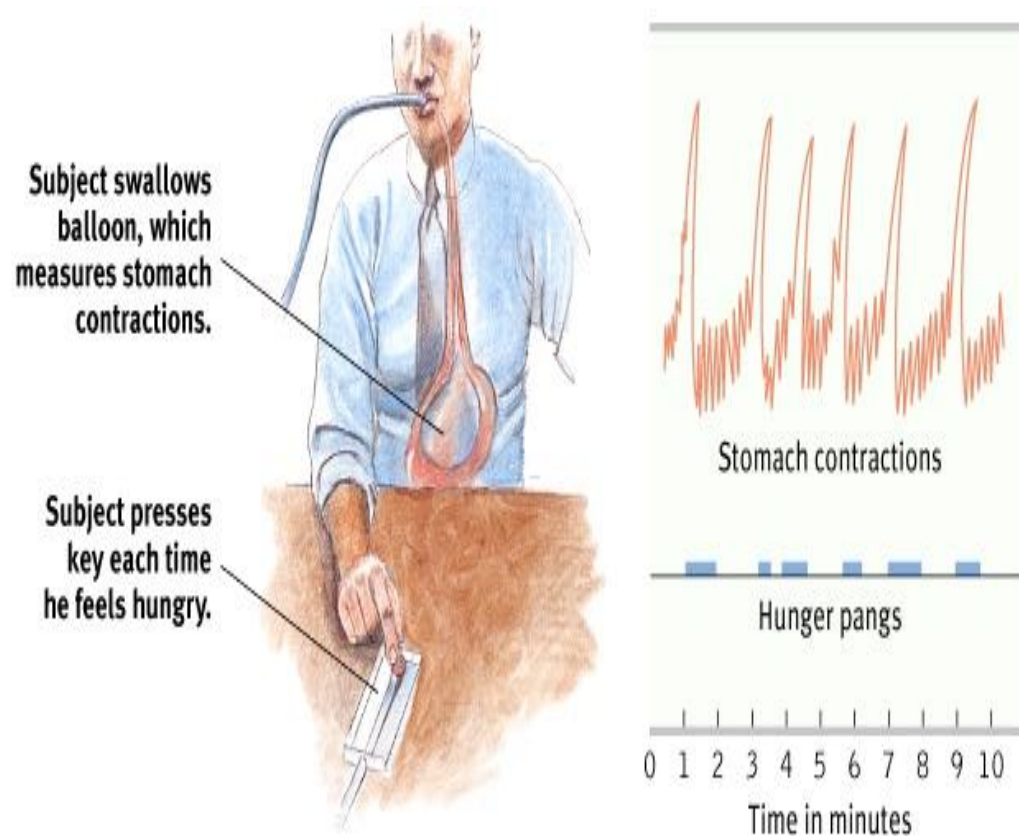


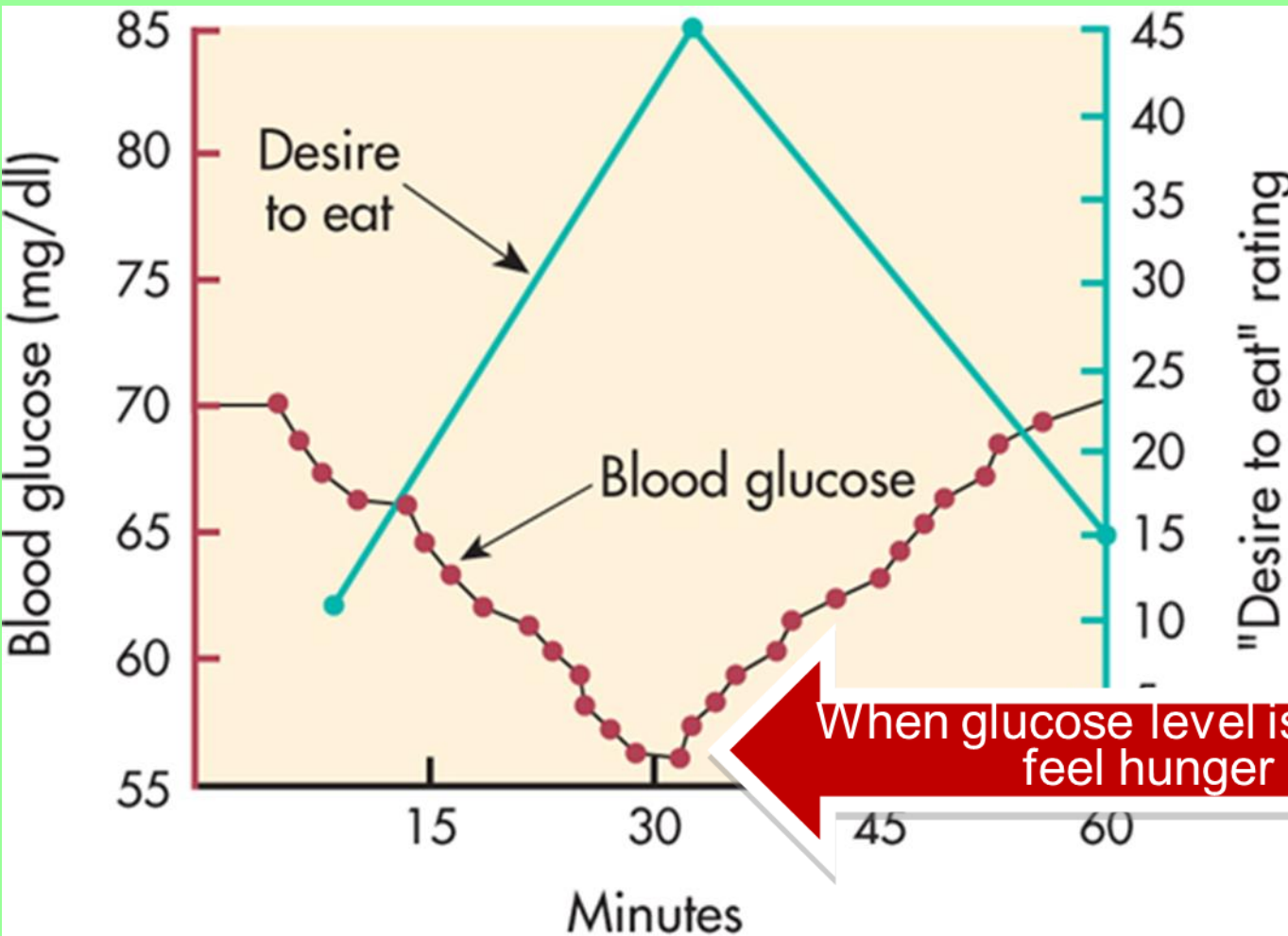
Physiology of Hunger

- Washburn's studies showed hunger was partially related to the stomach.
- But those with their stomachs removed still feel hunger.



Body Chemistry

- Glucose

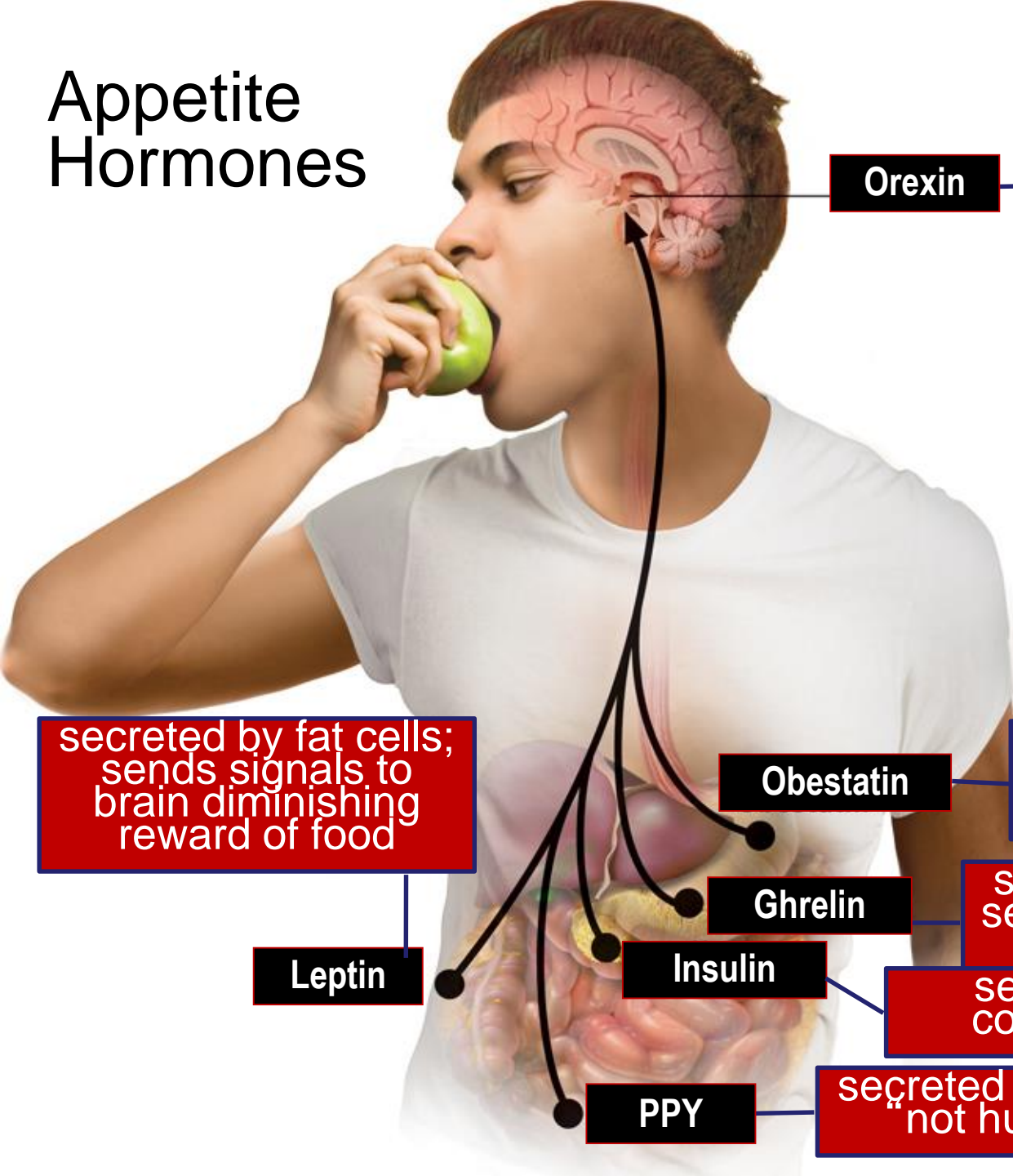


The hormone *insulin* converts glucose to fat.

When glucose level is low, we feel hunger

What is the correlation between Glucose and hunger?

Appetite Hormones



Orexin

secreted by hypothalamus; triggers hunger

What is the correlation between orexin and hunger?

secreted by fat cells; sends signals to brain diminishing reward of food

Leptin

Obestatin

secreted by stomach; sends "full" signals to brain

Ghrelin

secreted by empty stomach; sends hunger signals to brain

Insulin

secreted by pancreas; controls blood glucose

PPY

secreted by digestive tract; sends "not hungry" signals to brain

The Belly & The Brain

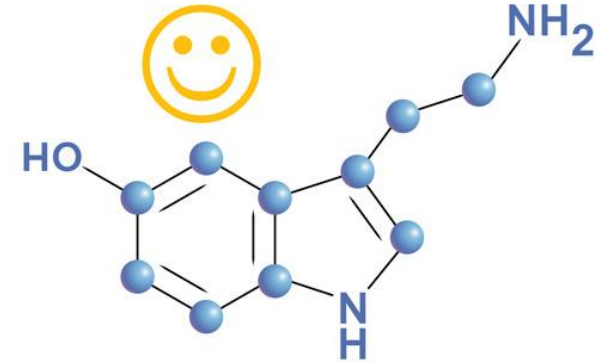
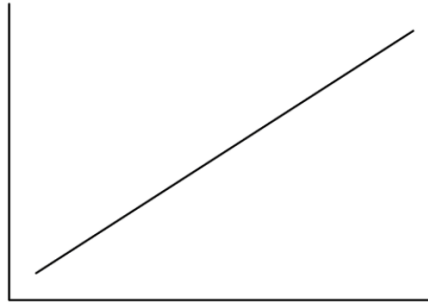
Simple vs Complex



Carbohydrates

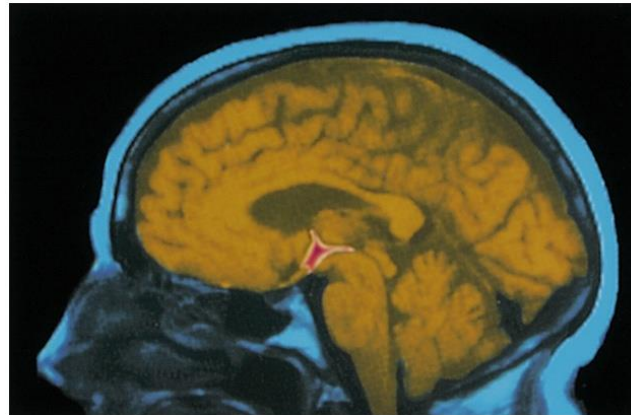
Relationship between

is



Serotonin

But, the brain is still heavily involved with hunger, namely due to.....



The Hypothalamus

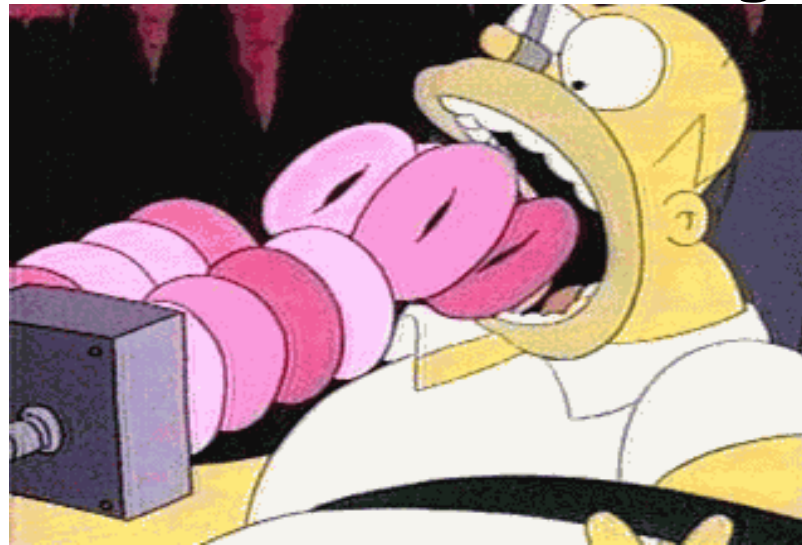
Up to 90% of the body's serotonin is in the belly, not the brain! So, the recent connection between depression and diet has opened up a new area of study.

"Comfort food"

The Hypothalamus & Hunger

- Along the sides of the hypothalamus is the lateral hypothalamus: which brings on hunger.

Stimulate the *lateral hypothalamus* and even a well fed animal will begin to eat.



Lesion the *lateral hypothalamus* and a starving animal will have no interest in food.

The Hypothalamus and Hunger

- Along the lower middle section of the hypothalamus is the ventromedial hypothalamus: which depresses hunger.

Stimulate the *ventromedial hypothalamus* and the animal will stop eating

Lesion the *ventromedial hypothalamus* the animal will continuously want to eat.



How does the hypothalamus work?

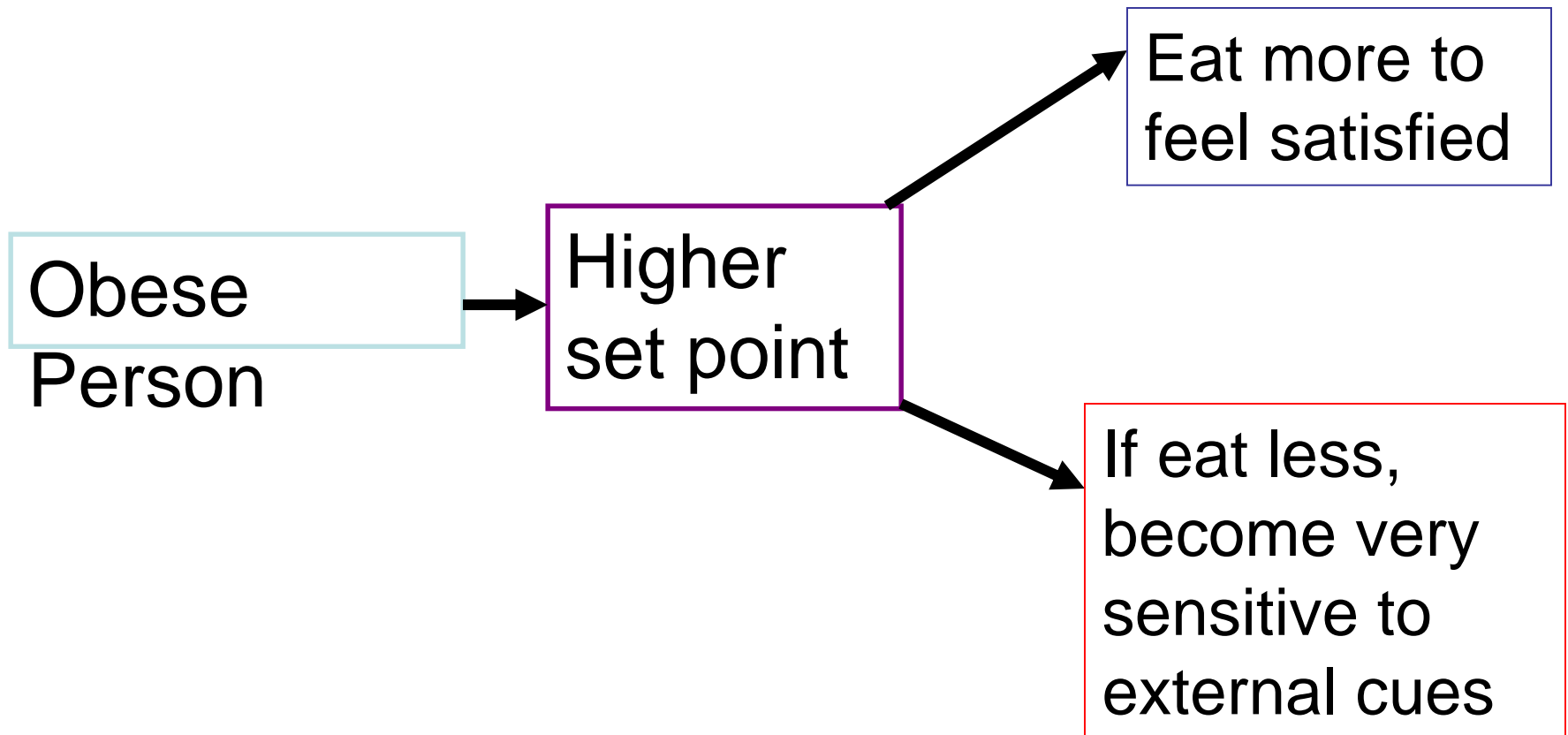
Two Theories

Leptin

Set Point

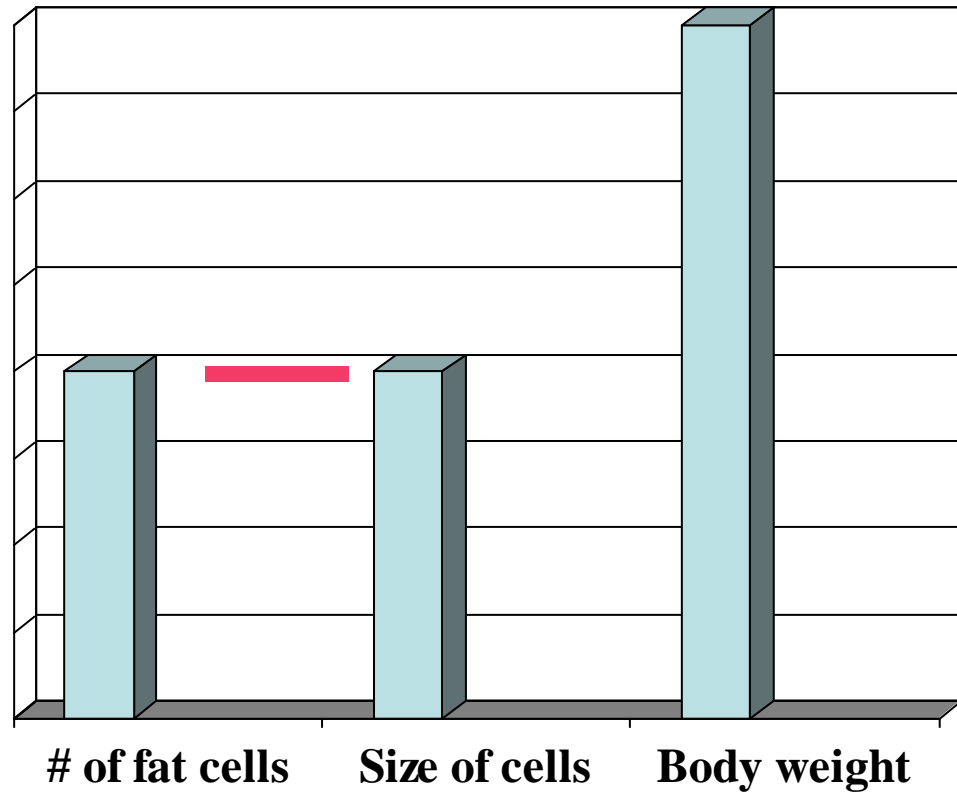
- Leptin is a protein produced by bloated fat cells, designed to reduce eating.
- Hypothalamus senses rises in leptin and should curb eating and increase activity.
- Those who eat a lot of sugar may become "leptin resistant" so the messages go unheeded.
- Hypothalamus acts like a thermostat.
- We are meant to be in a certain weight range.
- When we fall below weight our body will increase hunger and decrease energy expenditure (Basic Metabolic Rate).
- What happens if we go above our **set point**?

Set point



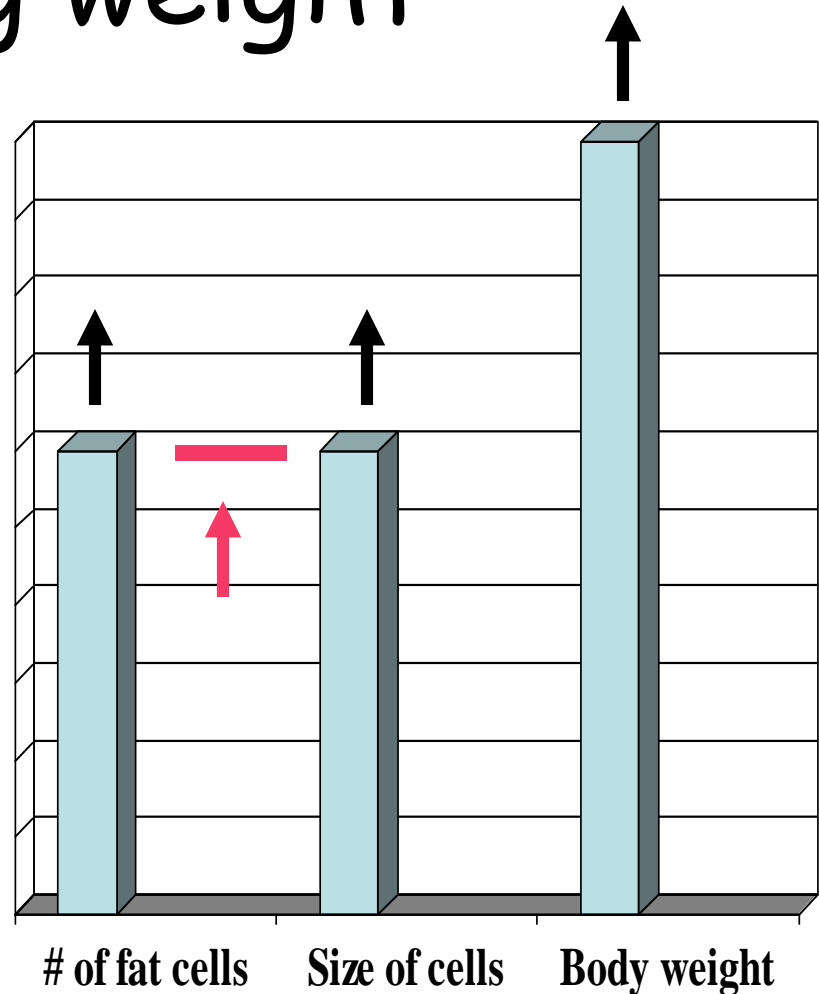
Set Point theory

- Set Point -----



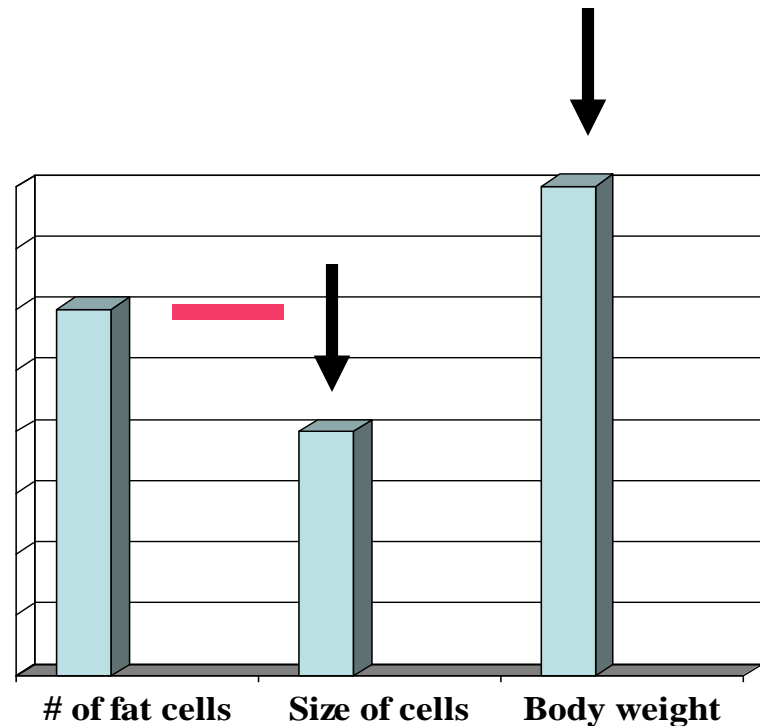
Gaining weight

- Increase in body weight
- Increase in # and size of fat cells
- Raises **set point**



Losing weight

- Any loss of weight after age of two
- No decrease in # of fat cells
- Decrease in size
- Weight **set point** doesn't drop
- Lowest possible weight gets "stuck"



Yo-Yo effect

- 95 % of wt lost is regained within a year
- Some dieters put on more wt than lost
- **Famine hypothesis**
 - Fat cells "think" there must be a famine while dieting
 - Rebound when person stops diet to help body survive the next "famine"

Set point and genetics

- IF...High metabolic rate
- THEN...Eat without gaining weight
- IF...Low metabolic rate
- THEN...Gain wt easily



The Psychology of Hunger

- *Externals:*
people whose eating is triggered more by the presence of food than internal factors.



Other factors which affect eating



- Meals by the clock
- Meal size unrelated to energy expended
- Highly palatable foods may be high in calories
- Eat for emotional or social reasons

Taste Preferences

Food taste better and we chew less when we are hungry (beginning of a meal).

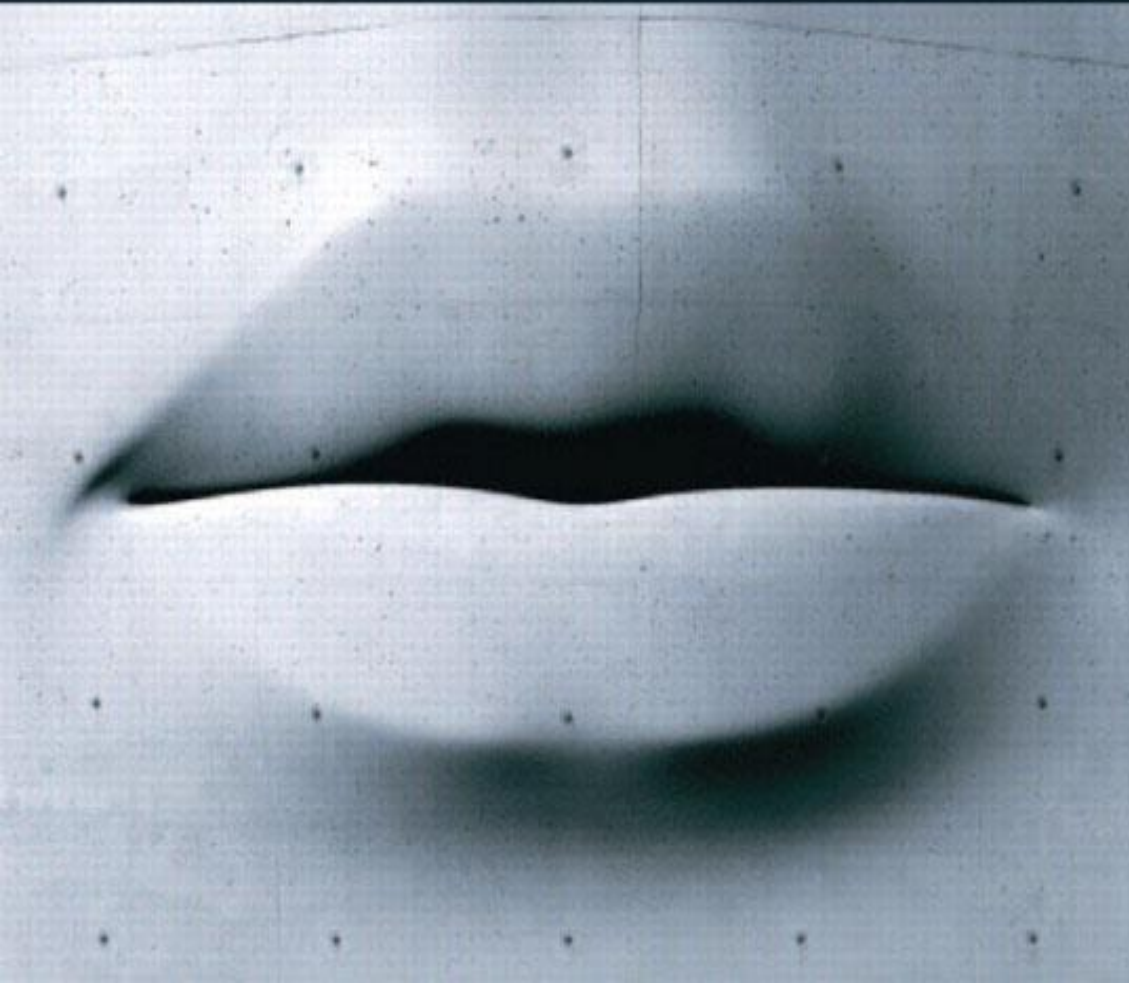
Food tastes worse and we chew more when we are not hungry (at the end of the meal).



Its weird, the better the food tastes, the less time we leave it in our mouths.



EATING DISORDERS



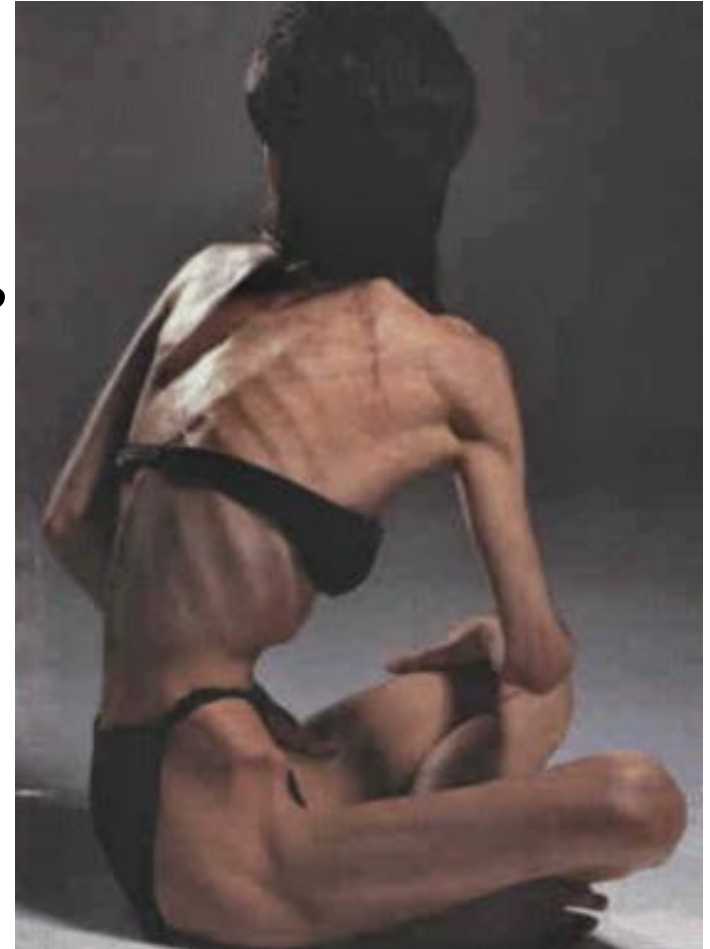
You Can't Weigh
Your Self-Esteem
or Self-Image; It's
What's Inside That
Carries The Most Weight





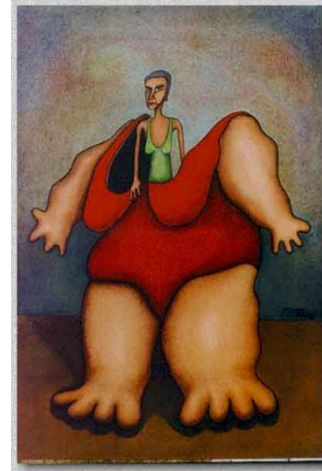
Eating Disorder information:

- The most common behavior that will lead to an eating disorder is dieting.
- Body shape and weight overly influence self-image
- It is estimated that currently 11% of high school students have been diagnosed with an eating disorder.
- Up to 19% of college aged women in America are bulimic.



What is Anorexia Nervosa?

- Anorexia Nervosa - normal weight person has distorted self-perception of being "fat"
 - Self-starvation regimens
 - Become dangerously underweight
 - Considered 15% or more underweight
 - 9 out of 10 times = adolescent female
 - Often can display characteristics of bulimia
 - Starts as a diet
 - Recovery rate is 70%



Ana Carolina Reston, 21



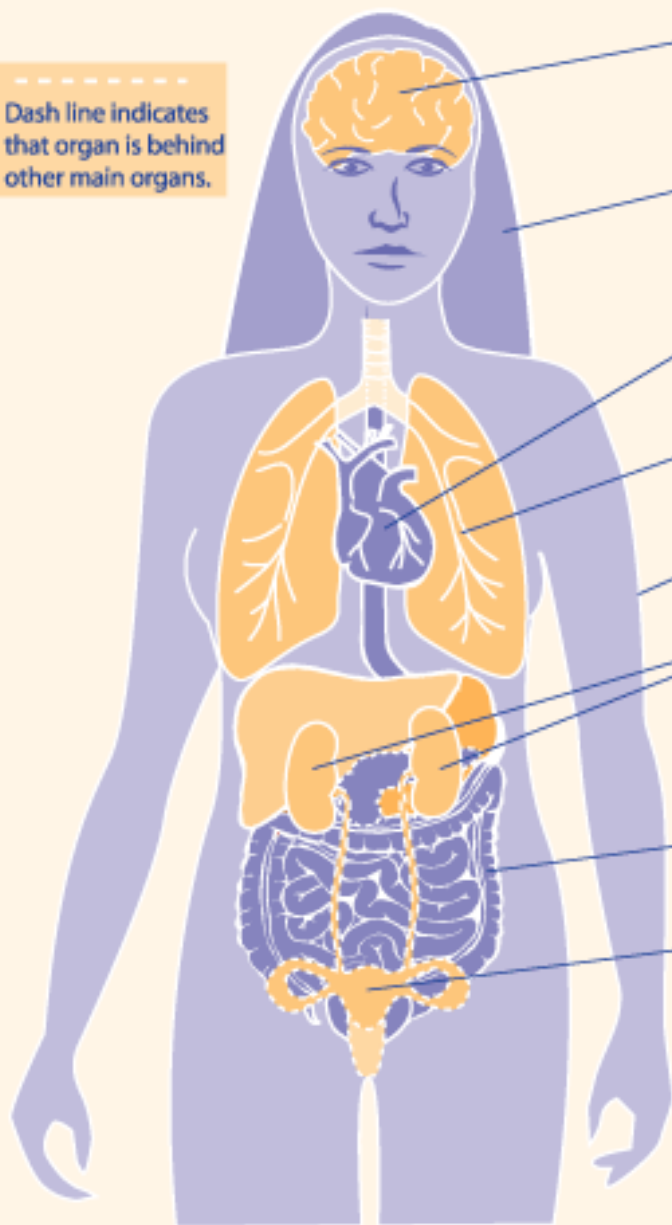
She had been modeling since she was 13 and she was keeping her family afloat with the money she got from her contracts.



When she died, the big-eyed Ana weighed only 88 lbs, and was 5'8". She had the body of a 12-year-old girl. She was 21.

Anorexia affects your whole body

Dash line indicates
that organ is behind
other main organs.



Brain and Nerves

can't think right, fear of gaining weight, sad, moody, irritable, bad memory, fainting, changes in brain chemistry

Hair

hair thins and gets brittle

Heart

low blood pressure, slow heart rate, fluttering of the heart (palpitations), heart failure

Blood

anemia and other blood problems

Muscles and Joints

weak muscles, swollen joints, fractures, osteoporosis

Kidneys

kidney stones, kidney failure

Body Fluids

low potassium, magnesium, and sodium

Intestines

constipation, bloating

Hormones

periods stop, bone loss, problems growing, trouble getting pregnant. If pregnant, higher risk for miscarriage, having a C-section, baby with low birthweight, and post partum depression.

Skin

bruise easily, dry skin, growth of fine hair all over body, get cold easily, yellow skin, nails get brittle