CONCEPT: MODERN GENETICS

- Today, genetics is used to study mutation and disease to improve _____ and _____
  - □ **Single nucleotide polymorphisms (SNPs)** are small variations (one nucleotide) in an individual's genome
    - In an Icelandic study of 78 children there were 4933 new SNPs
    - Mostly, these small variations come from the father (why? Sperm is made continuously – eggs aren't)
  - □ Lactose tolerance is a common example of a _____ in action
    - Adults with two SNPs in a *lactase* regulatory region, can digest lactose – those without it are intolerant

EXAMPLE:

Individual

1. ACTGATGGGATCCTAGGTACGATTAGCC
2. ACTGATGCGATCCTAGGTACGATTAGCC
3. ACTGATGGGATCCTTGGTACGATTAGCC

- □ Technology has advanced and made studying and altering these differences much easier
  - **Biotechnology** – manipulating biology for industrial purposes (ex: Golden rice and Vitamin A)
  - **Gene therapy –** Clinical transfer of normal genes into individuals with mutated genes
  - **Proteomics** – Study of a set of proteins in a cell under certain conditions
  - **Bioinformatics** – Use of software that helps analyze and store the large breadth of data
  - **Model organisms** – are organisms used to study the basics of genetics

PRACTICE:

1. Proteomics is the study of what?
    a. DNA
    b. RNA
    c. Transcripts
    d. Proteins

2. True or False: Single nucleotide polymorphisms are common in the human population.
    a. True
    b. False

3. Bioinformatics is especially useful at what?
    a. Transferring normal genes into individuals with diseases
    b. Using software to analyze large data sets
    c. Using biology for industrial purposes