

Advanced Veterinary Neuroscience – Week 1		
	Торіс	Presenter(s)
Regiona	I and Functional Neuroanatomy of the Nervous System	
•	Define the functional divisions of the nervous system	
•	Outline the structure of the spinal cord, its functional layout (dorsoventral and	
	craniocaudal) and state functions of the different regions of the grey mater, and white matter	Dr. Christine Thomson
•	State the key structures (grey and white matter) of the three functional divisions of the brain	
•	Extrapolate from normal functional anatomy, the signs of dysfunction that could occur with lesions in the different divisions	
Ventricu	lar System and Vascular Supply	
•	Identify the different components of the ventricular system and use them to help	
	determine the location of brain sections on imaging.	
•	Describe the CSF pathway from production to drainage.	Dr. Christine Thomson
•	Identify different arterial territories in the brain and spinal cord and hence be able to	
	determine which vessels must be occluded to cause infarction in a particular region.	
•	Recognize major blood vessels on brain imaging	
MRI of the	· · · · · · · · · · · · · · · · · · ·	
•	List frequently used MR sequences in the brain and their benefits Identify MRI pseudolesions	Dr. Matt Winter
•	List intracranial changes consistent with metabolic disorders	
Posture,	Gait and Sensory Systems	
•	State the key neurological functions tested in the neurological examination	Dr. Christine Thomson
•	Define core components of the limbic system and functional neuroanatomy of the ARAS	
•	Describe the functional neuroanatomy of proprioceptive pathways (conscious, subconscious, and general pathways) and the effect of lesions on an animal's proprioception	

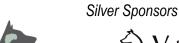
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 Differentiate nociception and pain and outline the functional neuroanatomy of these systems. 	
State the location of nociceptors that can result in spinal hyperpathia	
Motor Systems – Part I	
 Differentiate UMN and LMN structurally and functionally, and in neurological disease Define a reflex and state how reflexes and central pattern generators are used in locomotion 	
 Discuss the roles of the extrapyramidal and pyramidal systems in quadrupedal motor function 	Dr. Christine Thomson
 Outline cerebellar functional anatomy and its role in gait and posture Extrapolate to the signs of dysfunction that could occur with lesions in different motor components 	
Motor Systems – Part II	
 Differentiate UMN and LMN structurally and functionally, and in neurological disease Define a reflex and state how reflexes and central pattern generators are used in locomotion 	
Discuss the roles of the extrapyramidal and pyramidal systems in quadrupedal motor function	Dr. Christine Thomson
 Outline cerebellar functional anatomy and its role in gait and posture Extrapolate to the signs of dysfunction that could occur with lesions in different motor components 	
Myelography and CT in Neuroimaging	
 Understand the advantages and disadvantages of myelography compared to MRI when imaging the spine Understand the advantages and disadvantages of CT compared to MRI when imaging 	Dr. Silke Hecht
the spine	
MRI of the Vertebral Column	
 Select MRI sequences suitable for imaging of the canine and feline spine Develop a systematic approach to the evaluation of a small animal spinal MRI study Explain common pitfalls of small animal spine MRI 	Dr. Silke Hecht

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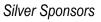


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Cranial Nerves – Part I	
 State the names, location and function of the cranial nerves and their nuclei, and which cranial nerves work together to permit various functions Extrapolate to signs of cranial nerve dysfunction caused by lesions affecting individual nerves or specific regions of the brain 	Dr. Christine Thomson
Cranial Nerves – Part II	
 State the names, location and function of the cranial nerves and their nuclei, and which cranial nerves work together to permit various functions Extrapolate to signs of cranial nerve dysfunction caused by lesions affecting individual nerves or specific regions of the brain 	Dr. Christine Thomson
Visceral Nervous System and Summary	
 State the functional neuroanatomy of the afferent, efferent and central portions of the visceral nervous system 	
 Eye: Describe / draw the autonomic innervation of the eye and adnexa. CN III, VII and sympathetic. Explain the clinical signs observed in Horner syndrome. Describe pharmacological testing of autonomic innervation of the eye. 	Dr. Christine Thomson
 Urinary bladder: Discuss the visceral and somatic innervation of the urinary bladder. Describe its function during storage and voiding. Differentiate UMN from LMN bladder and understand principles of pharmacological treatment. 	
Lysosomal Storage Diseases	
 Explain the pathogenesis of lysosomal storage diseases (LSD) Recognize the signs that suggest a diagnosis of LSD Utilize DNA testing to confirm a diagnosis 	Dr. Denny O'Brien
Metabolic Encephalopathies	
Explain the pathogenesis of inborn errors of metabolism	
 Utilize DNA testing or metabolite screening to make a diagnosis of an inborn error and apply dietary therapies, if available 	Dr. Denny O'Brien
 Explain the effects of sodium imbalances on brain function and recognize the importance of slow correction of the imbalance 	
Channelopathies Recall the role of ion channels in resting membrane potential and neuronal activity	Dr. Denny O'Brien

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Explain the pathogenesis of hereditary and acquired channelopathies	
 Apply appropriate therapies to restore normal activity 	
Movement Disorders	
Explain the function of the direct and indirect pathways of the basal ganglia	
 Differentiate paroxysmal and drug induced dyskinesias from seizures 	Dr. Denny O'Brien
Apply rational therapy to restore balance to the system	
Neurologic Examination in Large Animals	
Perform a comprehensive neurologic exam in horses, cattle, camelids, small	
ruminants, and pigs	Dr. Monica Aleman,
Recognize signs of neurologic dysfunction in large animal species	Dr. Amy Johnson
Review differences between large and small animal species	
Forebrain Disorders	
Recognize signs of forebrain disease in large animals	Dr. Monica Aleman,
Construct appropriate differential list for large animal species	Dr. Amy Johnson
Gain basic knowledge of diagnostic strategies and treatment approaches	Dr. Arriy Johnson
Episodic Events	
Appreciate the scope of episodic events observed in large animal species	
Recognize signs consistent with seizures and appropriate treatment strategies for	Dr. Monica Aleman,
seizures in large animals	Dr. Amy Johnson
 Describe other causes of episodic events, including syncope and sleep disorders, in 	Dr. 7 liny donnoon
large animal species	
Other Brain, CN, ANS	
Recognize signs of caudal fossa vs. peripheral cranial nerve disease in large animal	
species	Dr. Monica Aleman,
Construct appropriate differential lists for farm animals vs. horses	Dr. Amy Johnson
Explain the most helpful diagnostic strategies and appropriate treatments depending	,
on problem and species	
Equine Spinal Disorders	Do Mania Alama
Recognize signs of spinal cord disease in horses and apply the modified Mayhew	Dr. Monica Aleman,
grading scale	Dr. Amy Johnson

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Identify the most common causes of spinal cord disease in the horse as well as	
diagnostic and treatment strategies	
Describe current advances and limitations of imaging techniques in horses	
Non-Equine Disorders	
Recognize signs of spinal cord disease in farm animal species	
 Identify the most likely differentials for cattle, camelids, small ruminants, and pigs with 	Dr. Monica Aleman,
spinal cord disease	Dr. Amy Johnson
 Explain typical diagnostic algorithms and treatment strategies for each farm animal species 	
Tetany, Tremor and Neuromuscular Disorders	
Recognize signs of tetany and understand most common causes in farm animals vs.	
horses	Dr. Maniaa Maman
Recognize signs of diffuse neuromuscular weakness in large animal species and	Dr. Monica Aleman, Dr. Amy Johnson
prioritize differentials depending on species	Dr. Arriy Johnson
Describe immediate diagnostic and treatment principles for tetanic and neuromuscular	
syndromes in large animal species	
Cases	
Practice identifying and localizing signs of neurologic disease in large animals	Dr. Monica Aleman,
Apply knowledge of large animal diseases to construct a differential diagnoses list	Dr. Amy Johnson
Practice recommending appropriate diagnostic and treatment strategies depending on	Dr. Arriy Johnson
species and neuroanatomic localization	
Neuromuscular Pathology	
Recognize different nerve fiber types and to recall their function and	
neurophysiological properties	
Describe the various kinds of peripheral ganglia	Dr. Kaspar Matiasek
 Link specific substructures and ion channel distribution to the neurophysiological 	
properties	
Explain how structural changes might impact on nerve conduction	
Neuromuscular Pathology	
 Describe the most prevalent triggers and causes of congenital and acquired peripheral neuropathies in domestic animals 	Dr. Kaspar Matiasek
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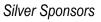
















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•	Recognize main disease phenotypes from representative images	
•	Name the most important pathological neuropathy categories and to understand about	
	their principal pathobiology	
Neuron	nuscular Pathology	
•	Describe the physiological and biochemical properties of the most important muscle fiber types	
•	Explain the general composition of muscle tissue, its functional and supportive elements, including its vascularity and innervation	Dr. Kaspar Matiasek
•	Recall the most important molecular players of muscle excitation, contraction, and relaxation	
Neuron	nuscular Pathology	
•	Recognize and name the most relevant muscle fiber abnormalities	
•	Explain the most common causes of myopathies in domestic animals	Dr. Kaspar Matiasek
•	Categorize myopathies in accordance with etiology, dysfunction and histological	•
	phenotype	
Cerebr	ospinal Fluid Analysis of the Dog and Cat	
•	List the indications and contraindications of CSF collection	
•	Describe the different methods of CSF collection and their relative advantages and disadvantages	Dr. Chris Mariani
•	Discuss the analysis of CSF parameters and how these parameters change with different disorders	
Infectio	us Meningoencephalitis	
•	List some common infectious agents that can invade the CNS of veterinary patients	
•	Describe the mechanisms by which infectious organisms cause CNS dysfunction	Dr. Chris Mariani
•	List the diagnostic assays available to identify infectious organisms and elaborate on	Dr. Chris Mariani
	their various advantages and disadvantages	
•	Generate a diagnostic plan for animals with a potential CNS infection	
Non-Infectious Meningoencephalitis		
•	List the different syndromes comprising non-infectious meningoencephalitis and describe their differentiating factors	Dr. Chris Mariani

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Generate a diagnostic plan for a patient presenting with signs compatible with non-	
infectious meningoencephalitis	
Treatment of Non-Infectious Meningoencephalitis	
 Explain the general mechanisms of action of immunosuppressive drugs used to treat 	
non-infectious meningoencephalitis	Dr. Chris Mariani
List the potential adverse effects of these medications	Dr. Griris iviariarii
 Discuss the results of clinical studies of these drugs in the context of non-infectious 	
meningoencephalitis therapy	
Intro to Electrodiagnostic Theory and Testing	
 Understand the biological source of signals recorded in electrodiagnostic tests 	
Recognize how machine recording settings affect the recorded response	Dr. George Strain
 Utilize artifact sources and actions you can take to remedy them and other recording 	Dr. George Strain
problems	
 Know what to do when it doesn't work – a logical stepwise approach 	
Hearing and Deafness	
Describe cochlear anatomy and physiology	
Distinguish between sensorineural and conduction deafness	
Distinguish between pigment-associated and non-pigment-associated inherited	Dr. George Strain
deafness	
Distinguish between different forms of non-congenital deafness	
Counsel clients with affected pets	
AER, Tympanometry, OAEs	
Recognize how a BAER test is performed and results are interpreted	
Describe the effects of age, temperature, and drugs on recordings	Dr. George Strain
Appreciate the effects of recording and stimulus settings on recordings	
Describe how tympanometry is used to assess middle ear function	
Electrodiagnostics – EMG	
Recognize how to optimally perform an EMG examination	Dr. Colette Williams
 Identify normal EMG events (insertional activity, MEPP/end plate spikes, MUAP) and 	Dr. Colette williams
abnormal ones (giant MUAP, absent/decreased/prolonged insertional activity,	

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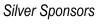
















fibrillation potentials, positive sharp waves, CRD, myotonic potentials, myokymic potentials)	
Incorporate the role of EMG in a complete neuromuscular workup Standard in the Company of Market Name Constant in the Company of the	
Electrodiagnostics – Sensory & Motor Nerve Conduction Velocity	
 Explain techniques used in motor and sensory nerve conduction velocity determinations 	
 Calculate numerical data such as, amplitudes, latencies and conduction velocities, 	Dr. Colette Williams
from a set of motor and sensory recordings and describe other features of these	
potentials	
Relate NCV findings to various disorders	
Electrodiagnostics – Late Wave, RNS, CDP, SSEPs	
Calculate f-ratios and to interpret the results	Dr. Colette Williams
Identify significant findings in RNS studies	Dr. Colette Williams
Recognize the utility of CNS recordings (CD, SEP and SSEP)	
Electrodiagnostics – Case Studies	
Critically evaluate all aspects of a given study to formulate a plan for additional	Dr. Colotto Williams
diagnostics	Dr. Colette Williams
Narrow down the diagnosis as closely as possible to aid in prognostication	

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