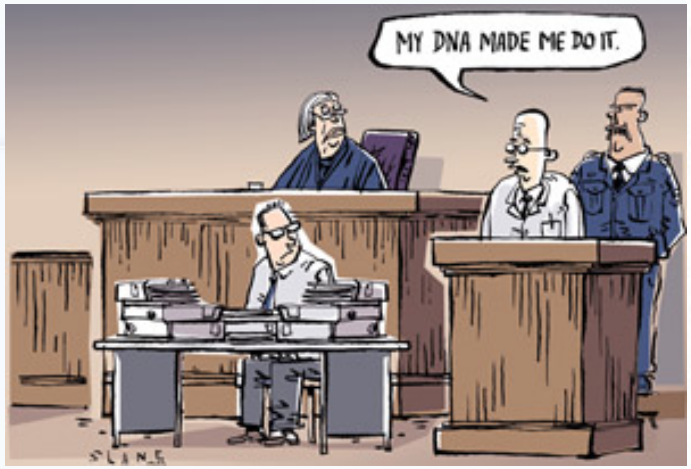
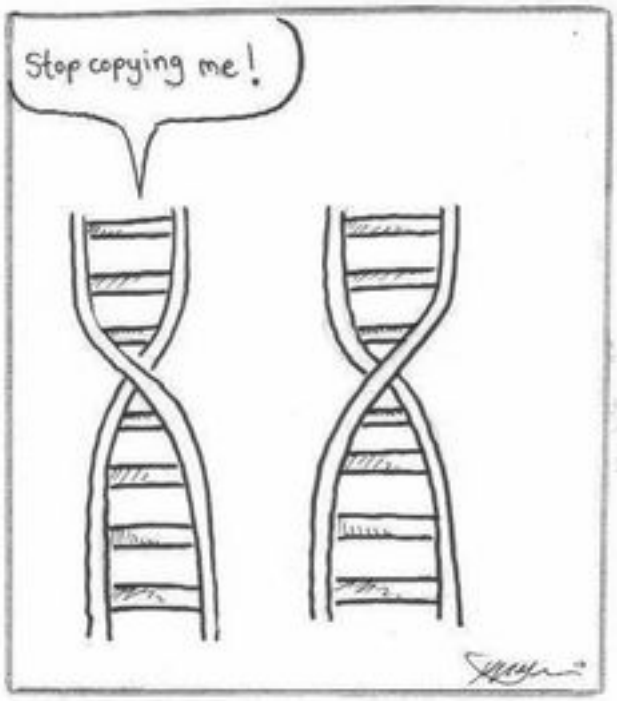




Ch. 6 Lesson 3 Part 2
DNA

I can explain the relationship among genes, chromosomes, and inherited traits.

I can investigate the relationship among DNA, genes, and chromosomes.

What Mastery looks Like

Where are the genes for the physical traits of an organism located?

A on a strand of RNA

B on a chromosome

C inside a hormone

D inside a carbohydrate

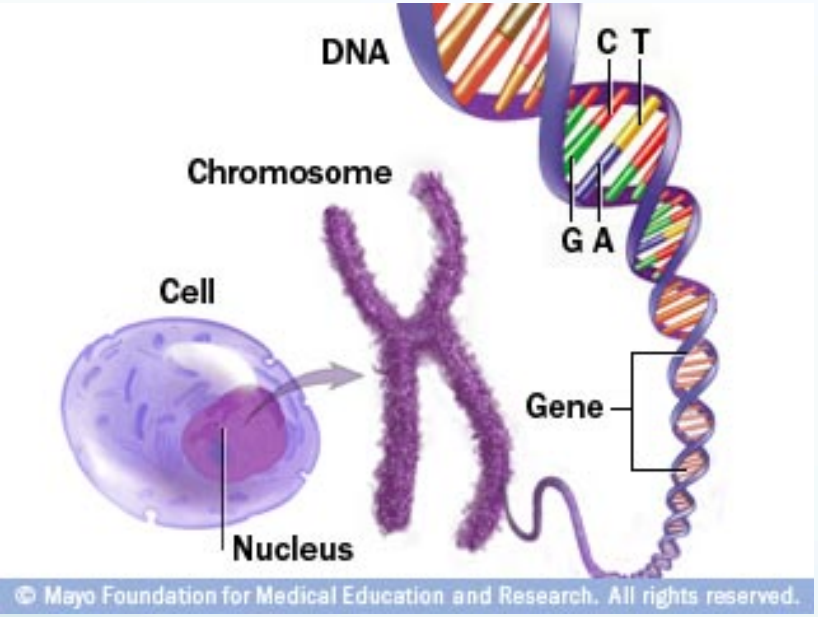
WHAT YOU'LL LEARN

- Identify the parts of a DNA molecule and its structure.
- Explain how DNA copies itself.
- Describe the structure and function of each kind of RNA

WHY IT'S IMPORTANT!

- DNA helps determine nearly everything your body is and does.

Genes



- Different kinds of proteins determine color of hair, height, and how things taste.
- Protein builds cells and tissues or work as enzymes.
- The instructions for making a specific proteins are found in the genes (section of DNA on a chromosomes.)
- Proteins are made of chains of hundreds or thousands of amino acids.
- Changing the order of amino acids makes different protein.

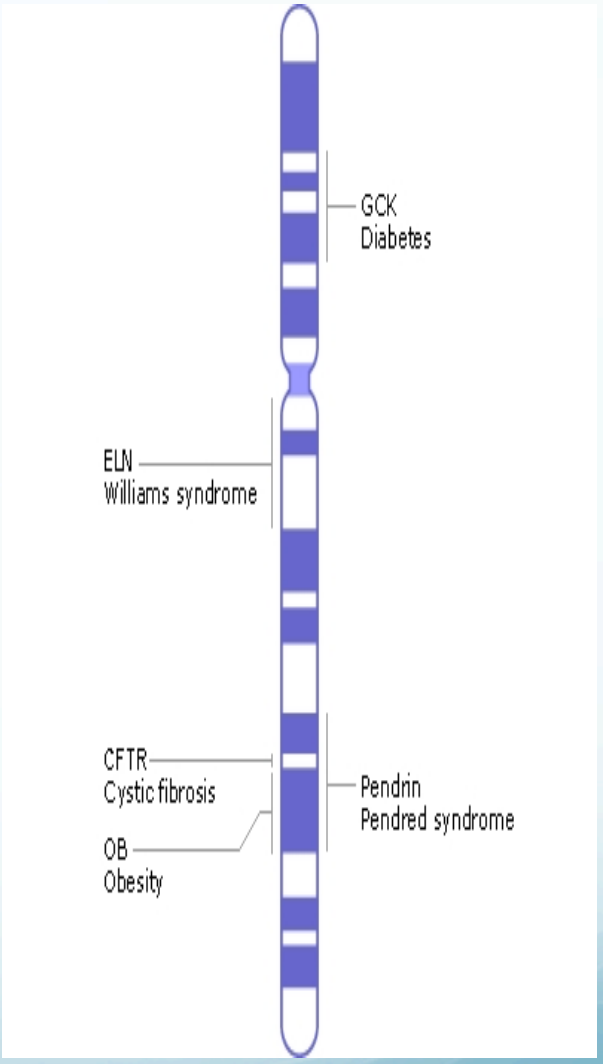
Making Proteins

See figure 16 on p. 160.

The diagram shows just a few of the genes that have been identified on human chromosomes.

What might occur if an important protein couldn't be made or if the wrong protein was made in your cells?

- Proteins are made on ribosomes in cytoplasm.
- Code for making proteins – carried from nucleus to ribosomes by a nucleic acid called RNA (ribonucleic acid).



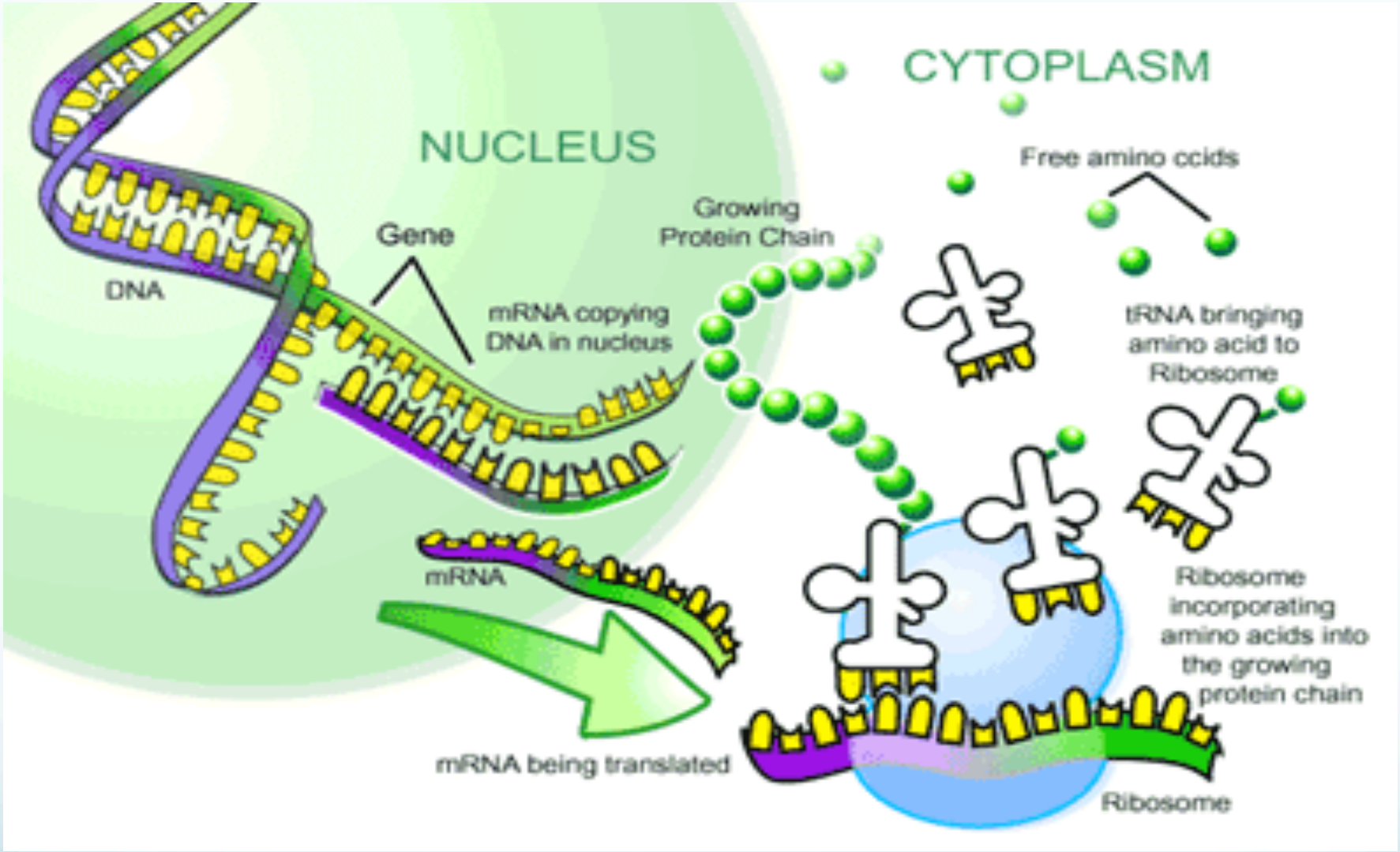
Ribonucleic Acid

- RNA made in nucleus on a DNA pattern but is different than DNA
  - Looks like a ladder cut in half
- RNA has nitrogen bases
  - Adenine, Guanine, Cytosine and Uracil (not thymine found in DNA)
- Sugar-phosphate molecule in RNA contains sugar ribose
- Three main kids of RNA made from DNA in cell's nucleus:
  - mRNA – messenger RNA
  - rRNA – ribosomal RNA
  - tRNA – transfer RNA

- https://www.youtube.com/watch?v=0Elo-zX1k8M

Ribonucleic Acid

- Protein production begins when mRNA moves into the cytoplasm.
  - There, ribosomes attach to it. (Ribosomes are made of rRNA)
- Transfer RNA molecules in cytoplasm bring amino acid to ribosomes.
- Inside ribosomes, 3 nitrogen bases on mRNA temporarily match the 3 nitrogen bases on the rRNA.
  - The amino acids that are attached to the 2 tRNA molecules bond.
  - This is the beginning of a protein.
- The code carried in mRNA directs the order in which amino acid bond. After rRNA lose its amino acids, it moves about cytoplasm and pick up another amino acids like first one. The ribosomes moves along mRNA. New tRNA with amino acids match up and add amino acids to make protein molecule.
  - (See animation on next slide)



https://www.youtube.com/watch?v=NJxobgkPEAo 3 min or
https://www.youtube.com/watch?v=h5mJbP23Buo 7min
https://www.youtube.com/watch?v=5bLEDd-PSTQ 3 min
translation

Controlling Genes

- In many-celled organisms-each cell uses only some of the thousands of genes that it has to make proteins.
  - Like an actor using only the lines for his or her role

  Ex. Muscle proteins are made in muscle cells

- Cells control genes by turning some genes off and others on.
  - Different ways to do this:
    - DNA twist so tightly – no RNA can be made
    - Chemical bind to DNA so it can not be used.

    Why?

    If the incorrect proteins are produced, the organism cannot function properly.

Mutations

- Sometimes mistakes happen when DNA is being copied.
  - Proteins made from the instructions might be made incorrectly.
  - Some mutations include cells receive extra chromosomes or missing a chromosomes.
  - Outside factors- cause mutations
    - X-rays
    - Sunlight
    - Some chemicals.
- https://www.youtube.com/watch?v=eDbK0cxKKsk

Results of a Mutation

- Genes control the traits we inherit.
  - Without correctly coded proteins, an organism can not grow, repair, or maintain itself.
    - See figure 19
- If mutation occur in body cell, it might or might not be life threatening.
- If mutation occur in sex cell, then all the cells that form from it will have that mutation.
- Mutations add variety to a species.
  - Many are harmful –causing death
  - Some do not appear to have any effect
  - Others are beneficial.

Figure 19 TB p. 193
Defect on chromosome 2, the mutant fruit fly has short wings and cannot fly.

Predict: **Could this defect be transferred to the mutant's offspring? Explain**

Closure

- Using a Venn diagram, compare and contrast DNA and RNA