With log transformation

- Additive change
  - ✓Same amount of change in Y regardless of x values
- Multiplicative change
  - ✓Change of Y depends on x values

- We expect to see β increase in log(Y) with one unit increase in X (-> hard to get what it means)
- Important to interpret with **original scale of Y**
  - Meaning of positive or negative β
  - Multiplicative change instead of additive change

Data: athletes.txt

- Data on 102 male and 100 female athletes collected at the Australian Institute of Sport, courtesy of Richard Telford and Ross Cunningham.

- Sport: Sport
- Sex : male or female
- Ht : Height in cm
- Wt : Weight in kg
- LBM : Lean body mass
- RCC : Red cell count
- WCC : White cell count
- Hc : Hematocrit
- Hg : Hemoglobin
- Ferr : Plasma ferritin concentration
- BMI : Body mass index = weight/height^2
- SSF : Sum of skin folds
- %Bfat : % body fat

Data: athletes.txt

- Response: Ferr (Plasma ferritin concentration)
- Predictors: all except Sport

❖ **Use original scale of Ferr**

- Stepwise selection through “proc reg” with .05 criteria for entering and removal of variables
- Check diagnostics plot
- Interpretation of estimated coefficients

❖ **Use log transformed Ferr**

- Try log transformation on Ferr
- Repeat the same thing with log(Ferr)
- Check diagnostics plot
- Interpretation of estimated coefficients

With log transformation

- When x is continuous
  - Y is expected to increase/ decrease with multiplicative factor being $e^{\widehat{\beta}}$, with one unit increase in x
- When x is categorical
  - Expected Y of male (comparison group) is $e^{\widehat{\beta}}$ times for the expected Y of female (reference group)