Jacketed external electroencephalographic (EEG) telemetry monitoring in conscious beagle dogs and cynomolgus monkeys: qualification of a central nervous system safety testing model

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INTRODUCTION
Implanted EEG monitoring by telemetry was reported in non-clinical studies but non-invasive with freely moving EEG recordings by telemetry as used in humans was not previously reported in non-rodents.

MATERIALS AND METHODS
A system for non-invasive continuous EEG-video monitoring by telemetry was qualified in dogs and non-human primates. EEG traces were obtained in beagle dogs and cynomolgus monkeys using short electrophysiology needles in a Cz-Oz configuration from the 10-20 system connected to a telemetry transmitter. An intravenous infusion (1.7 mg/kg/min) of pentylenetetrazol (PTZ) was used to characterize the model for seizure detection.

DISCUSSION
The incidence of signal artifacts was low (<5% of total EEG traces) and adequate for EEG interpretation. Non-invasive EEG monitoring was associated with a higher incidence of signal artifacts than surgically implanted EEG telemetry. The power of the EEG spectral bands was lower than values obtained from surgically implanted EEG leads but with comparable ratios between each band (delta, theta, alpha, sigma and beta). EEG traces showed normal profiles for the species evaluated with circadian changes. Upon PTZ infusion onset, paroxysmal EEG activity was observed with the expected trace morphologies (e.g. isolated sharp waves, repeated sharp waves, increased synchrony). PTZ induced ictal activity showed expected characteristics with a dominant frequency at Fast Fourier Transform (FFT) ranging from 3-6 Hz in dogs and monkeys.

RESULTS

CONCLUSION
Non-invasive EEG monitoring by telemetry in freely moving animals was confirmed to be adequate to monitor normal, pre-ictal and ictal CNS activity in conscious beagle dogs and non-human primates.

REFERENCES