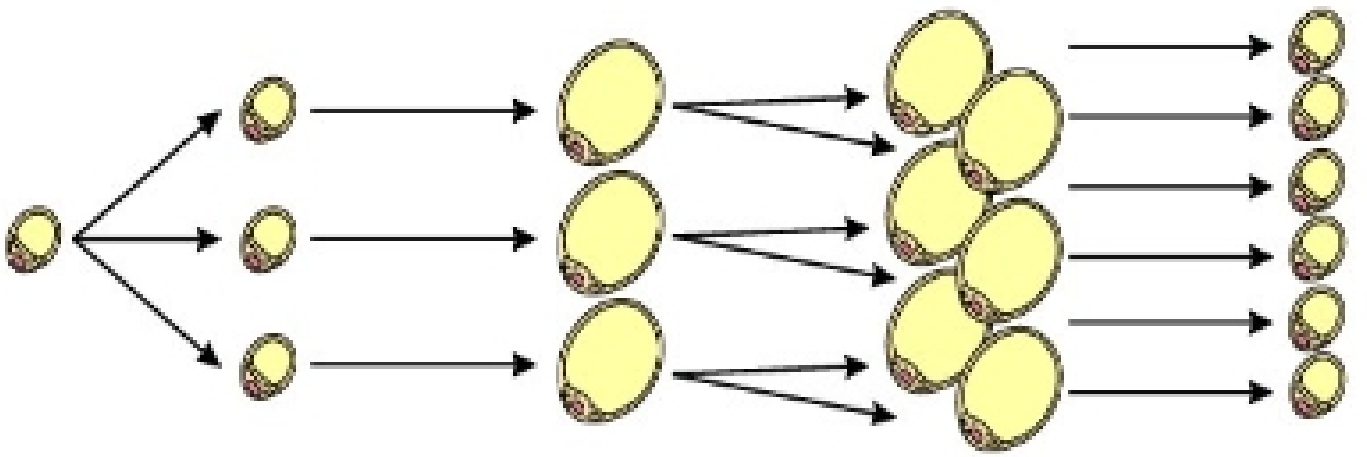
Obesity
Chapter 9 continued

- Obesity is an epidemic world wide
    - It took 2.5 million years for man to become what it is today, but only 50 for man to become obese to the point of it being considered such a terrible problem
- As of 2009, no state has a population with less than 15% obesity
- This will eventually lead to problems with health care
- Georgia, Mississippi, and Arkansas have the highest rates or childhood obesity
- PROJECTED: over 50% population will be obese in the US by 2025
- Comorbidities of Obesity (triangle)
    - (tip of triangle) Obesity, abdominal fat, insulin resistance, high blood cholesterol
    - (middle) Type II diabetes, hypertension, dyslipidemia
    - (base) Atherosclerosis, coronary event-stroke, heart attack
- The Mystery of Obesity
    - Controlled by genes, energy balance, metabolism
    - Basal metabolism- can't be controlled
    - Physical activity level and caloric intake (thermic effect of food)- can be controlled
    - More muscle mass- increased basal metabolic rate
    - Genes determine weight, but you can control whether or not you're effected by it
    - You can also control your eat habits
- Weight Regulation
    - Fat cell theory
        - Obesity increases number and size of fat cells
    - Set point theory
        - The body tends to maintain at a certain weight by means of internal control (preprogrammed)
        - Factors circulating in the blood communicate to the brain the amount of adipose tissue to be in the body
        - When adipose tissue decreases below the "set point", food intake increases and energy expenditure decreases
            - IF this were true, there would be no obesity



During growth, fat cells increase in number.

When energy intake exceeds expenditure, fat cells increase in size.

When fat cells have reached their maximum size and energy intake continues to exceed energy expenditure, fat cells increase in number again.

With fat loss, the size of the fat cells shrinks, but not the number.

- Causes of Obesity
  - Nurture debate
    - Environmental factors influence weight
      - Ex- fast food restaurants
    - Learned eating habits
    - Activity factor (or lack of)
    - Poverty and obesity
  - Average caloric consumption has increased
    - 1977-1999: 1876 to 2006 kcals
  - Fat consumption has decreased
  - Sugar consumption has increased (12-48 kg/yr and 94g/day)
    - Increased consumption sugar-laden foods, soft drinks, and foods consumed away from home
    - High fructose corn syrup
  - Nature debate
    - Genetics account for ~40% of weight differences
    - Genes affect metabolic rate, fuel use, brain chemistry
    - Thrifty metabolism gene allows for more fat storage to protect against famine
- Physical Inactivity
  - Some people may be obese, not because they eat too much, but because they move too little.
  - Today, people spend their free time watching TV or on the computer as opposed to playing outside, etc
  - REALITY: physical activity levels have slightly decreased over time while obesity levels have dramatically risen

    ➔ See Table 9.6
- Genetics
  - A person's genetic inheritance greatly influences, but does not ensure, the development of obesity.
  - Children with obese parents at higher risk
  - Lifestyle remains critical

    - Identical twin studies
        - Genetics largely determine body wt
        - Body weights of adopted children are not similar to adoptive parents
- Genes involved in obesity: ob/ob and db/db mice
    - Defect in *ob* gene
        - Codes for leptin – satiety signal
        - Over eat
    - *db* gene
        - Defective leptin receptors
        - Leptin
    - Provides protection from starvation
        - Problem: thrifty gene hypothesis
    - The adipose tissue hormone leptin suppresses the appetite in response to a gain in body fat.

➔ See mice picture, pg 332

- Genes involved in obesity
    - Tub
    - Agouti
    - Fat
- Nature and Nurture
    - Obesity is nurture allowing nature to express itself
    - Location of fat is influenced by genetics
    - A child with no obese parents has a 10% chance of becoming obese
    - A child with 1 obese parent has a 40% chance of becoming obese
    - A child with 2 obese parents has an 80% chance of becoming obese
- Environment
    - Pima Indians:
        - Migrated from Mexico to southern Arizona around 300BC
        - North American Pimas have:
            - High incidence of obesity
            - Reduced energy expenditure
            - Non-insulin dependent diabetes at younger age
- Inside the Body Obesity
    - Metabolic theories attempt to explain obesity on the basis of molecular functioning
- Outside the Body Obesity
    - Studies of human behavior identify stimuli that lead to overeating
    - People can override signals of satiety and hunger and eat whenever they wish
- End of Story
    - The three lifestyle components leading to healthy body weight are diet, physical activity, and behavior change.
    - There is no magic pill to control obesity
        - The one drug that was used has been taken off the market
        - The one that could possibly work is Alli, but it only blocks fat absorption
- Why Diets Don't Work
    - Obesity is a chronic disease
        - Treatment requires long-term lifestyle changes