

Weightlifting Cage Calibration

Principle:

We need to calibrate the weightlifting cage to obtain an calibration equation for determining the weight need to be added to the lever plate to achieve desired work load for mice.

Procedures:

A. Calibrate the force transducer, if needed.

(Use a designated force transducer, which may not be required to be calibrated every time)

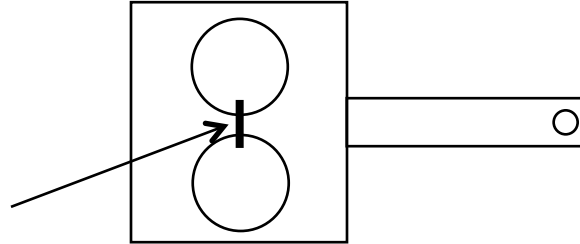
- 1) Turn on the computer and plug in the Pre-Amp;
- 2) Open the WinDaq software and set the sampling rate to 100 (i.e. every 10 ms);
- 3) Turn the "Offset" knob clockwise all the way;
- 4) Adjust the "Gain" to 0;
- 5) Attach the following weights (from "Standard Weights" ox) to the metal string on the force transducer (make sure it does not touch any other objects);
- 6) Record the readouts (in volts) on screen for each weights added:

Readout	Weight (g)
	0
	0.82
	2.86
	6.33
	12.88
	20.12

- 7) Plot "readout (x) – weight (y)" as "Marked Scatter" graph in excel;
- 8) In excel, add a trendline to the scatter graph (right click the data points and choose "Add a Trendline"; make sure to check "Display equation on chart" and "Display R-squared value on chart");
- 9) The equation of the trendline ($y = ax \pm b$) represents the relationship between the readouts (volts) and the actual weight (g).

B. Calibrate the weightlifting (WL) cage top

- 1) Tie the moving arm compartment on the WL cage lid to the force transducer with a cotton string at the tie point:



*make sure that:

- a) the cotton string is tied in the middle of the two openings of the lever plate as showed (the position to which the mouse applies its force);
- b) the cotton string is vertically aligned with the metal string on force transducer;
- c) the lever plate is lifted slightly off.

*place the cage top on a cage and tilt it if necessary to ensure that the string is not touching anything.

- 2) Record the readout (in volts) for without adding any weight to the hook on the end of the lever plate;
- 3) Attach the following weights (can be the same as when calibrating the force transducer) to the end of moving arm and record the **readouts** (in volts):

Cage Calibration		
Readout (volts)	Load	Weight (g)
		0
		0.82
		2.86
		6.33
		12.88
		20.12

- 4) Calculate "Load" column with the new readouts according to the calibration equation in part A (the trendline equation for force transducer).
- 5) Plot "Load (x) – Weight (y)" as "Marked Scatter" in excel;
- 6) Add a trendline to the scatter graph (right click the data points and choose "Add a Trendline"; make sure to check "Display equation on chart" and "Display R-squared value on chart");
- 7) The equation of the trendline ($y = ax \pm b$) is to be used for calculating weights (y) to be added to the moving arm for a specific desired load (x), e.g. x% of body weight.

- 8) Lastly, print the trendline graph for individual cage top, seal it in plastic wraps, and tape it onto each cage top for future reference.