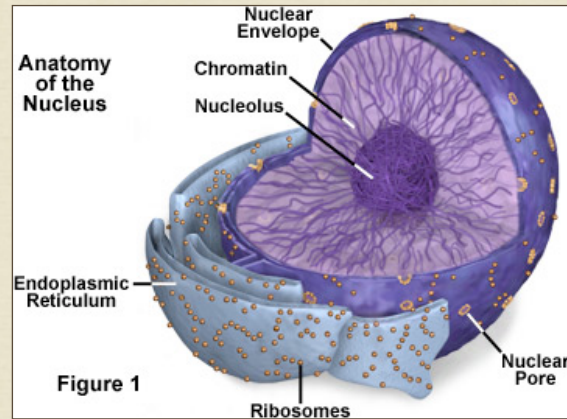


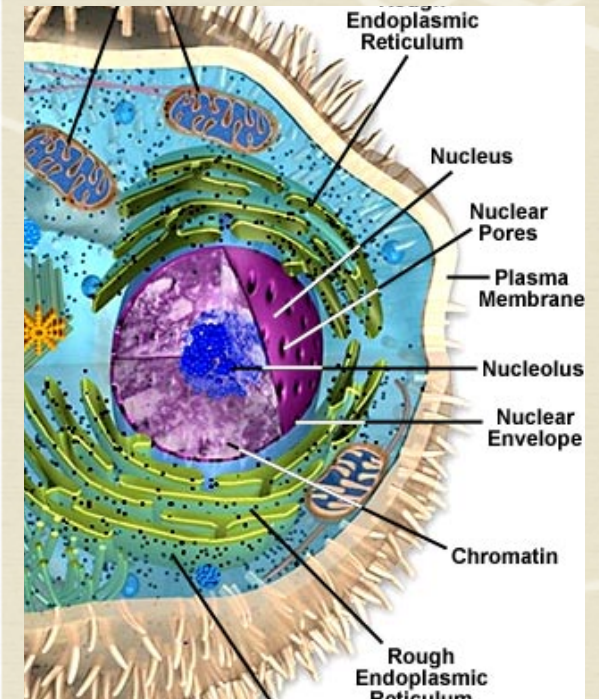
The Nucleus, also known as the “control center,” is the most important organelle, not only is it the captain of the cell, it intrinsically resembles the cell itself. Much like the cell, the Nucleus consists of a nuclear envelope, a membrane that separates the cell from the cellular cytoplasm, much like the cellular membrane separates the inside of the cell from its surrounding environment; the nuclear envelope is a double lipid bilayer with nuclear pores facilitating the exchange of proteins and genetic material with the outside cell. The nucleus also contains the nuclear lamina, which is a network within the nucleus that adds mechanical support, much like the role of the cytoskeleton to the cell.



The Nucleus contains various subparts each of which are essential to its function. Combined, these subparts achieve the ultimate goal of the Nucleus: maintain the integrity of the cells chromosomes and manage the functioning of the cell.

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THE NUCLEUS



A dense organelle present in most eukaryotic cells, typically a single rounded structure bounded by a double membrane, containing the genetic material.

WHY NUCLEUS?

The nucleus is found in most eukaryotic cells (animal cells). In prokaryotic cells, or plant cells, the genetic material is not kept separate from the cytoplasm. The nucleus is often thought of as a ball, with two cellular membranes 10 to 50 nanometers apart, which act as a border to prevent macromolecules from diffusing and affecting the contained nucleoplasm. The double membrane contains pores (much like the cell itself) which are made of proteins that allow some water-soluble molecules in and out while protecting the nucleoplasm from macromolecules. There is only one nucleus in each cell, this one nucleus regulates all cell activity. The DNA (located in the nucleus) contains the information for the production of proteins. This information is encoded in the 4 DNA bases; Adenine, thymine, cytosine, and guanine. The order of these bases tells the cell what order to put the amino acids, and thus, what protein to create. The genetic instructions are sent to the ribosomes, which actually create the proteins. The three processes that enable the cell to manufacture protein and therefore perform its function in the organism are: replication, transcription and translation. Replication allows the nucleus to make exact copies of its DNA. Transcription allows the cell to make RNA working copies of its DNA. And finally, translation is when the messenger RNA is used to line up the amino acids into a protein molecule.

SOURCE

"The Cell Nucleus." *Function and Structure of the Nucleus*. Web. 22 Nov 2009. <<http://www.cartage.org.lb/en/themes/Sciences/Zoology/AnimalPhysiology/Anatomy/AnimalCellStructure/Nucleus/cellnucleus.jpg>>.

SOURCE

"Anatomy of Animal Cell." *Animal Physiology*. Web. 22 Nov 2009. <<http://www.cartage.org.lb/en/themes/Sciences/Zoology/AnimalPhysiology/Anatomy/AnimalCellStructure/animalheader.jpg>>.

SOURCE

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"Structure and Function in the Nucleus". *Science* **280**: 547–553