UCD Veterinary Diagnostic Laboratories: an overview

The Veterinary Diagnostic Laboratories are an integral part of the UCD Veterinary Hospital with their primary role to support the clinical teaching of the School of Veterinary Medicine, writes Dr Bryan Markey MVB PhD MRCVS, associate professor of veterinary microbiology, School of Veterinary Medicine, University College Dublin

The Veterinary Diagnostic Laboratories (VDL) play an essential role in veterinary training, helping to maintain the highest standards in the professional training of our students as recognised by the School's recent improvement in the world vet school QS rankings from 40th in 2015 to 29th in 2017. The School is one of only six schools in Europe currently accredited by the American Veterinary Medical Association (AVMA). As well as education, the laboratories have a wider mandate that includes the support of the wider veterinary community and the advancement of knowledge of animal disease. The laboratories offer a fast, friendly and highly-accurate diagnostic service to veterinary practices across Ireland, drawing on the expertise and knowledge of the staff at the School of Veterinary Medicine.

The laboratories also play a pivotal role in many of the School's research projects as well as offering specialist support for research carried out throughout UCD and other third level institutions. The diagnostic services of the VDL cover five disciplines:

- Veterinary morphological pathology;
- Veterinary clinical pathology;
- Veterinary microbiology;
- Veterinary parasitology; and
- Veterinary endocrinology.

NEW-LOOK WEBSITE

The UCD Veterinary Hospital website has had a full makeover to give it a fresh, more professional look. The section dealing with the VDL has also been completely revamped and provides information on the services, packaging, submission of samples and turn-around times. There is also a downloadable catalogue and information on the interpretation of the reports generated by the VITEK 2 Compact System (BioMérieux) in bacteriology.

NEW APPOINTMENT AND STAFF DEVELOPMENT

Pamela Kelly, a UCD graduate, has recently joined the team of morphological pathologists. Pamela has previously worked for IDEXX laboratories in the UK and is both a fellow of the Royal College of Pathologists and a Diplomate of the European College of Veterinary Pathology (ECVP). She joins an excellent team of specialist diagnosticians and technical staff. Their specialist skills are brought to bear on the materials submitted to us and are also used to train the next generation of veterinary surgeons to achieve advanced professional qualifications from the Royal College and the relevant European College under the auspices of the European Board of Veterinary Specialisation (EBVS). There are currently two residents in morphological pathology (Janne Schoening and Alison Lee). They are enrolled in four-year training programmes leading to the award of a professional doctorate and to ECVP accreditation. Both are involved in research projects: investigating the tissue distribution and potential pathological significance of silica in badgers; and in estimating the prevalence and distribution of ovine pulmonary carcinoma (Jaagsiekte) in Ireland, respectively. In addition, Maria Balan is resident in clincal pathology while Andres Garcia Campos has recently completed his PhD and is now working towards European Veterinary Parasitology College (EVPC) specialist status.

RECENT DISCOVERIES

Not infrequently our diagnostic activities help to highlight novel diseases and lead to collaborative investigations with veterinary colleagues, both nationally and internationally. Recent discoveries involving the VDL that have resulted in publications in international, peer-reviewed journals include:

- Dermatosparaxis, a connective tissue disorder characterised by extreme skin fragility, in two Limousin

Figure 1: Severely affected cow with cutaneous besnoitiosis.

Figure 2: Characteristic sclerocysts of *Besnoitia besnoiti*.

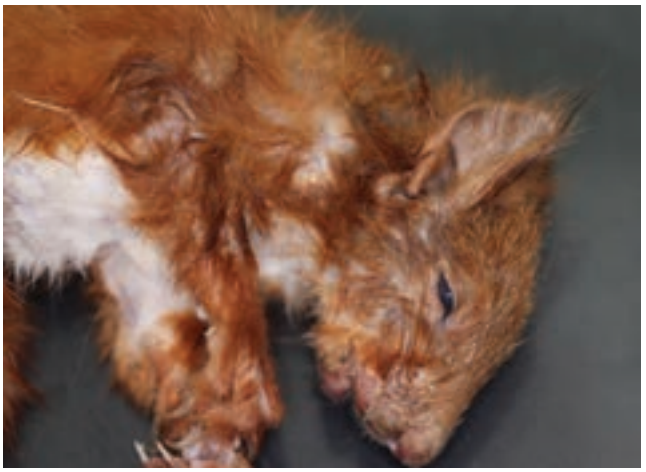

Figure 3: Red squirrel with pox lesions.

Figure 4: Cats with chronic diarrhoea may be infected with *T foetus*.

Figure 5: Loading the VITEK 2 Compact System (BioMérieux).

calves. This condition has not been reported in this breed before (Irish Veterinary Journal [2016] 69: 15);

- Bovine besnoitiosis (*Besnoitia besnoiti*) in an Irish dairy herd (see Figures 1 and 2), this is the first time that this important protozoan condition has been described in Ireland (Veterinary Record [2016] doi: 10.1136/vr.103683);
- Acute fatal haemorrhagic pneumonia caused by *Streptococcus equi* subspecies *zooepidemicus* in Irish greyhounds (Veterinary Record [2016] In press);
- Red squirrels in Ireland infected with leprosy bacilli, following the discovery of *Mycobacterium lepromatosis* in Irish red squirrels (*Sciurus vulgaris*). This native mammal is already under threat from squirrel pox (see Figure 3), habitat loss and competition from the introduced grey squirrel (Science [2016] 354: 744-747); and
- Confirmation of the first outbreaks of rabbit haemorrhagic disease virus type 2 in Ireland (Veterinary Record (2016) doi: 10.1136/vr.i5530).

UCD VETERINARY HOSPITAL CONFERENCE

One of the highlights of the year is the annual UCD Veterinary Hospital conference, which will be held in June this year and will be held in conjunction with the European Veterinary Emergency and Critical Care congress. The VDL will be meeting their veterinary clients at the conference to discuss their diagnostic needs.

NEW TESTS IN PARASITOLOGY AND ENDOCRINOLOGY

Tritrichomonas foetus is an emerging parasite of cats (see Figure 4), causing chronic diarrhoea.

A number of studies have shown that this parasite is a more common cause of large bowel diarrhoea than previously thought. Definitive diagnosis of *T foetus* relies on confirmation of the presence of the organism in a faecal sample. The VDL has just obtained the InPouch test kit for the cultivation and detection of *T foetus* in fresh faecal samples.

VDL have recently introduced canine TLI, cobalamin and folate assays. Low cTLI is a marker of exocrine pancreatic insufficiency in dogs (EPI), while elevated cTLI might be indicative of pancreatitis. Cobalamin and folate tests which can be performed on feline and canine serum samples are used to diagnose disease of the small intestine.

ANTIMICROBIAL RESISTANCE

AMR in humans is recognised as a major public health

concern worldwide and is of increasing importance in veterinary medicine. Since March 2015, VDL have been using the VITEK 2 Compact System (BioMérieux), an automated testing system (see Figure 5) that can both rapidly identify bacterial organisms and provide quantitative results (minimum inhibitory concentrations [MIC]) for antibiotic therapy (see Table 1).

Results available approximately 24 hours earlier than when using standard biochemical tests for identification and disk diffusion for antibiotic susceptibility testing.
The availability of MIC data allows the clinician, when appropriate, to combine this data with pharmacokinetic data (available on the package insert or from a textbook) and thus calculate antimicrobial dosage more accurately.
The use of appropriate antibiotics at effective dose levels helps reduce AMR.
The data generated enhance the quality of research papers and clinical report.
Adoption of this automated test system has resulted in faster turnaround and more consistent results.

Table 1: Advantages of the VITEK 2 system, which is currently international best standard.

Generation of results is more rapid than previously, with identification and susceptibility patterns generally available within 36 to 48 hours of receipt of sample. The availability of MIC values also allows the clinician to more accurately select the most appropriate antimicrobial compared with using simple 'susceptible' or 'resistant' data provided by disk diffusion methods.

ADVANCED SYSTEMS FACILITATE BETTER TREATMENT OPTIONS

As a tertiary referral hospital, we have noted a gradually increasing number of cases presenting to our UCD veterinary hospital with multi-drug resistant (MDR) infections. Similar to human medicine, it is cases infected with MDR Gram-negative organisms, such as MDR *Escherichia coli*, *Serratia* species (coliform organisms) and *Pseudomonas* species, that are proving most problematic with few treatment options available in some cases. Additionally, in veterinary medicine methicillin-resistant *Staphylococcus pseudintermedius* (MRSP) is an emerging problem and, although not as prevalent in Ireland as in other countries, such as the US, it is a significant emerging issue for clinicians. It is usually highly resistant; sometimes there is no effective licensed antibiotic available for treatment among all of those routinely tested for.

In such cases, the VDL expands the service and tests additional antibiotics using the disk diffusion method. For some MDR infections, including those involving MRSP, topical antisepsis may be a possible alternative to antimicrobial therapy.

VDL are investing further into their diagnostic services through the acquisition of new software. This software will enable VDL to tailor the diagnostic reporting of antimicrobial susceptibility patterns to each individual case. Such an approach will encourage more prudent antimicrobial prescribing by providing susceptibility information on the most appropriate antibiotics that should be employed.

This system is now used in human medicine as part of antimicrobial stewardship programmes.

The software will also facilitate generation of summary reports of the most common organisms isolated in the laboratories and their associated susceptibility patterns. VDL plan to send out such reports to clients at six-month intervals.

VDL expect that these reports will be very useful in informing the prescribing behaviour of clinicians in primary care practices and in the UCD veterinary hospital.