Gait Analysis

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Summary:

This test uses a treadmill, a high-speed camera, and a software to capture and analyze gait (stride, stance, swing times, stride length and frequency) in mice. The comprehensive, quantitative assessment of gait in mice can be used to evaluate motor performance, balance and ataxia.

Reagents and Materials:

Reagent/Material	Vendor	Stock Number
ExerGait XL Treadmill	Columbus Instruments	
Treadscan software	CleverSys	
High speed camera w. software	CleverSys/Basler	
Computer w. video card/monitor	Dell	
Lab coats/gloves/PPE		
Cleaning solution/Paper towels	10% Nolvasan	
Disinfectant-Coverage Plus	Steris	

Protocol:

1. SET-UP

a. Acclimate mouse in their home cages in the testing room at least 1 hour before testing.
b. Room lights ON; treadmill lights ON at least 5 min prior to testing.
c. Position the camera to capture all treadmill belt (entire mouse needs to be captured by camera).
d. Open Camera Software and Grab Menu: select “Set Max Frames to 1500” and “Grab to memory”
e. Capture background frame without mouse on treadmill.
f. Treadmill conditions (speed and duration) must be defined according to subjects and protocol.

2. PROCEDURE (total time is ~30 min)

The aim is to capture sufficient length of video for accurate analysis, usually more than 5 sec of mouse running without wall contact. This can require more than one trial per mouse. Set an acceptable maximum number of trial (e.g., 3) before removing the mouse from procedure.

a. Place mouse into treadmill enclosure by opening top lid, acclimate for 30 sec.

N**OTE: make sure the mouse is oriented in the proper direction (towards the front of treadmill) before turning the treadmill on.**

b. Slowly adjust treadmill speed to 20 cm/sec (rotary dial to 13). Adjust speed to the highest the mice can handle (rotary dial to 8 is the preferred minimum speed).

c. When mouse is running steadily, start recording (select "Red Dot Button").
NOTE: gently prod the mouse with a ruler if mouse is trailing).

d. Image capture is initiated when subject displays a stable gait, but is restarted if mouse cannot complete a useable/analyzable run within 20 seconds.

e. The treadmill will stop automatically when the defined length of video has been captured.

f. Remove mouse by opening side door of treamill enclosure and thouroughly clean the treamill and enclosure with 10% Nolvasan.

g. At the end of the procedure, disinfect the instrument and bench top with Coverage Plus.
NOTE: change gloves between mice.

h. Saved video footages are analyzed using the Treadscan Software. Completed videos are ropped by selecting the first frame of a run and adding 500 frames to make a 5-second video for analysis.

IMPORTANT NOTES:

- If the mouse cannot produce an "analyzable run" as determined by video capture software after 2 min, or constantly contacts the walls of enclosure, the treadmill must be stop and the trial is a failure.
- A maximum number of trials must be set (protocol). Mouse must have a 30-60 sec rest period between trials.
- A mouse is removed from analysis when it fails to accomplish an analyzable video after 3 trials (or as defined by research protocol).