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Abstracts

The animal and the man, the amazing story of the fables

By M. Martin-Sisteron (*invited lecture, pp.5-18*).

(No abstract available)

Interest of Magnetic Resonance Imaging in the diagnosis of equine locomotor disorders

By F. Audigié, D. Didierlaurent, V. Coudry, S. Jacquet and J.-M. Denoix (*communication pp.19-24*).

Magnetic Resonance Imaging (MRI) is the current gold standard in human medicine for locomotor apparatus imaging. This paper presents the interest of MRI in the diagnosis of equine locomotor disorders, based on patients examined at the CIRALE centre with a C-shape low-field system (0.2 T). The protocols used and indications of this technique are described. The diagnostic interest of MRI is then presented by anatomical entities. MRI is a very reliable technique to identify bone lesions which are radiologically invisible. Compared to ultrasonography, MRI provides images of all soft tissues in the foot, with greater tissue discrimination within the lesions. The downside, however, is that a general anesthesia is necessary to obtain diagnostic images of high quality. Moreover, current MRI systems are able to visualise only the distal segments of the limbs (including carpus and tarsus), the head, and the cervico-cranial hinge. The development of MRI systems designed to examine a standing horse is an interesting avenue of research, which would overcome these limitations.

Key words: *diagnostic imaging, horse, lameness, poor performance.*

Acoustodynamometry : an innovating non-invasive technique used to measure tendon load during movement

By N.Crevier-Denoix, B. Ravary, J.-M. Denoix and Ph. Pourcelot (*communication pp.25-31*).

A novel technique was developed to measure the tendon load in people and in horses in motion. This non-invasive technique is based on a relation, demonstrated experimentally in vitro on isolated tendons and limbs, between the velocity of ultrasound in the tendon and the load to which it is subjected. A prototype was created to examine the equine superficial digital flexor tendon. The reproducibility of these measurements assessed in five horses was very good in a given subject, but marked differences were observed between the animals, in terms of plot shape and ultrasound velocity. These differences appeared directly related to the horse's digital standing conformation. The technique thus validated was then used to examine the effect of four types of orthopaedic shoes compared to a standard shoe, on hard as well as soft ground.

Key-words: *horse, tendon, load, ultrasounds, shoeing.*

CT scan for brain and spine imaging in pet carnivores

By O. Kéravel (*communication pp.33-38*).

Computerized Tomography is no longer limited to exceptional circumstances. It is an essential tool when investigating the central nervous system in pet carnivores, in spite of accessibility constraints, high cost, and the necessity to use a general anaesthesia.

Brain CT scans are based on the interpretation and comparison of cross-sectional images obtained before and after the intravenous injection of contrast material. They are able to differentiate congenital, degenerative, inflammatory, vascular (ischemia or haemorrhage) and tumoral (benign or malignant) lesions.

Spine CT scans must be preceded by a careful neurological clinical examination, to localise the lesion and hence the area to investigate (C1-T3, T3-L3 or L3-S1). If necessary, a myelography may help identify the site of lesion. This technique is used to investigate paresis or paralysis cases, whether acute (e.g. acute disk hernia, embolism), chronic (e.g. chronic disk hernia, neoplasia, wobbler's syndrome), or posttraumatic.

Key-words: Computerized Tomography, brain, hydrocephalus, stroke, tumour, intracranial hypertension, spinal cord, disk hernia, embolism, horse tail syndrome (Wobbler's syndrome).

Fish responses to viruses: from interferon to T-cells

By P. Boudinot and A. Benmansour. (*communication pp.39-44*)

Viruses affecting farmed fish species, such as the rainbow trout, have been studied extensively because they cause significant economic losses. Studies on vaccines developed against Viral Hemorrhagic Septicemia (VHS) have provided evidence of an effective and specific response based on neutralizing antibodies, as well as of an immune memory. Various techniques of differential transcript analysis were used to investigate the non-specific leukocyte response to the VHS virus in trout. As in mammals, this response was dependent on interferon-responsive genes. A VDJ junction spectratyping approach of transcripts of the specific T-cell antigen receptor (TCR) was also developed to examine the specific cellular response in rainbow trout. This approach was used to show the existence of complex antiviral T-cell responses in fish.

Key words: rhabdovirus, VHS, immune response, interferon, salmonids.

Interest of reverse genetics applied to RNA viruses: examples of a salmonid rhabdovirus and alphavirus

By M. Brémont. (*communication pp.45-51*)

European and French rainbow trout farms are faced with viral infections which kill every year approximately one fifth of their production (i.e. 10,000 tons worth €23m a year in France). Major viral diseases are caused by two coexisting rhabdoviruses: the viral hemorrhagic septicaemia virus (VHSV) and the infectious hematopoietic necrosis virus (IHNV). The genome of rhabdoviruses, the best known being the rabies virus, consists of a single negative-strand RNA molecule of about 12 kb. These viral diseases are the most

frequent, but the intensification of salmonid fish farms as well as the development of fish farming using new species have lead to the emergence of new diseases as well as an increase in the incidence of existing diseases. One of the more notable examples over the past few years is undoubtedly the emergence of salmonid sleeping disease, known since the '80s in most of the European countries and in North America. Although it used to be infrequent in French fish farms, it now affects 30-40% of their production. The genome of the sleeping disease virus (SDV), a member of the alphavirus family, consists of a single positive-strand RNA molecule of about 12 kb.

Over the past few years, we have been focusing some of our research activity on the virus genetic engineering to obtain live vaccines.

Genetic engineering of RNA viruses is based on the availability of a DNA copy of the RNA genome. This approach is called "reverse genetics". Reverse genetics on a positive-strand RNA virus was demonstrated for the first time on the poliovirus in the '80s. It took another fifteen years to establish a reverse genetics system for the recovery of a negative-strand RNA virus, the rabies virus. The synthesis of an intermediate cDNA, which is an exact copy of the viral RNA genome, helps manipulations such as gene deletions to study their role, or gene insertions to express heterologous genes.

Reverse genetics systems have now been established for IHNV and SDV, and have helped generate numerous recombinant viruses, of which some are currently being tested as vaccines in large-scale field trials.

Key words: *RNA virus, salmonids, reverse genetics, vaccine strain, gene vector.*

Bacterial diseases of farmed fish

By J.-F. Bernardet, C. Michel, É. Duchaud and A. Benmansour (communication pp.53-56).

*An overview of bacterial diseases in farmed fish is presented, including bacterial species involved, predisposing factors, routes of infection, modes of transmission, and control. INRA studies on the main bacterial pathogen of salmonid fish worldwide, *Flavobacterium psychrophilum*, are also presented. Once techniques of culture, identification, and molecular typing of isolates were defined, a reproducible model of experimental infection was developed using the rainbow trout. Molecular studies improved considerably the taxonomy and phylogeny of the whole *Flavobacteriaceae* family. The full genome of a *F. psychrophilum* strain has recently been sequenced. Its analysis has already identified many genes involved in the pathogen's lifestyle, especially in its virulence towards the host.*

Key words: *bacterial diseases, salmonid fish, *Flavobacterium psychrophilum*, experimental infection, virulence, genome.*