium Chloride (BAC) disinfectants can promote antibiotic resistance”³. BAC is the most commonly used member of the QAC family of disinfectants and are used in products such as surface disinfecting agents, consumer and pharmaceutical products.

The problem is not the efficacy of BAC itself as an antimicrobial, it's the indiscriminate use or underuse of the product at varying concentrations or directions, (not dissimilar to the debate around AMR with antibiotics).

It is therefore critical when selecting an appropriate disinfectant to:

1. Consider the products claims and directions to suit your requirements;
2. Request independent trial data proving efficacy. If they have it, they can provide it.
3. Ask when these trials were conducted. Have they been conducted since 2020?

Due to the increase in resistance by microbes, what may have been effective 20, 10, or even 5 years ago may not be effective today. Be informed and include “proven” and “up to date” disinfectants as a critical tool in your antimicrobial stewardship.

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- 1 <https://www.amr.gov.au/>
- 2 <https://www.ava.com.au/siteassets/resources/fighting-antimicrobial-resistance/ava-submission-national-amr-strategy-2020-and-beyond.pdf>
- 3 <https://journals.asm.org/doi/full/10.1128/AEM.01201-18>



WHERE HAVE ALL THE BIRDS GONE? HUMANS BEHIND EXTINCTION OF HUNDREDS OF BIRD SPECIES OVER THE LAST 50,000 YEARS

A new study from Tel Aviv University and the Weizmann Institute revealed that over the last 20,000-50,000 years birds have undergone a major extinction event, inflicted chiefly by humans, which caused the disappearance of about 10%-20% of all avian species. According to the researchers, the vast majority of the extinct species shared several features: they were large, they lived on islands, and many of them were flightless.

The study was led by Prof. Shai Meiri of the School of Zoology at the George S. Wise Faculty of Life Sciences and the Steinhardt Museum of Natural History at Tel Aviv University, and Amir Fromm of the Weizmann Institute of Science. The paper was published in the *Journal of Biogeography*.

Prof. Meiri: "We conducted a comprehensive review of scientific literature, and for the first time collected quantitative data on the numbers and traits of extinct species of birds worldwide. Those that became extinct in the last 300 years or so are relatively well known, while earlier species are known to science from remains found in archaeological and paleontological sites worldwide. Altogether we were able to list 469 avian species that became extinct over the last 50,000 years, but we believe that the real number is much higher."

The researchers think that the vast extinction was caused primarily by humans, who hunted the birds for food, or by animals brought to islands by humans -- that fed on the birds and/or their eggs. This assumption is based mainly on two facts: First, the greater part of bird remains were found on human sites, apparently belonging to birds consumed by the inhabitants. Second, in most cases the extinctions occurred a short time after the arrival of humans.

The researchers also found that extinction was not random, as most extinct species shared three major features:

- About 90% of them lived on islands. When humans arrived on the island, the birds were hunted by them, or fell victim to other animals introduced by humans, such as pigs, rats, monkeys, and cats.
- Most extinct bird species were large, some very large. Consequently, since each bird provided humans with a great quantity of food, they were a preferred target for hunters. In fact, the body mass of the extinct species was found to be up to 10 times as large as that of surviving species. Previous studies have found a similar phenomenon among mammals and reptiles, especially lizards and turtles that lived on islands: the larger ones were hunted by humans and became extinct.

- A large portion of the extinct bird species were flightless, and often unable to escape their pursuers. The study found that the number of flightless bird species that became extinct is double the number of flightless species still existing today; all in all, 68% of the flightless bird species known to science became extinct. One of the better-known examples is the moa bird in New Zealand: 11 species of moa became extinct within 300 hundred years, due to hunting by humans

Prof. Meiri: "Our study indicates that before the major extinction event of the past millennia, many more large, even giant, as well as flightless avian lived on our globe, and the diversity of birds living on islands was much greater than today. We hope that our findings can serve as warning signals regarding bird species currently threatened with extinction, and it is therefore important to check whether they have similar features. It must be noted, however, that conditions have changed considerably, and today the main cause for extinction of species by humans is not hunting but rather the destruction of natural habitats."



Journal Reference:

Amir Fromm, Shai Meiri, Jenny McGuire. Big, flightless, insular and dead: Characterising the extinct birds of the Quaternary. *Journal of Biogeography*, 2021; DOI: 10.1111/jbi.14206

WHAT MAKES VETS FEEL GOOD AT WORK?

Receiving a simple thank you, spending time with peers and further developing their expertise, are all factors that make veterinarians feel good at work, according to a new study by researchers at the University of Adelaide.

In the study published by Vet Record, researchers investigated the positive side of veterinary work and specifically what brings vets pleasure in their job.

Lead author Madeleine Clise, a psychologist and Adjunct Lecturer at the University of Adelaide's School of Psychology says: "At a time in Australia when there are national shortages of vets, particularly in regional areas, and increased publicity about the risks and challenges in the profession, it's important to focus on what can be done to retain those in the profession and attract more people to the field.

"By focusing on what contributes to vets experiencing positive emotions, we can better understand how to improve wellbeing of those who care for our beloved pets, livestock and wildlife."

In a questionnaire completed by 273 Australian veterinarians, participants were asked to provide up to 10 responses to the prompt, 'I derive pleasure from my work as a veterinarian when...'. Over 2500 responses were grouped into themes and sub-themes and categorised using the 'Job Demands-Resources Model', which focuses on both the positive and negative aspects of a job that are indicative of employee wellbeing.

"The results highlight that there is an abundance of factors related to pleasure at work for veterinarians, above and beyond working with and helping animals," Ms Clise said. "In fact, positive relationships between clients and vets, and vets and their colleagues, was a more frequent response than positive relationships with animals.

"Vets, just like all of us, feel good when they are shown trust and respect. And a simple 'thank you' goes a long way."

Other findings from the study suggest that having opportunities to use and develop their specialised skillsets is highly pleasurable for veterinarians in practice. A positive workplace culture, successful outcomes with patients and opportunities to collaborate with other vets were also highlighted.

Senior author Dr Michelle McArthur, Associate Professor at the University of Adelaide's School of Animal and Veterinary Sciences, says: "Managers and practice managers can use the results to enhance the work environment for employees.

"This could include introducing an informal and formal recognition system and increasing time spent with colleagues.

"Further beneficial changes could include the introduction of a peer supervision or mentoring program to support veterinary expertise and increase connectedness across the profession."

The results also showed experiencing certain positive beliefs about oneself, such as flexibility, having a positive attitude and accomplishment are associated with pleasure at work.

"So further developing personal resources, for example in the university curriculum or as ongoing professional development, could increase the overall wellbeing of veterinarians," said Dr McArthur.

The researchers hope the results will spark discussion and further focus on the positive aspects of veterinary work, which they say are often overshadowed by the negative.

"Veterinarian work is such a rewarding profession and it's important that we share the many positives with new veterinarians and those in training as reassurance, and to encourage others to join the profession," said Dr McArthur.



Uni of Adelaide vet scientists in training.
CREDIT: The University of Adelaide

PETOPIA® - A WORLD FIRST IN PET EDUCATION

Kellyville Pets, Australia's largest independent pet store and animal welfare advocate, has launched petopia® - an online pet education, conservation and exploration platform, featuring the world's first ever online Reptile Masterclass Series.

The petopia® online Reptile Masterclass Series includes courses covering Bearded Dragon's, Python's and Turtle's and the soon to be released Frog's and teaches prospective and existing reptile carers how to successfully look after these fascinating animals in captivity.

Each Masterclass includes over two hours of engaging, cinematic content and is divided into easily digestible chapters focussing on topics including natural history, anatomy, habitat, general husbandry, diet, and conservation. According to Kellyville Pets General Manager, Richard Sheen, the Reptile Masterclasses fill a demand in the market, recently created due to covid-19. "Reptiles have always been a popular pet as they don't require a large space to live, they leave no mess, they don't smell, and make no noise. But over the past year and a half, we have seen a huge increase in the interest surrounding these unique pets."

"Unfortunately, because of the covid-19 pandemic, new reptile keepers couldn't partake in our in-store reptile courses that we have been operating for the past 25 years. There was also no similar course offered online."

"As strong advocates of animal welfare and responsible pet care we wanted to create an educational platform that delivered the most accurate and up-to-date information on how to look after animals, that could be accessible to pet parents of all ages, and not only in Australia but on a global level. So, petopia® and our online pet Masterclasses were born." Says Mr Sheen.



The petopia masterclasses are professionally shot with cinematic, high-definition visuals and are presented by Reptile Expert and conservationist, Ben Dessen.

Ben holds a Bachelor of Natural Science and has dedicated his life to animal welfare and conservation. Ben manages the Reptile Department at Kellyville Pets, having developed and presented the reptile masterclasses for the past 10 years. He is also a resident teacher at the Future Vet Kids Camp, is the Sanctuary Manager and Director of the Zambai Native Wildlife Sanctuary and is a member of Sydney Wildlife Rescue. Ben has also lived in the jungles of Borneo establishing an orangutan orphanage and rehabilitation centre and worked with Bob Irwin and Dr Harry Cooper on various wildlife projects and presentations.

"My vision is to encourage the responsible treatment of animals and nurture the conservationists of tomorrow. I believe these Masterclasses help do exactly that and I'm so excited that I can share my knowledge and passion for reptiles with the world." Explains Mr Dessen.



LACK OF PET FOOD REGULATION A RISK TO AUSTRALIAN PETS

The Australian Veterinary Association (AVA) has joined forces with RSPCA Australia and the Pet Food Industry Association of Australia (PFIAA) to express concern at the significant delays in developing and implementing robust regulation for Australia's pet food industry. It is now three years since a Senate inquiry recommended a mandatory Pet Food Standard to ensure pet food quality and safety.

"All pets in Australia should have access to safe, high-quality food, that adheres to animal welfare standards in regards to processing. Pet owners should have confidence that the food they're buying is safe and that if an unexpected problem arises, there will be prompt and regulated recall" said AVA PetFAST Representative Dr Sue Foster.

"At the moment there is no regulation of pet food in Australia and the national Standard for pet food is voluntary. The recent adverse event in Victoria, where at least 67 dogs became ill, with 23 dying, has tragically highlighted this lack of protection."

Moving from a voluntary Standard to a mandatory one would guarantee that pet food (including pet meat) meets a high standard of food safety and traceability, help to prevent potential contaminants and toxins from entering pet food, and ensure that there is a mandatory recall process to prevent further illness and death of pets if a problem with pet food occurs.

In June 2018, the Federal Government instigated a national review of pet food safety regulation. However, over three years later, nothing has changed.

"Pets have never been more important, with increasing number of people turning to pets to provide for comfort and companionship in these uncertain times. The consequences of losing a beloved companion to unsafe pet food are profound and long lasting. However, to date, the Government has not released any report or outlined a way forward."

"This process has already taken too long. The time to act is now before any more Australian pets become ill and die."

"Pets are considered family members and so the community expectation is that pet food should be regulated in the same way as human food. Australians should be able to buy food for their pets knowing that the industry is regulated to reduce the chance of unsafe pet food being produced and sold and to ensure that there is a standard recall process across the industry to guarantee a prompt and effective response if a problem is identified."

The AVA strongly recommends that nation-wide government regulation of pet food is established and that the Australian Standard AS5812 becomes mandatory. This will provide confidence for pet owners and their veterinarians that all pet foods are produced to the same high standard.

The AVA, RSPCA and the PFIAA wrote a joint letter to the Federal Minister for Agriculture, Mr David Littleproud, with these concerns in July but have not yet received a response.

For further information and requests for interviews contact the AVA media office on 0439 628 898 or media@ava.com.au.

The Australian Veterinary Association (AVA) is the only national association representing veterinarians in Australia. Founded in 1921, the AVA today represents 9000 members working in all areas of animal science, health, and welfare.



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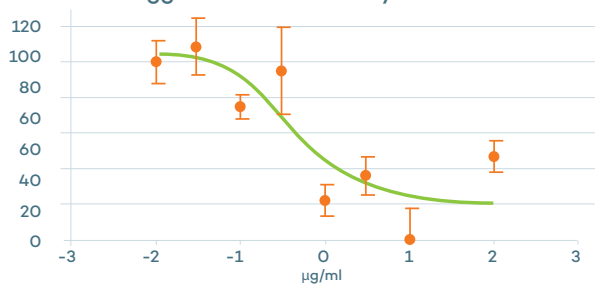
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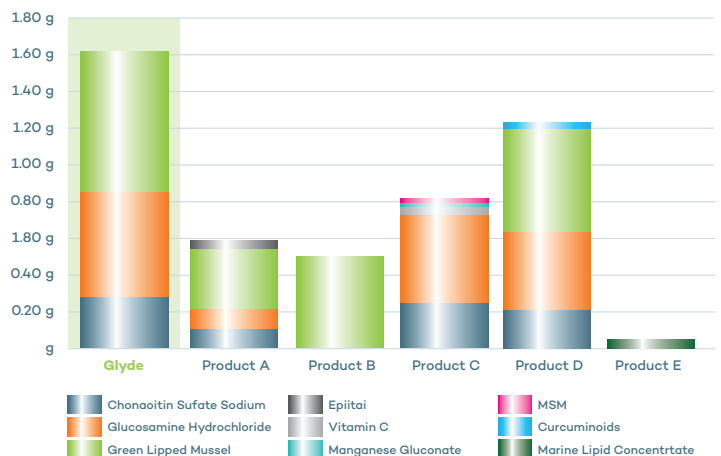
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VARYING IMMUNE CELL LEVELS IN CANINE BRAIN TUMOURS COULD PROVIDE THERAPEUTIC TARGETS

A new study reveals that high-grade gliomas, or brain tumors, in dogs contained more immune cells associated with suppressing immune response than low-grade gliomas. The work, which is the most extensive examination of immune cell infiltration in canine glioma to date, adds to the body of evidence that these brain tumors might recruit cells that aid in immunosuppression. The findings could have implications for future immunotherapy-based glioma treatments in both humans and dogs.

Glial cells are support cells located throughout the brain and spinal cord. When those cells become cancerous, the resulting tumor is called a glioma. In dogs, gliomas are the second most common type of tumor in the central nervous system and represent about 35% of all intracranial cancers. Median survival time for dogs with glioma treated with radiation therapy ranges from nine to 14 months, which is similar to the 14 month median survival time for humans treated with a combination of surgery, radiation and chemotherapy.

There are three types of canine glioma: oligodendroglioma, astrocytoma or undefined glioma. Each of these subtypes can be further classified as low or high-grade based on certain microscopic features. Although glioma subtype and grade affect survival and treatment choice in humans, it is currently unknown whether the same is true for dogs.

Immunotherapy harnesses the power of the body's immune system to attack cancer. Though immunotherapy has shown promise in certain types of cancers, it hasn't been successful in glioma in humans, possibly because gliomas have been shown to suppress the immune system in order to facilitate tumor growth. Researchers are trying to better understand the interaction between glioma and the immune system with hopes of improving therapeutic outcomes.

"If we want to pursue immunotherapy for glioma, we first need to understand how these tumors interact with the immune system," says Gregory Krane, first author of the research and a veterinary pathologist who recently received his Ph.D. from North Carolina State University. "There are many shared features between canine and human glioma, which makes researching the immune system in canine glioma a good approach to addressing questions about this cancer in both humans and dogs."

The multi-institutional research team examined 73 different gliomas obtained from veterinary patients seen at the NC State College of Veterinary Medicine between 2006 and 2018. Utilizing immunohistochemical tagging and computerized image analysis, the team identified the numbers of each type of immune cell in each tumor: B lymphocytes, T lymphocytes, regulatory T lymphocytes (Tregs) and macrophages. The team found higher numbers of Tregs and polarized macrophages in high- versus low-grade tumors, but no differences for other immune cells between different tumor types or grades.

"Tregs inhibit aspects of the immune response," Krane says.

"In healthy individuals, this prevents autoimmune disease. But cancers can recruit and activate Tregs to prevent the immune system from attacking the tumor. We found that Tregs were more abundant in high-grade gliomas than in low-grade gliomas. We hypothesize that Tregs may be involved in glioma-mediated immunosuppression, although that will require further research."

The research team also counted the number of macrophages in each tumor, which can be polarized to either end of a spectrum referred to as M1 or M2 polarization. In a general sense, M1-polarized macrophages are pro-inflammatory and anti-tumor, and M2-polarized macrophages are the opposite. They found that the macrophage population in high-grade gliomas tended to be polarized towards the M2 phenotype.

"These macrophage polarization data can expand the glioma immunosuppression hypothesis by providing another mechanism by which gliomas may suppress the immune system in the dog," Krane says.

Krane is hopeful that this study may lead to a better understanding of how gliomas affect the immune system, and eventually to improved immunotherapies for glioma. "Using the dog as a preclinical model for understanding the immune response to glioma could lead to treatments that will help both dogs and people," Krane says. "Though further work is needed, our data provide some support to utilize canine patients with glioma to evaluate therapies targeting Tregs or macrophage polarization designed for use in humans."

The research was published online in July 2021 in *Veterinary Pathology* and was supported by the National Institute of Environmental Health Sciences' National Toxicology Program (NIEHS/NTP), NC State's College of Veterinary Medicine, and Charles River Laboratories. Christopher Mariani, associate professor of neurology at NC State and principal investigator of NC State's Comparative Neuroimmunology and Neuro-oncology Laboratory, is corresponding author. Other NC State co-authors were associate professors of pathology David Malarkey and Debra Tokarz, and veterinary student Britani Rainess. Researchers from NIEHS/NTP, Charles River Laboratories, the University of Alabama at Birmingham, Cornell University and Integrated Laboratory Systems coauthored the work.

Journal Reference:

Gregory A. Krane, Carly A. O'Dea, David E. Malarkey, Andrew D. Miller, C. Ryan Miller, Debra A. Tokarz, Heather L. Jensen, Kyathanahalli S. Janardhan, Keith R. Shockley, Norris Flagler, Britani A. Rainess, Christopher L. Mariani. Immunohistochemical evaluation of immune cell infiltration in canine gliomas. *Veterinary Pathology*, 2021; 030098582110239 DOI: 10.1177/03009858211023946

NEW MULESING STATUS CATEGORY GOOD FOR TRANSPARENCY IN WOOL: RSPCA

RSPCA Australia has welcomed the new requirement for wool growers to declare sheep freeze branding on the National Wool Declaration from January 2022 – a move that will increase transparency in the supply chain for wool growers and buyers.

Sheep freeze branding involves applying liquid nitrogen to a lamb's breech area to leave an area of scarred skin that is smoother and therefore less susceptible to flystrike. It is performed as an alternative to the traditional procedure known as mulesing, but evidence suggests freeze branding is similarly painful for the lamb.

The National Wool Declaration – which wool growers complete voluntarily to declare their mulesing status – will now include a category requiring sheep freeze branding to be declared as well. To date, wool from sheep subjected to freeze branding could be declared as 'non-mulesed'.

"This decision is good news for wool buyers seeking greater transparency in the supply chain," said RSPCA Australia Senior Scientific Officer (Farm Animals), Melina Tensen.

"This means that wool buyers can make fully informed choices – particularly if they are seeking to buy wool from sheep who haven't been mulesed or subjected to another painful procedure to manage flystrike risk.

"We know that people care about where wool comes from, and that mulesing status is clearly relevant to the consumer. There's no greater evidence of that than the number of retailers who are moving away from mulesed wool.

"Recent research in lambs subjected to sheep freeze branding or mulesing with pain relief found that lambs show similar behavioural pain responses, regardless of the procedure.

"The fact remains that sheep freeze branding and mulesing are painful procedures, and breeding plainer bodied, flystrike-resistant sheep is the only long-term solution to protecting sheep from flystrike."



RECRUITING DOGS FOR LATE-STAGE TRIALS OF NOVEL AUSTRALIAN TREATMENT FOR B-CELL LYMPHOMA

Monepantel in Pet Dog Clinical Trials

PharmAust Ltd, a Western Australian drug discovery company, is working with vets across Australia to develop its anticancer drug Monepantel (MPL) as a treatment for pet dogs with treatment naïve B-cell lymphoma.

To date, MPL alone has proven very safe and very successful in promoting stable disease of target lesions, with the current Bayesian Phase 2 clinical trial meeting all interim goals for efficacy. Efficacy was measured as objective tumour response as well as objective clinical benefit following extensive thoracic X-ray imaging and abdominal ultrasonography. Ongoing combinatorial treatments post trial with prednisolone have provided a very good extension of longevity and a very high quality of life reported by pet owners.

An attractive quality of MPL treatment is that it is not toxic to owners and their children like chemotherapy, so people can continue playing with their pet dog throughout treatment.

History of MPL first as livestock anthelmintic and now as anticancer agent

MPL was originally developed as a veterinary anthelmintic in sheep, and was first registered in New Zealand in 2009. It is now registered as a livestock anthelmintic in over 38 jurisdictions globally including Australia. In livestock worms both MPL and its major metabolite MPL sulfone (MPLS) act as potent nicotinic acetylcholine receptor (AChR) agonists causing worm muscle paralysis. The target AChRs are present only in the worms that infect livestock and not in the livestock themselves, worms that infect humans or humans. This specificity accounts for MPL's very high safety profile observed in the field since its introduction over 12 years ago.

In 2013 PharmAust discovered off-target MPL and MPLS activity against the mechanistic target of rapamycin (mTOR) signalling pathway in human cancer cells. MPL induces autophagy and apoptosis resulting in cancer cell death. Extensive safety and toxicology studies in beagles demonstrate that doses as high as 10 grams a day for 13 weeks, or 1 gram a day even for 52 weeks have no toxicity, with no maximum tolerated dose reached. No chemotherapeutic like side-effects such as hair loss, gastrointestinal disturbances and immunosuppression have been observed to date.

PharmAust completed a successful Phase 1b trial in humans with treatment refractory solid cancers in 2015. MPL treatment promoted stable disease in the absence of myelosuppression or changes in clinical chemistry, hematology and urinalysis. This trial in humans permitted an understanding of reformulation requirements required to turn a successful veterinary drench into a convenient tablet suitable for both pet dogs and humans with cancer to take at home. PharmAust is preparing for a Phase 2 trial in humans, specifically with pancreatic, gastrointestinal and colorectal cancers.

More dogs needed to finalise dose optimisation going into Phase 3

PharmAust is currently recruiting up to 10 dogs for a 28-day treatment to finalise dose optimisation as a monotherapy and up to another 10 dogs to finalise dose optimisation as combinatorial therapies with prednisolone and CHOP. Further information including trial inclusion criteria and trial sites in Sydney, Perth and Brisbane can be found at www.pharmaust.com/petdogtrial.

For further enquiries, please contact Dr Richard Mollard at rmollard@pharmaust.com



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