

ABSTRACT

The thesis entitled "Diagnosis and Therapy of Epilepsy and Neuromuscular Diseases in Dogs" presents the most relevant scientific, professional and academic achievements in the field of neurology from the time of obtaining the PhD degree in Veterinary Medicine (2009) to the present. The thesis outlines future plans for career development, research areas, and professional perspectives.

The structure of the thesis followed the criteria recommended and approved by CNATDCU and was organized into 3 sections:

- **Section I** in which the scientific achievements are detailed point by point, with the presentation of the main research directions and the results obtained, as well as the professional and academic achievements,
- **Section II** which includes the plan for career evolution and development and
- **Section III** in which the bibliographic references used are found.

After completing the PhD, I carried out research on neurophysiology and clinical neurology of companion animals, performing studies with a high degree of interdisciplinarity in fields such as biochemistry, physiology, internal veterinary medicine, pharmacology, neuroimaging.

The main results of the research activity are presented in Chapter I of Section I and are structured in three major research directions:

1. Neurophysiology and neuroelectrophysiology studies in dogs;
2. Diagnosis and treatment of epilepsy and epileptic emergencies;
3. Diagnosis of neuromuscular diseases.

The results presented reflect the current state of scientific research in the field studied, highlighting contributions with a high degree of originality and importance for the scientific community.

The first research direction includes neurophysiology and electrophysiology studies in dogs and is organized into three subchapters:

- a) studies on cerebrospinal fluid metabolomics in healthy dogs,
- b) electrodiagnostic studies (brainstem auditory evoked potentials - BAER) in healthy dogs, raccoon dogs and cats and the diagnostic value of the technique in central vestibular syndrome, and
- c) studies on the identification of cerebral coherence in dogs using the quantitative electroencephalography technique.

Metabolomic research has succeeded in identifying and quantifying 13 metabolites simultaneously and analyzing the correlations between them in the same cerebrospinal fluid sample in a healthy dog. The data obtained have provided the possibility of a more reliable analysis of the cerebral metabolic profile and to evaluate cerebrospinal fluid homeostasis in healthy dogs. Due to the low biologic variability of the metabolites and the large number of metabolites identified simultaneously, the data reported in this study can be used as reference values for further studies on cerebrospinal fluid metabolomics in dogs but also in clinical research of the human central nervous system.

The research activity using electrodiagnostic techniques includes the study of brainstem auditory evoked potentials and electroencephalography studies.

Ornament

Regarding BAER technique, we evaluated the effect of surface electrodes on the latencies and amplitudes of the BAER trace waves in cats, dogs and raccoon dogs. The data obtained in dogs and cats have demonstrated the fact that when recording BAER traces with surface electrodes different reference values are obtained comparing with those obtained by collecting signals with needle electrodes. Another original study was represented by BAER analysis and identification of reference values for healthy raccoon dogs. After describing the impact of the type of electrodes on BAER signals, we validated the technique through a study on dogs with central vestibular syndrome.

Starting from these studies, the research activity continued investigating the impact of the type of electrode on cerebral coherence in the awake dog by using the quantitative electroencephalography technique. In this study, we investigated the effect of needle and disc electrodes on the power of frequency bands and cerebral coherence in a group of vigil dogs without neurological pathology. Our results showed a coherence value greater than 0.4 only in the FP channel, mainly in the delta and theta frequency bands, when EEG traces were recorded with the help of needle electrodes. This may have important implications in neurophysiology or neurology studies (especially in patients with cognitive disorders).

The second research direction includes research on the clinic and therapy of epilepsy and epileptic emergencies in dogs. Thus, after describing a new EEG pattern (very low frequency high amplitude spike-wave complexes) in motor focal epilepsy clinically characterized by a symptomatology similar to canine idiopathic head tremor syndrome, we present the changes in the vegetative nervous system (SNA) in the interictal period in epileptic. Our research has identified specific electrical pulse conductivity delays (increased PWD and QTc interval) as well as a model of SNA function characterized by increased parasympathetic activity. Research in the field of epileptic emergency therapy has looked at the effects of intranasal midazolam (when compared to rectal diazepam or intravenous midazolam) in stopping epileptic status in dogs are presented. Our research shows that intranasal midazolam is much more effective than rectal diazepam or intravenous midazolam (when there is no prior venous access) and can be considered as first-line medication both in hospital and at home conditions.

The last research direction is represented by the clinic and diagnosis of neuromuscular diseases and presents particular aspects of myasthenia gravis in dogs (myasthenia secondary to SARS-CoV-2 infection) and polyradiculoneuritis (hypertension secondary to polyradiculoneuritis) as well as research on new possibilities of serological diagnosis of this by investigating IgG anti-GM2 and anti-GalNAc-GD1a serum antibodies and establishing their role as biomarkers.

The most important results of professional and academic activity, obtained since the completion of the doctoral thesis, can be found in Chapter II and III.

Section II outlines the plan for the advancement and advancement of professional, scientific, and academic careers. The objectives that have been proposed are included, as well as the possibilities for implementing them.

The list of bibliographic references used to prepare this thesis and the articles included in it is contained in Section III.

