

# Exploratory markdown

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## Libraries

```
tidyverse  
lubridate  
gapminder  
modelr  
broom
```

## Data

Two data files will be used for this exploratory analysis. The CEA\_data includes physiological measurements of the oysters during the exposure trials as well as size measurements, mortalities, and upper lethal temperatures. The algae data includes the number of algae cells cleared over time during a post exposure clearance rate trial.

## Basic Data Exploration

### CEA Data:

**Rows:** n = 175

**Columns:** n = 24

**Column Names:** Species, Date, Day, Treatment, Fiber concentration, Tank ID, Animal ID, CHO, LiP, PRT, Ea, Ec, CEA, Shell width, Tissue Mass, X16, Treatment b, Fiber concentration b, Initial n, End of expt Mortality, X21, Treatment c, Fiber concentration c, Upper lethal temperature

### Algae Data:

**Rows:** n = 20

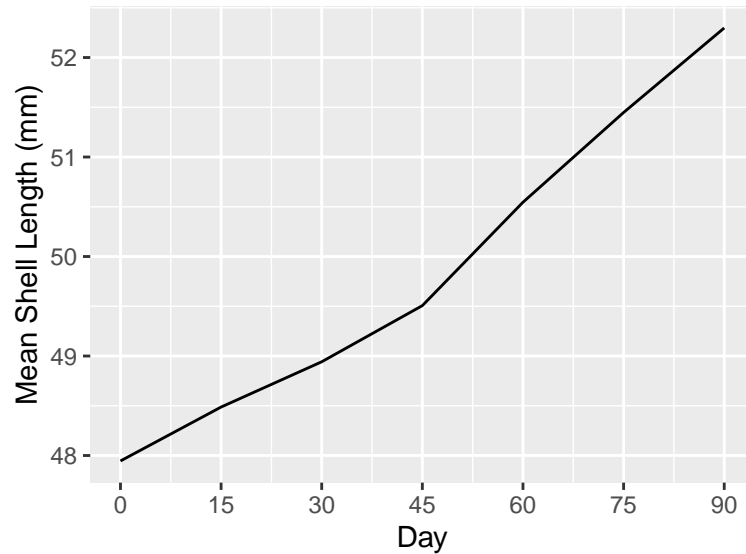
**Columns:** n = 4

**Column Names:** Treatment, Fiber concentration, Time, Algal cell concentration

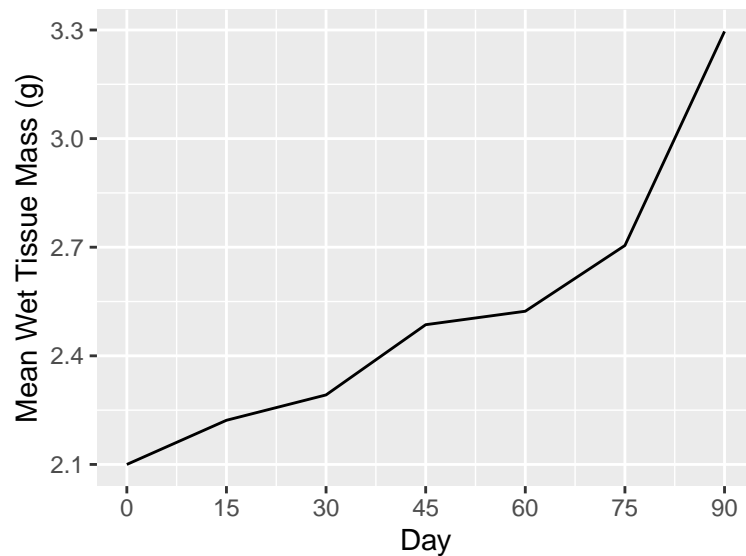
After looking over the column names it appears that the CEA data seems a bit disorganized. It looks like there are some spaces left between columns that should be removed and I think it is worth while to assign a few more variables to help separate and organize all of the data.

To start, I am curious to see if there was any noticeable growth among the oysters over the duration of the experiment.

Basic plots of shell length and tissue mass by day to determine if there was any growth overall in the oysters during the duration of the experiment (regardless of treatment exposure)



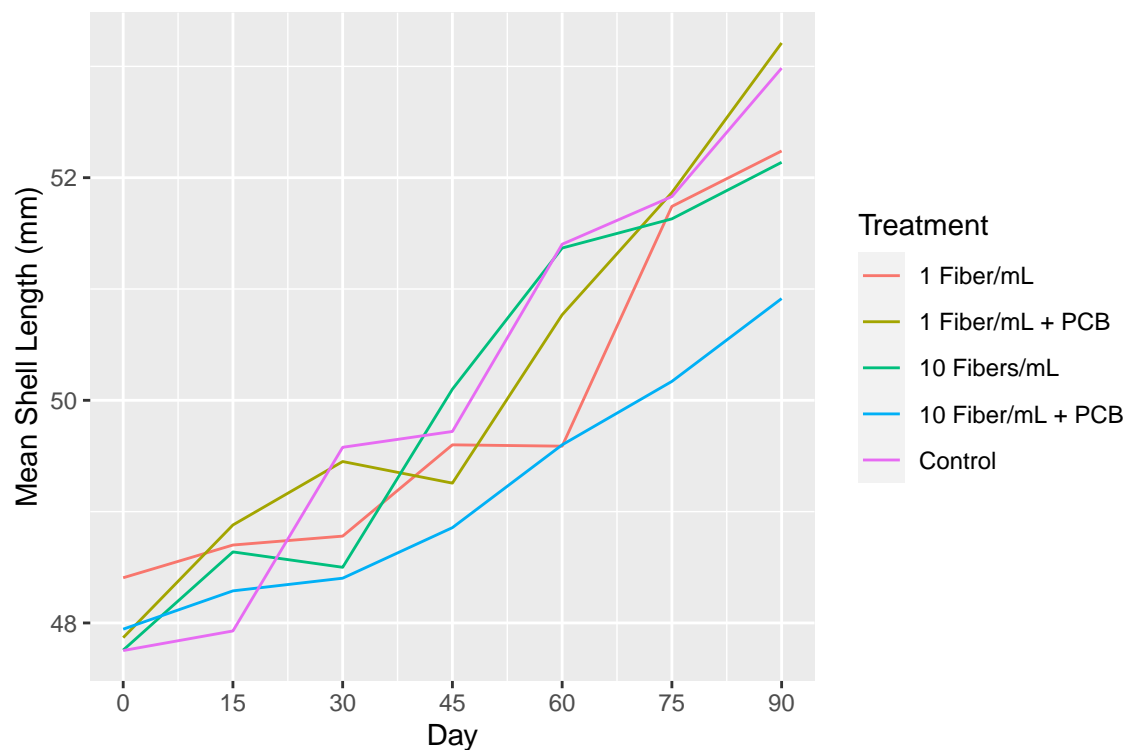
**Figure 1.** Mean shell length of oysters per sample day over the duration of the experiment. Overall there is an obvious upward trend indicating that there was indeed some shell growth during the experiment.



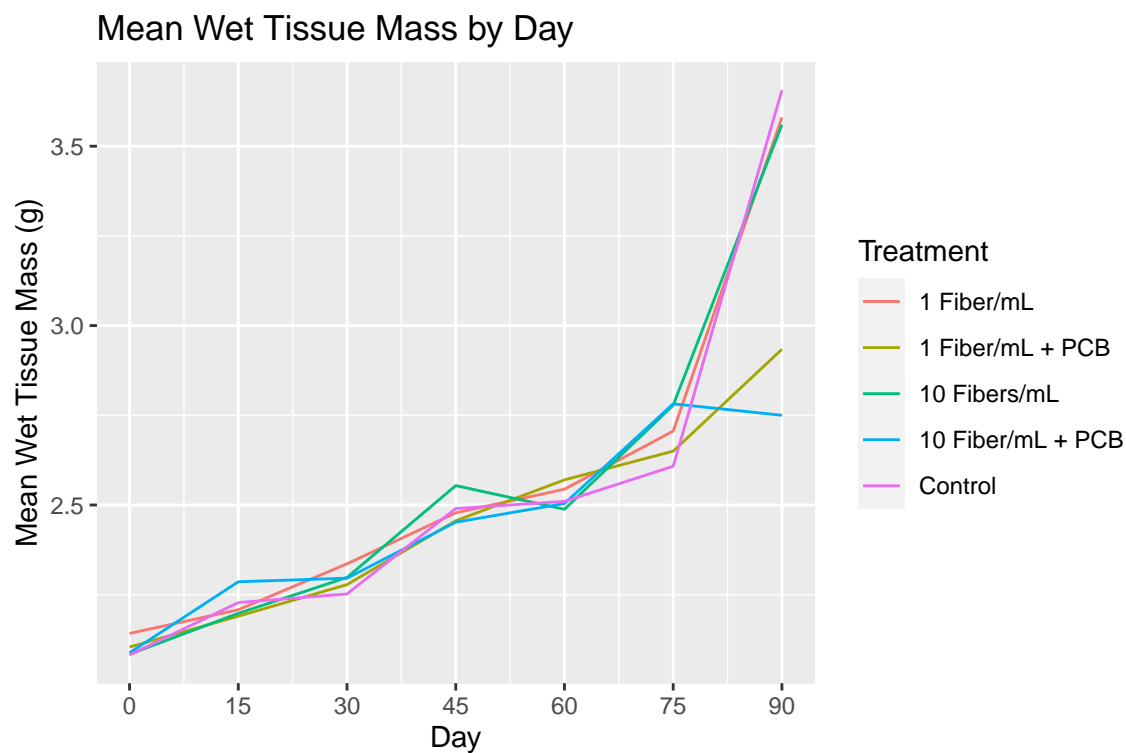
**Figure 2.** Mean wet tissue mass of oysters per sample day over the duration of the experiment. Overall there is an upward trend with the largest increase in tissue mass occurring after day 75.

These two plots tell me that there was at least some growth occurring in the oysters over the duration of the experiment indicating that our husbandry techniques were sufficient enough to allow for proper growth to occur.

I am now curious to see if there was any differences in growth trends between treatments.



**Figure 3.** Mean oyster shell length by treatment and by day. Variations within the data may potentially be a result of damage/breakage of shells while being handled throughout the experiment. Overall trends appear similar among the treatment groups with the exception of 10 Fibers/mL + PCB which appears to have experienced less shell growth overall.



**Figure 4.**