Learning Objectives

- Describe the features and function of the cell’s nucleus.
- Define chromosome.
- Explain the role of the nucleolus.

Where is your DNA?

You may know that a criminal can easily leave DNA at a crime scene. How? DNA is found in every cell of your body. In each cell there is a nucleus, which is home to your DNA. So if a criminal has a cut, and blood is left at the crime scene, or a hair falls out and is left behind, then DNA will also be left at the scene.

The Nucleus

The nucleus is only found in eukaryotic cells. It contains most of the genetic material (the DNA) of the cell. The genetic material of the nucleus is like a set of instructions. These instructions tell the cell how to build molecules needed for the cell to function properly. That is, the DNA tells the cell how to build molecules needed for life. The nucleus is surrounded by the nuclear envelope, a double membrane (two phospholipid bilayers) that controls what goes in and out of the nucleus. The nucleus also has holes embedded in the nuclear envelope. These holes are known as nuclear pores, and they allow things to flow in and out of the nucleus.

Chromosomes

Inside of the nucleus, you will find the chromosomes. Chromosomes are strands of DNA wrapped around proteins. They contain genes, or small units of genetic material (DNA) that contains the code for the creation of a protein. Human cells have 46 chromosomes (23 pairs). There are hundreds to thousands of genes on each chromosome.
Nucleolus

The nucleus of many cells also contains a central region called the **nucleolus**. The job of the nucleolus is to build ribosomes. These ribosomes flow out the nuclear pores into the cytoplasm. **Ribosomes** are organelles that make proteins in the cytoplasm. See the composition of the nucleus pictured below (Figure 1.1).

**Summary**

- The nucleus contains the genetic material of the cell.
- The genetic material of the cell is found in chromosomes, DNA wrapped around proteins.
- The nucleolus, which makes ribosomes, is also within the nucleus.

**Explore More**

Use the resources below to answer the following questions.

- **Nucleus** at http://www.youtube.com/watch?v=DMd3mr6rQ2o (2:25)

  1. What is chromatin? What molecules make up chromatin?
  2. What is the nuclear membrane? What kind of membrane is this membrane?
  3. What is the nucleolus? What molecules do you find there?
  4. How is the inside of the nucleus connected to the cytosol? Why is this connection vital for the cell?

**Review**

1. What is contained in the nucleus of a cell?
2. What is a chromosome? Where are chromosomes located?
3. How many chromosomes do humans have?
4. What is the function of the nucleolus?
References

1. Mariana Ruiz Villarreal (LadyofHats), modified by CK-12 Foundation. Position of the nucleus inside a cell. Public Domain