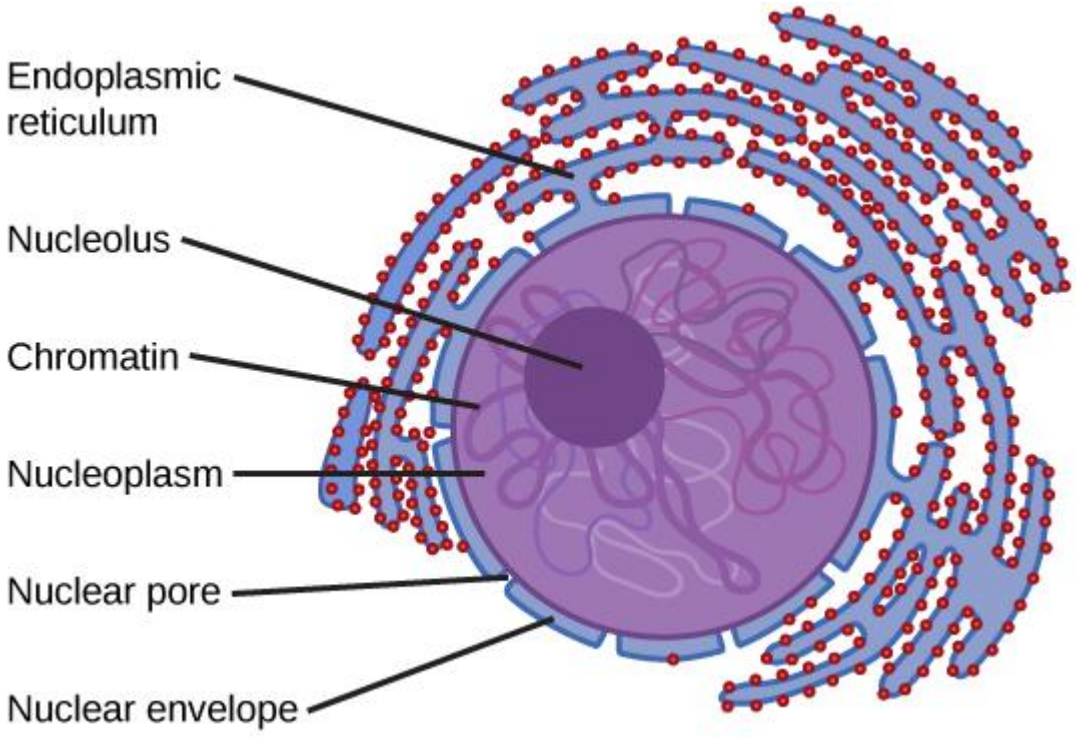
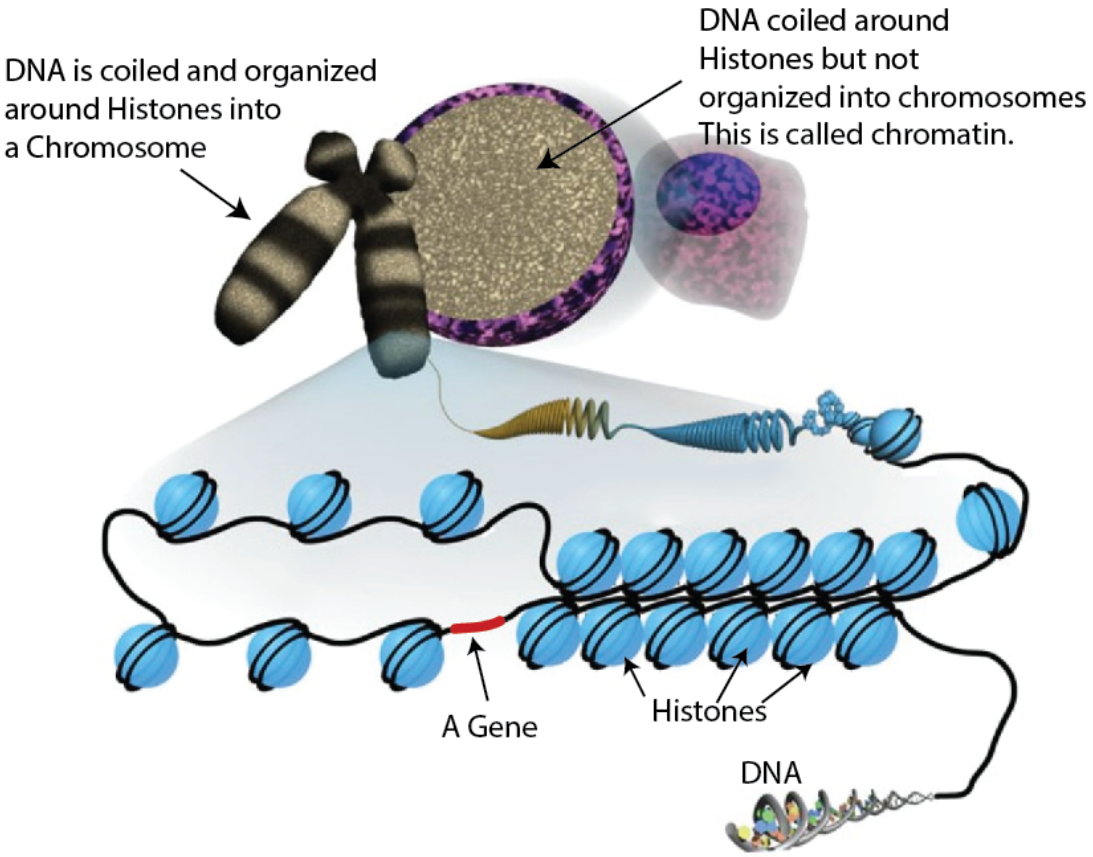
5.2.1

The Cell Nucleus

The nucleus is surrounded by a double membrane bound structure (**nuclear envelope**) that serves to isolate the nuclear contents from the cellular cytoplasm. This nuclear envelope is dispersed during mitosis and meiosis as the cell prepares to divide. The outer membrane of the nuclear envelope is continuous with the membranes of the rough endoplasmic reticulum. The inner membrane makes the border to isolate the nucleus. The space between the two membranes is continuous with the space (lumen) inside the endoplasmic reticulum, except at various points where the two membranes are connected by specialized structures known as **nuclear pores** . The nuclear pores serve as transport pathways between the interior of the nucleus and the cytoplasm. The nucleus contains the genetic material (genes) that are organized into long double stranded molecules called DNA. DNA are tightly bound to proteins called histones to form chromatin, which is finally organized into chromosomes.





DNA Structure: Gene, Histones, Chromatin & Chromosomes. Modified image - Title: File: Sha-Boyer-Fig1-CCBy3.0.jpg; Author: unknown; Site: https://books.byui.edu/-FjMn;
License: This work is licensed under the Creative Commons Attribution 3.0License.

The **nucleolus** is a region of the nucleus responsible for the synthesis of ribosomes. This region is made of DNA, RNA, and proteins. Gene messages are copied from the DNA as single strands of RNA, which are further processed into what we call “messenger RNA” (or mRNA) and sent out of the nucleus through the nuclear pores. The mRNA interacts with ribosomes to produce a specific protein. Many genetic mutations result in errors, making the associated proteins non-functional. The nucleus also functions to maintain control and integrity over the genes. The genes, in turn, regulate the activity of the cells. Thus, the nucleus is the control center of the cell.