How to Calculate Mean, Standard Deviation (SD), Standard Error of the Mean (SEM), and 95% Confidence Interval Using Excel

1. Enter your measurements or values in a column in an Excel spreadsheet.

```
Measurements
23  
27  
29  
23  
25  
21  
24  
27  
23  
26
```

Choose a label for your measurements. In this example, the label is “Measurements,” but it should be something more descriptive like “Relative Hindlimb Length.”

Select the cell where you want the mean to appear and label the cell next to it “Mean.”

2. Start typing “=AVERAGE” in the cell where you want the mean to appear.

```
=AV
```

As you start typing, Excel will display matching functions in a drop-down menu. Click on “AVERAGE” when it appears.
3. After you select “average,” select the values you will use to calculate the mean.

Use your cursor to highlight the range of values and press “Return.” Alternatively, you can type in cell numbers. In this example, you would type “=AVERAGE(D9:D18)” and press “Return.”

4. The mean will appear in the cell you selected.

The sample mean is 25. Now, select the cell where you want the standard deviation to appear and type “Standard Deviation” next to it.
5. Start typing “=STDEV.S” in the cell where you want the standard deviation to appear.

As you type, Excel will display matching functions in a drop-down menu. Click “STDEV.S” when it appears. (Note that “STDEV.S” is the function for sample standard deviation. Excel has another function, “STDEV.P,” for the population standard deviation.)

6. Select the values that you want to use to calculate the standard deviation—the same ones you used for the mean.

After you select the values, press “Return.” Be careful not to include the value for the mean in your selection.
7. The standard deviation will appear in the cell you selected. Next you will calculate the standard error of the mean (SEM).

8. Excel does not have a built-in function for calculating SEM, so you will enter this calculation manually.

SEM is the standard deviation divided by the square root of the sample size, which is 10 in this example. To calculate SEM, type “=STDEV.S(range)/SQRT(COUNT(range))”. Range is the range of values, which here is D9 to D18. You can also type in “=D20/SQRT(10)”. D20 is the cell with the standard deviation. Press “Return.”
9. The SEM will appear in the cell you selected. You will now calculate the 95% confidence interval (95% CI).

10. In this lab, we are estimating the 95% CI as 2 times SEM.

Select the cell where you want the 95% confidence interval to appear and type “95% CI” next to it.

You can calculate this in Excel by typing “=2*(D21).” D21 is the cell with the SEM value.

Press “Return” and the 95% CI will appear in the cell you selected.
11. You can also calculate 95% CI using Excel’s built-in function.

Start typing in “=CONFIDENCE.” When the function appears, click on it.

You will then type in “=CONFIDENCE(0.05, standard_dev, size).” In this example, the values are “=CONFIDENCE(0.05, D20, 10).”

Press “Return” and the 95% CI will appear. You will see that the number is not exactly the same as the estimate of twice SEM for this particular sample.