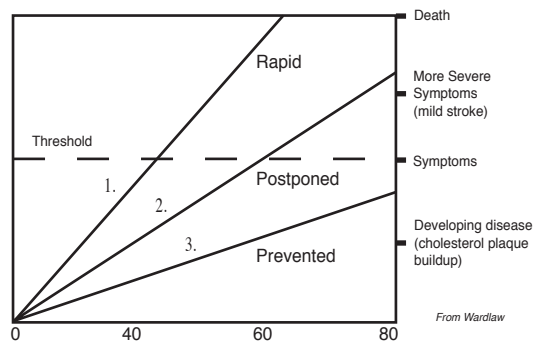


# Introductory Handouts

Select Introductory  
Handouts to  
Accompany Lecture



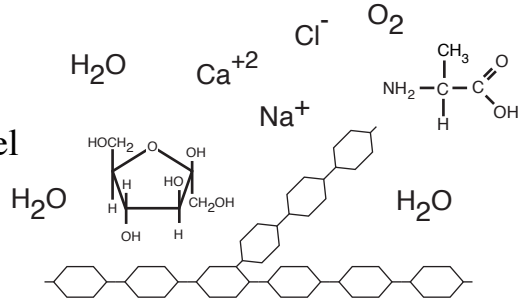
*By Noel Ways*

# Levels of Organization

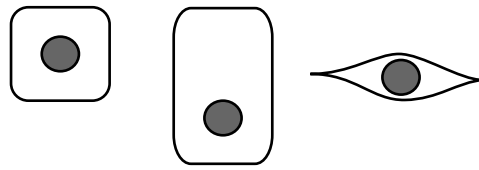
Organism  
Me  
You



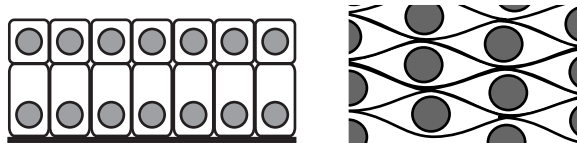
Chemistry Level  
Atoms  
Molecules



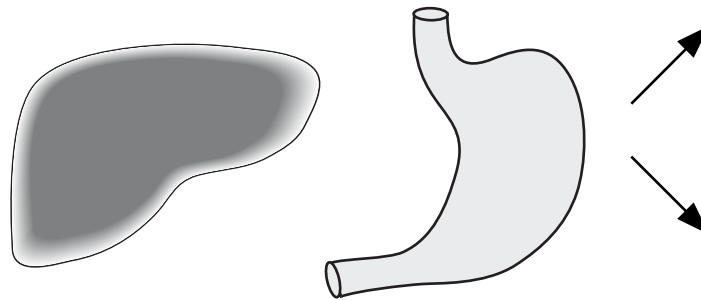
Cellular Level  
Muscle Cell  
Neuron  
Adipocyte



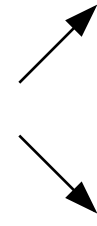
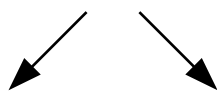
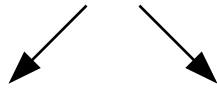
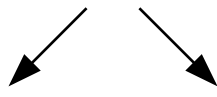
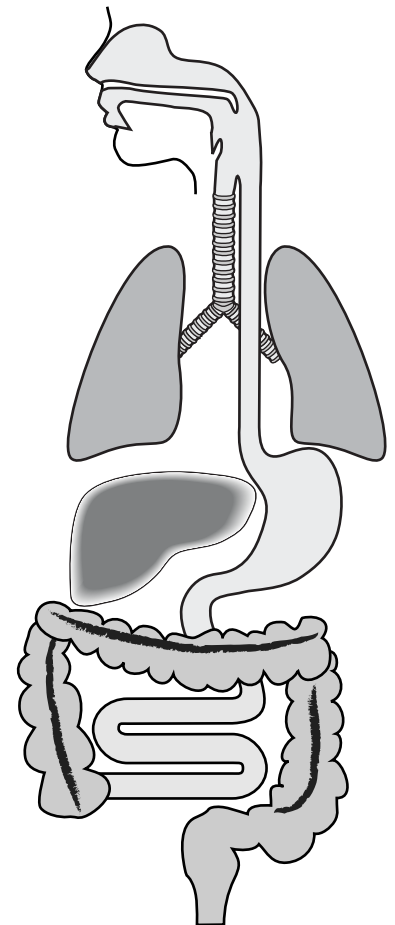
Tissue Level  
Muscle Tissue  
Nervous tissue  
Fat Pads



Organ Level  
Heart  
Stomach  
Lungs



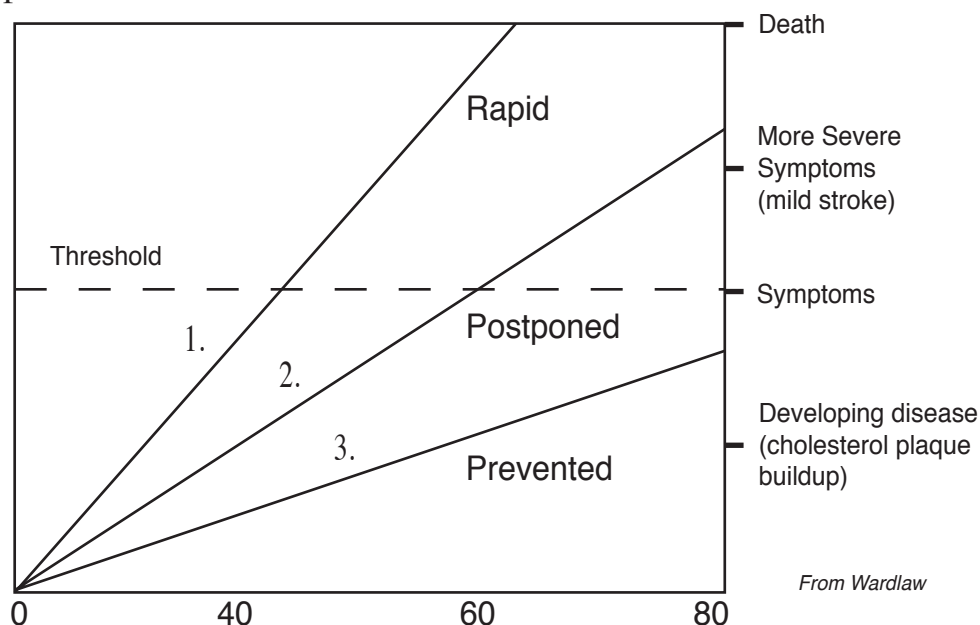
Organ System Level  
Respiratory system  
Digestive System  
Nervous System



# Compression of Morbidity

It is the desire of most of us to live out our life span and be productive, happy, and in the end, to know that we have had a positive impact in those areas of life and the lives of people most important to us. To do so, time, unhampered by a sick and infirm body is a necessary ingredient. The quality and quantity of these two ingredients, time and health, are significantly effected by the decisions that we make relative to our physiology. And it is true that we can reduce risk factors that contribute to chronic disease and death.

In the chart below, is an example of what is known as "Compression of Morbidity." On the bottom of the graph is age. At the right hand side of the graph is a description of states of disease. The dashed line is the threshold where symptoms become manifest. The example here is an example of heart disease.



Looking at graph #1, one notes a rapid development of heart disease where at the age of 40 symptoms develop and now hamper productivity and vitality of life. Death occurs around the age of 60.

Graph #2, however shows the same person exercising precautionary measures relative moderation. The development of symptoms is delayed until age 60 and sever symptom occur about age 80. Death will likely follow a few years later, perhaps due to some other condition other than heart disease.

Graph #3 depicts the ideal scenario where a healthful lifestyle subdues the development of heart disease for the life of the person. Here, the symptoms of heart disease are so delayed that they simply are not experience in the life of this person. Death will be from some other chronic condition, or perhaps just old age! This will be a life of greater productivity, impact, and happiness - a worthy goal for any of us.

# Primer on Metric System

You are to be familiar with the prefixes in dark and what they mean.

Major units are:

- Grams (for weight)
- Liters (for volume)
- Meters (for length)
- Calorie (for energy)

|              |          |                       |
|--------------|----------|-----------------------|
| Peta         | P        | 1,000,000,000,000,000 |
| tera         | T        | 1,000,000,000,000     |
| giga         | G        | 1,000,000,000         |
| mega         | M        | 1,000,000             |
| <b>kilo</b>  | <b>k</b> | <b>1,000</b>          |
| hecto        | h        | 100                   |
| deka         | da       | 10                    |
|              |          | <b>1</b>              |
| <b>deci</b>  | <b>d</b> | <b>0.1</b>            |
| <b>centi</b> | <b>c</b> | <b>0.01</b>           |
| <b>milli</b> | <b>m</b> | <b>0.001</b>          |
| <b>micro</b> | <b>μ</b> | <b>0.000,001</b>      |
| nano         | n        | 0.000,000,001         |
| pico         | p        | 0.000,000,000,001     |

Example: 90 milligrams/deciliter (90 mg/dl)

this could be written: 0.090 grams / 0.1 liter or  $\frac{0.090 \text{ grams}}{0.1 \text{ liter}}$

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Calorie is the basic unit of energy. A calorie is defined as the amount of energy needed to raise one gram of water one degree celcius. In metabolism this energy be used for cellular functions.

Different food types have different energy:

- Carbohydrates (for weight) 4 kcal / gm
- Protein (for volume) 4 kcal / gm
- Lipid (fat) (for length) 9 kcal / gm
- Alcohol (for energy) 7 kcal / gm

# Conversion Factors

| From | Multiply by | To |
|------|-------------|----|
|------|-------------|----|

---

## Length

|        |      |             |
|--------|------|-------------|
| Inches | 2.54 | centimeters |
| Foot   | 30   | centimeters |
| Yards  | 0.91 | meters      |

## Mass (Weight)

|        |     |           |
|--------|-----|-----------|
| Ounces | 28  | grams     |
| Pounds | .45 | Kilograms |

## Volume

|              |      |             |
|--------------|------|-------------|
| Teaspoons    | 5    | milliliters |
| Tablespoons  | 15   | milliliters |
| Fluid ounces | 30   | milliliters |
| Cups         | 0.24 | Liters      |
| Pints        | 0.47 | Liters      |
| Quarts       | 0.95 | Liters      |
| Gallons      | 3.8  | Liters      |

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## Temperature

|            |           |         |
|------------|-----------|---------|
| Fahrenheit | -32 (5/9) | Celsius |
|------------|-----------|---------|