

Genetics: Name that Fish – Fact Sheet

Cell Biology

- The **Cell Membrane** monitors and controls entry into and out of the cell.
- The **Cytoplasm** is fluid that fills the cell and is made up of about 80% water and is usually colorless.
- **Mitochondria** are known as the “power house” of the cell because they produce energy to be used throughout the cell. They also have their own DNA!
- **Ribosomes** assemble proteins by linking amino acids coded for by mRNA.
- The **Endoplasmic Reticulum (ER)** is part of a protein sorting pathway. It is, in essence, the “transportation system” of the eukaryotic cell.
 - **Rough ER** has ribosomes that make proteins.
 - **Smooth ER** lacks ribosomes and functions in lipid metabolism, carbohydrate metabolism, and detoxification
- **Lysosomes** are the “digestive system” inside the cell; break down old or unneeded parts of the cell or any substances that have been brought into the cell from outside.
- The **Golgi Apparatus** is the “post office” of the cell. It modifies, packages, and distributes proteins primarily from the rough ER.
- **Centrioles** help the chromosomes move during cell division. They are only found in animal cells.
- The **Nucleus** holds the genetic information.
- **Chromosomes** are DNA neatly packaged and organized for cell division.

DNA

- DNA is made of subunits called **nucleotides**. There are four different nucleotides depending on the base:
 - A – adenine
 - C – cytosine
 - G – guanine
 - T – thymine
- Two separate chains, or strands, of nucleotides bond together and form the double helix structure of DNA.
 - A always pairs with T
 - C always pairs with G
- This **complementary base-pairing** is what allows the DNA to be accurately copied and inherited from cell to cell.
- DNA carries the heredity information for every cell in the body.
- The complete set of an organism’s DNA is called the **genome**.

Fun Facts

- All humans are 99.9% the same genetically!
- Goldfish, ferns, and dogs all have more chromosomes than humans!
- Humans share genes with bananas!
- If you took all your DNA and laid it in a straight line it would stretch from here to the sun and back over 600 times!
- April 25 is National DNA Day - commemorating the completion of the human genome in April 2003.
- The human genome contains about 3 billion base pairs (A,T,C,G)!
- There are only 20,000- 25,000 genes in the entire human genome.
- Scientists have been able to study the DNA from a 120 million year old weevil!

Links to More Resources

- Cells Alive – interactive animal cell model: https://www.cellsalive.com/cells/cell_model.js.htm
 - Main sites (<https://www.cellsalive.com/>, <http://www.geneticsalive.com/>)
- American Museum of Natural History: <https://www.amnh.org/explore/ology/genetics>
 - DNA Detective: <https://www.amnh.org/explore/ology/genetics/dna-detective>
 - <https://www.amnh.org/explore/ology/genetics/what-makes-you-you2>
- More advanced resources:
 - Learn Genetics: <https://learn.genetics.utah.edu/>
 - Amoeba Sisters: <https://www.amoebasisters.com/our-videos.html>
 - Veritasium: https://www.youtube.com/watch?v=X_tYrnv_o6A (molecular machines)