

Pattern diagnosis in veterinary neuropathology

Introduction and guide

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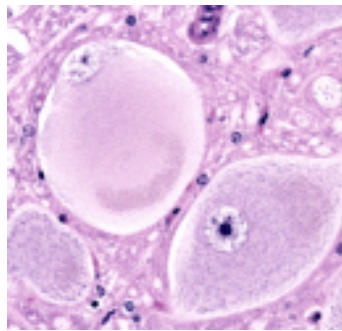
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*"When we try to pick out anything by itself,
we find it hitched to everything else in the
Universe"*

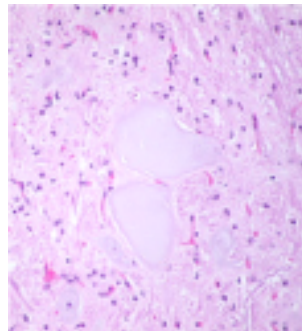
John Muir, My First Summer in the Sierra
(Boston: Houghton Mifflin, 1911)

Why a lesion pattern-based approach ?

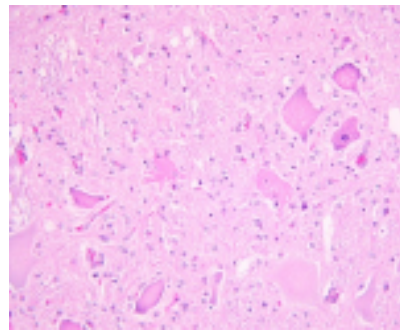
- Limited history - 'neurological signs'
- Considerable overlap in pathology between toxic, intrinsic and acquired metabolic, and infectious diseases



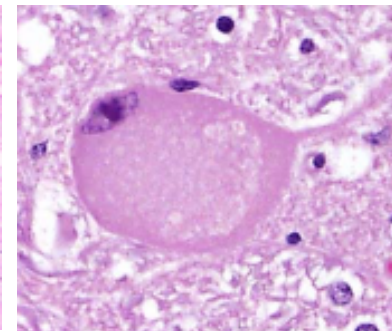
copper deficiency



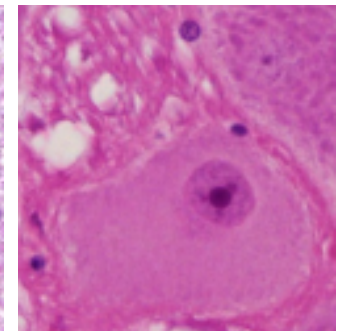
breed-related
encephalopathy



severe flaviviral
infection



aspergillus clavatus
toxicity



compressive

Background

The nervous system's repertoire of cytopathological changes is limited, so the pathology of many inflammatory and neurodegenerative (genetic, acquired metabolic, toxic) diseases overlap considerably.

Neuronal lesions are associated with gliovascular changes and vice versa, neurodegenerative lesions are associated with immune responses and vice versa.

In addition there is considerable potential for confusion due the nervous system's propensity for artefactual change to mimic lesion.

Nevertheless, using a pattern based approach which combines data on cytopathology and anatomical distribution, it is possible to discern major lesion patterns which form a basis for understanding the underlying cellular pathogenesis and establishing differential diagnosis lists.

I would appreciate comments on this approach and correction on any matters of fact or omission.

A pattern approach to diagnostic neuropathology

Orientation in neuraxis:

- Grey matter / white matter / both / meninges / vasculature
- Symmetrical / random
- Neuroanatomical location (standardised sites)

Lesion type:

- Inflammatory / cellular infiltrate
- Degenerative / cytopathology

Generate list of possible aetiologies

- signalment + history
- further testing if appropriate

Aetiological diagnosis (hopefully) !

Major lesion groupings – neurodegenerative

Grey matter

- Neuronal necrosis
 - Laminar cerebrocortical, hippocampal, cerebellar
- Neuronal degeneration / spheroid formation
- Multi/focal neuropil / parenchymal necrosis / malacia
- Vacuolation / inclusions

Grey matter and white matter

- Multi/focal neuroparenchymal necrosis
- Chromatolysis / long fibre tract degeneration
- Spheroid formation
- Vacuolation

White matter

- Multi/focal neuroparenchymal necrosis / malacia
- Spheroid formation
- Hypomyelination
- Dysmyelination (lesions of myelin sheath / oligodendroglia)
- Vacuolation

Groups of neuraxial inflammatory diseases

Inflammatory infiltrate

- Purulent (suppurative)
- Fibrinous
- Haemorrhagic
- Eosinophilic
- Granulomatous / histiocytic
- Non-suppurative
- ± necrotising

Microscopic localisation

- Meningitis
- Encephalitis / myelitis / encephalomyelitis
 - Grey / grey and white [pan] / white
- Meningoencephalitis / meningoencephalomyelitis

Regional anatomical distribution

Neuropathology references

CORNELL

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Principal Content Editor

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