Experience related changes in dog (Canis familiaris) sleep EEG

Introduction
Information processing and memory consolidation have been the focus of sleep research for a long time, thus these phenomena are widely studied both in humans and model systems (Klimesch 1996, Stickgold et al. 2001). Dogs have become a primary model of social cognition research, however these have almost exclusively focused on awake functioning. Furthermore, apart from a few exceptions (e.g. Törnqvist et al. 2013) EEG data on animal models is gathered with invasive techniques.

AIM
To adapt the human (non-invasive) polysomnographic technique to dogs.

QUESTIONS
STUDY 1: Is the sleep pattern of dogs different following a behaviourally active versus passive day? (method validation)
STUDY 2: Is memory consolidation after a learning task reflected in dog sleep EEG?

RESULTS
STUDY 1
Active day: 6-8 hours of walking and/or training
Passive day: 6-8 hours at home without any activity

STUDY 2
Learning: known actions to be executed on new commands
Control: known actions executed on known commands

Conclusions
- Human non-invasive polysomnography can be applied to dogs.
- Experiences influence both the macrostructure (active/passive day) and the relative EEG spectrum (active/passive day; learning) of sleep in dogs – similarly to humans.
- These results validate the family dog as a model species for studying the effect of pre-sleep activities on EEG pattern under natural (non-laboratory) conditions.

References

Acknowledgement
Szilvia Csóka and Bogrács for their pioneering work that inspired this project Ferenc Gombos for invaluable technical help Enikő Kovács for assistance with data recording MTA 01 031 and K 84036 for financial support