

## Editorial Board

### **Kate Bradley MA VetMB PhD DVR DipECVDI MRCVS**

Kate is a Senior Clinical Fellow in Veterinary Diagnostic Imaging for the University of Bristol/Langford Veterinary Services.

### **Giunio Bruto Cherubini DVM DECVN MRCVS**

Giunio is responsible for neurology/neurosurgery service at DWR and contributes to the undergraduate teaching programme at the University of Nottingham School of Veterinary Medicine and Science.

### **Iain Cope BSc BVM&S Cert AVP (Zoo Med) MRCVS**

Iain is an RCVS recognised Advanced Veterinary Practitioner in Zoological Medicine. He runs his own practice at Newmarket Vets4Pets.

### **Mark Craig BVSc MRCVS Cert SAD**

Mark runs Re-Fur-All Referrals, a veterinary dermatology referral service in the south of England and the Midlands.

### **Valerie Lamb BVM&S DipECVIM-CA MRCVS**

Val is a specialist in small animal internal medicine working at Southern Counties Veterinary Specialists in Hampshire.

### **Mark Lowrie MA VetMB MVM DipECVN MRCVS**

Mark is an RCVS and European specialist in veterinary neurology (ECVN). Mark works at Dovecot Veterinary Hospital, Castle Donington, part of CVS Group plc.

### **Anna Meredith MA VetMB PhD CertLAS DZooMed MRCVS**

Anna is Head of Melbourne Veterinary School, University of Melbourne, Melbourne, Australia.

### **Paola Monti DVM MSc FRCPath DipACVP (Clinical Pathology) MRCVS**

Paola is an American Specialist and RCVS-Recognised Specialist in Clinical Pathology. She is a Clinical Pathology Consultant with Dick White Referrals, Cambridgeshire

### **Jo Murrell BVSc PhD(Bristol) DipECVA MRCVS**

Jo is a European specialist in Veterinary Anaesthesia and Analgesia, primarily based at the School of Clinical Veterinary Sciences, University of Bristol.

### **Malcolm Ness BVetMed MRCVS DipECVS CertSAO FRCVS**

Malcolm is a European Specialist in surgery and heads up the surgery team at Croft Veterinary Hospital in Northumberland.

### **Matthew Oxford BVM&S GPCert(SAS) MRCVS**

Matthew is a referral Veterinary Dentist and oral surgeon with clinics at Lumby Park Veterinary Specialists, South Devon Referrals, Stone Lion Veterinary Hospital and Priory Veterinary Hospital. He is the Course Organiser for the British Veterinary Dental Association, included in which he lectures at Bristol University.

### **Karen Perry BVM&S CertSAS DipECVS FHEA MRCVS**

Karen is Assistant Professor in Small Animal Orthopaedics at the Veterinary Medical Center, Michigan State University, Michigan, USA

### **Sarah Shull DVM CCRT**

Sarah leads the Veterinary Rehabilitation Service at the Michigan State University Veterinary Medical Center.

### **Kit Sturgess MA VetMB PhD CertVR DSAM CertVC FRCVS**

Kit is an RCVS Recognised Specialist in Small Animal Medicine and an Advanced Practitioner in Veterinary Cardiology; he sees clinical cases 3 days per week at Optivet Referrals in Hampshire.

### **Molly Varga BVetMed CertZooMed DZooMed (Mammalian) MRCVS**

Molly is an RCVS Recognised Specialist in Zoological Medicine. She works at Cheshire Pet, Cheshire.

### **Sam Woods BSc (Hons) MA VetMB CertSAS Dipl.ECVS MRCVS**

Sam is a European and RCVS Registered Specialist in Small Animal Surgery and is currently a Senior Lecturer in Small Animal Surgery (Soft Tissue and Orthopaedics) at the Royal (Dick) School of Veterinary Studies, University of Edinburgh.

### **Ian Wright BVMS BSc MSc MRCVS**

Ian has a Master's degree in Veterinary Parasitology and is a member of the European Scientific Counsel Companion Animal Parasites (ESCCAP UK and Ireland).

# Where is monoclonal antibody therapy leading us?

While there is something of a lag in new therapies for veterinary use, we are gradually seeing more monoclonal antibody products becoming available on the veterinary market, with the recent release of two anti-nerve growth factor therapies bedinvetmab (Librela) and frunvetmab (Solensia)

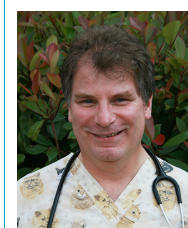
for the management of osteoarthritis in dogs and cats respectively. As this area expands, monoclonal solutions for the management of acute diseases are also being released, for example in COVID-19 treatment, expanding the possibility of more specific treatments for serious viral disease; a real step forward from current therapies that tend to be targeted broadly against viral DNA/RNA replication with significant potential for side effects.

For many of us, this group of agents did not feature as part of our undergraduate pharmacology, so what are they, are they safe and how effective might they be? Well, the origin of this technology was to identify antigen-specific plasma cells that produce antibodies to that specific antigen, and then to fuse these cells to myeloma cells to make them immortal. The process is relatively inefficient, but specialist medias have been developed to promote hybridoma growth. The rapid evolution of molecular techniques has led to a variety of other solutions to monoclonal antibody production, such as phage display or single B cell culture, also allowing their applicability to multiple species.

The main issue that faced early therapies was the host immune response, as the monoclonal antibody produced was related to the species in which it was created (usually rabbits or mice). This led to the development of processes to humanise the resulting monoclonal and minimise the likelihood of it being recognised as foreign. Over time, the use of transgenic mice, phage display and single B-cell cloning have resulted in fully human monoclonal antibodies. It is also now possible using CRISPR/Cas9 and other technologies to produce recombinant monoclonal antibodies from viruses and yeasts that allow multiple monoclonal antibodies with slightly different amino acid sequences, which can then be screened for stability and ability to recognise the antigen. However, the final product is not completely homogeneous as changes in the antibody structure will occur during the manufacturing process as a result of various reactions such as deamination or glycosylation.

The key things to remember about these products are that they are species-specific (use in another species risks both a lack of efficacy as the monoclonal antibody may not recognise the target or produce a significant immune response as the antibody is foreign) and they are target-specific to the receptor, so they may have very limited action outside of the specific indication for which they were created. By being more target-specific, effects should be more predictable and side effects less, but this is also a potential weakness as if the pathway being targeted is not responsible for the clinical presentation, the drug will not have a suitable action.

Inherently, this means that our diagnoses need to become more specific to effectively deploy these products. Nonetheless, this is a really exciting opportunity for veterinary medicine and with many other monoclonal antibody therapies in development, there is hope that we may have some new drugs in our armoury to treat previously intractable diseases for which current therapies have significant side effects. [CA](#)



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