Whole Body Tension Protocol.v1.1

This protocol will allow for measurement of whole body muscle strength as an index of muscle contractile function *in vivo* as previously published (Carlson, 1990; Carlson, 2010).

Whole body tension measurement
1. Perform this test at 10 am in the morning unless the experimental design requires a different time.
2. Turn on the PC and plug in the transducer pre-amp.
3. Open "Data Quest Instrument Hardware Manager" software, and chose "4ACF1F18" and click "Start Windag" to start monitoring.
4. Turn the "Off set" dial on the transducer pre-amp all the way clockwise.
5. Adjust "Gain" to "0.00". Check force on monitor whether force (Volt) is ".000". Adjusting the "Gain" very carefully and gently so that the voltage reads at ".000".
6. Go to "Edit", open "Sampling rate" and change sampling rate to "100".
7. Go to "Scale" and open "Limit" to change scale (Bottom limit: -0.1, Top limit: 0.5)
8. Tape the wire to the base of the mouse's tail and the other end into the transducer. **<u>Attention: Put the wire on the upside of the tail very tightly, and remove excess tape.</u>**
9. Place the mouse in the tunnel made of a metal mesh. Make sure the mouse is pointing towards the end of the tunnel. Close the end of the tunnel with a cardboard box.
10. To start record, go to "File" and chose "Record", and you will be asked to choose a file name and location. You will be asked "File size" and "Recording time", but you do not change these parameter. If you want to stop the recording, go to "File" and chose "Stop".
11. Pinch the mouse's tail (at different locations each time) and monitor the recordings to see if a decent peak is achieved. Attempt to obtain at least 10 peaks but wait approx. 10 seconds between pinches.
12. Leave some recording with no action at the beginning and end of each mouse. A marker can also be placed by pressing "Control + Space".
13. Stop the readings by clicking "Freeze" option. Your data will appear automatically.
14. Click on "Edit" and then "Compress" to compress the data so that all the recordings can be visualized. Compress at the maximal level.
15. Choose "Scaling" and click on "Division". Chose base at 0 and divisions as 0.1 so each grid will be equal to 0.05
16. Estimate the values of the top 5 peaks obtained and record them in the notebook. **<u>Attention: You should check the values with Maximized Screen. Otherwise, force value of the square is not 0.05.</u>**
17. Turn off PC and unplug the transducer pre-amp.

Calculation
Calculate force from standard curve. The data needs to be normalized by expressing the force generated per gram body weight.

Calibration
*The force transducer is quite reliable, and it is not necessary to calibrate for each experiment.
1. Place whole body tension equipment to **<u>vertical</u>**.
2. Use steps 1-6 for the whole body tension measurement.

3. Go to "Scale" and open "Limit" to change "Bottom limit" and "Top limit". For the calibration, Top limit=1 and Bottom limit=-0.1 should be enough.
4. Put different weight (0g, 30g, 50g, 100g, 200g, 300g, 500g and 800g) and record the reading to make a standard curve.

References

Carlson and Makiejus. A noninvasive procedure to detect muscle weakness in the mdx mouse. Muscle Nerve (1990) vol. 13 (6) pp. 480-4

Carlson et al. A simple protocol for assessing inter-trial and inter-examiner reliability for two noninvasive measures of limb muscle strength. J Neurosci Methods (2010) vol. 186 (2) pp. 226-30