Introduction

- Activity levels can serve as a clinical outcome in preclinical studies
- Assessment is subjective, time-consuming and prone to artefact
- Video monitoring often not suitable for studies in high containment for group-housed animals
- Implantable accelerometer-based data loggers are a useful tool to measure activity in experimental ferrets.

Method

- Validation phase: performance of the accelerometer-based dataloggers (DST-Tilt) was validated using live video monitoring during an open field experiment
- Experimental phase: data loggers were used in an efficacy experiment using group-housed ferrets in high containment.

Validation phase

- The performance of the data logger was validated during an open field experiment (see Figure 1) with simultaneous live video monitoring.
- The loggers recorded accelerometer data at 15 second intervals for 1 minute, resulting in 4 measurements, every 5 minutes over the duration of the measurement period.
- Twelve healthy outbreak female ferrets (Mustela putorius furo), were equipped intraperitoneally with data loggers.
- Results from the loggers were compared to observer-based video-tracking analyses (Figure 2 and 3).

Experimental phase

- Ferrets were either vaccinated or placebo treated and subsequently challenged with influenza virus.
- The loggers recorded accelerometer data at 15 second intervals for 1 minute, resulting in 4 measurements, every 5 minutes over the duration of the measurement period.
- Classical data (e.g. body weight loss, body temperature and viral shedding/load) were generated.
- Results from the loggers were compared to classical data (Figure 4).

Results

Validation phase:

- Activity scores generated by two independent observers following evaluation of the video footage, and by the logger data analyses, plotted over time, demonstrated good overlap of the detected periods of active behavior

Experimental phase:

- Higher body weight loss and higher viral load in the lungs were detected in placebo treated animals
- Percentage of body weight loss correlated negatively with the activity measures

Conclusion

Activity levels, derived from implantable loggers represent a valid clinical outcome measure for preclinical studies, with added value for the refinement of animal experiment.