

Contents

Abbreviations	7
List of figures.....	10
1.Introduction	14
2. Literature review	15
2.1 Definition of primary epilepsy	15
2.2 Breed predisposition in idiopathic epilepsy	16
2.3 Pathophysiology of primary epilepsy	17
2.4 Morphology of the hippocampus	18
2.5 The role of the hippocampus in epilepsy	24
2.6 Refractory epilepsy	26
2.7 MRI abnormalities in dogs with seizures	27
2.8 Magnetic resonance spectroscopy	29
2.8.1 Physical principles of MR-spectroscopy	29
2.8.2 Quantification of MR Spectra	32
2.8.3 Major metabolites	37
2.8.3.1 N-acetyl aspartate (NAA) – the neuronal marker	38
2.8.3.2 Choline (Cho)	42
2.8.3.3 Creatine (Cr)	42
2.8.4 Internal metabolite referencing	44
2.8.5 MRS methodology on animal models of epileptogenesis	45
3.Research study	47
3.1 Aim of the study	47
3.2 Materials and Methods	47
3.2.1 Study population	47
3.2.2 Neurodiagnostic investigation	48

3.2.3 Anaesthesia protocol.....	49
3.2.3 Magnetic Resonance Imaging (MRI).....	49
3.2.4 Magnetic Resonance Spectroscopy (MRS)	49
3.2.6 Data processing and quantification	50
3.2.7 Statistical analysis.....	53
4.Results.....	54
4.1 Comparison of the metabolite ratios between the control and diseased group	61
4.2 Correlation between the metabolite ratios and the age and sex	63
4.3 Correlation between the metabolite ratios and the time from the last seizure in the group of the diseased dogs	65
5. Discussion.....	66
5.1 Limitations of the study	68
6. Conclusion	71
7. Summary	71
8. Zusammenfassung.....	71
9. Acknowledgments	72
8. References	73
9. Ethics	94