

Cell structure :  
nucleus and cytoskeliton



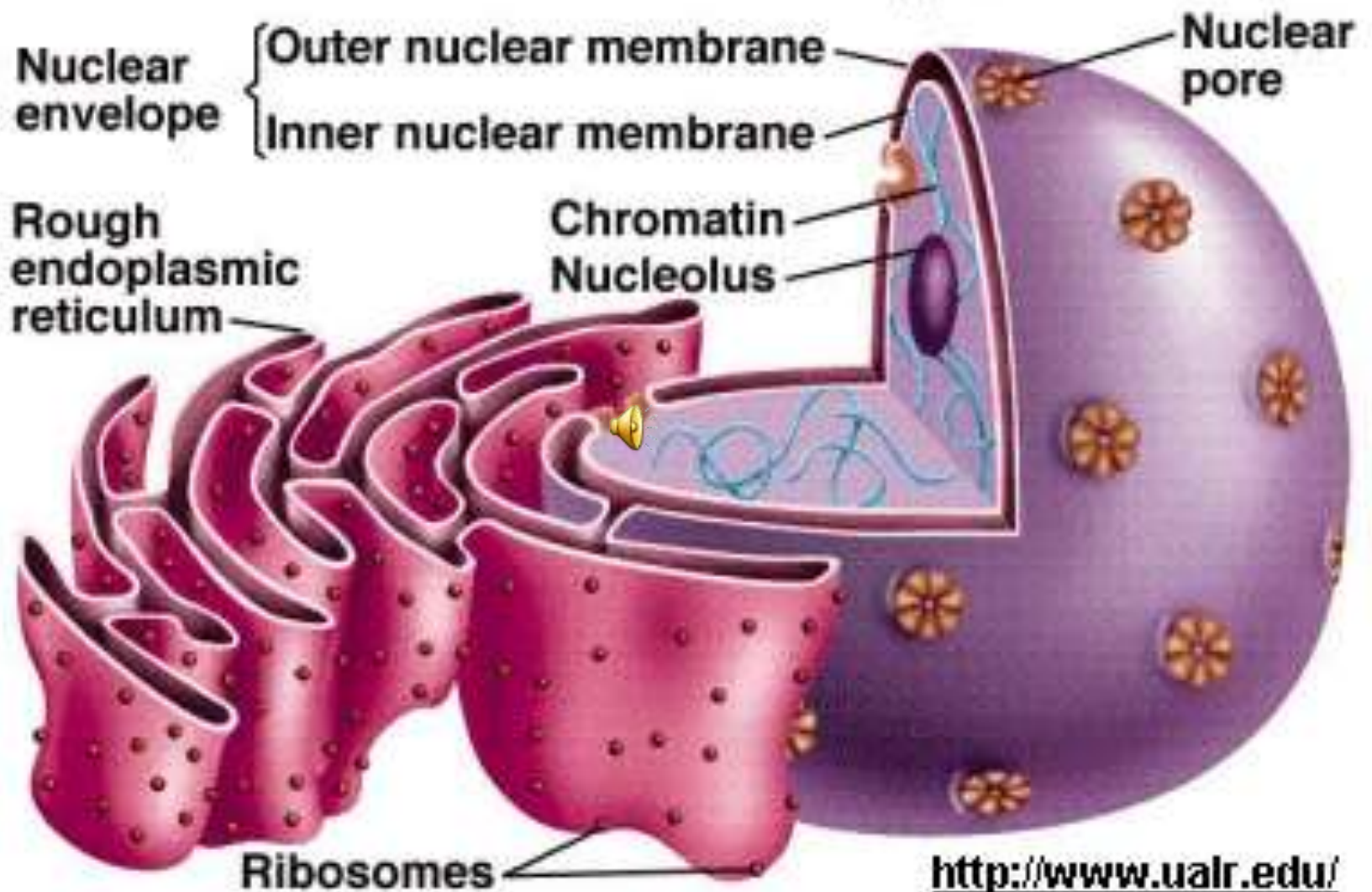
# The Nucleus

The nucleus is a prominent structure in eukaryotic cell, it has a diameter of about 5 Mm, it is an important structure because it's function which is to containing the genetic material that determines the characteristics of the body's cells and their metabolic functioning.

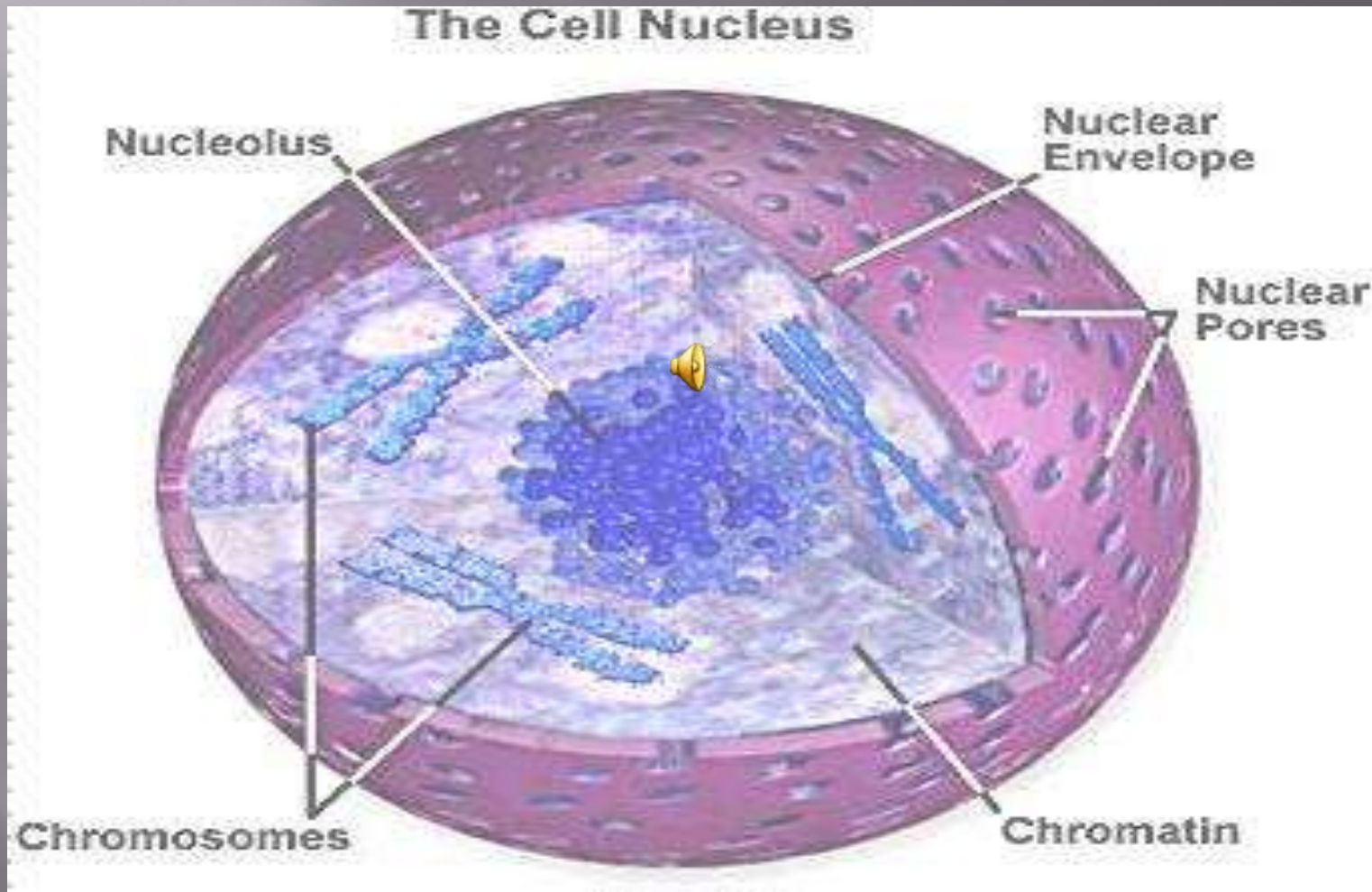
Every cell contain complex  copy of genetic information, but each cell type has certain genes or segments of DNA turned on and other turned off.

The nucleus can be seen by E.M and the DNA molecules can be distinguished and there is a chromatin which found into the nucleus in the interphase stage.

# Nuclear Envelope



# The nucleus



- ▣ The nucleus consist of the followings:
- ▣ 1-nuclear envelope.
- ▣ 2-nucleoplasm.
- ▣ 3-chromatin.
- ▣ 4-nucleolus.
- ▣ Nucleus is the control center of the cell, if the nucleus in an egg cell destroyed the egg cannot go on to develop into a new individual.



# Nuclear envelope:

The nucleus is separated from the cytoplasm by a double membrane, known as the nuclear envelope, this envelope consist of two layers, outer layer is the layer of protein fibers called the nuclear lamina which associated with the inner layer.



# Functions of nuclear lamina:

- 1-help to maintain the shape of the nucleus.
- 2-organizes chromatin by providing chromatin attachment sites.
- 3-it may play as funnel substances toward or away from the nuclear pores. 📢

The nuclear envelope has nuclear pores of sufficient size(100 nm) to permit the passage of proteins into the nucleus and ribosomal subunits out of the nucleus.

# Nucleoplasm:

Is an semi-fluid medium which chromatin immersed in it, the difference in PH between cytosol & the nucleoplasm contain several material like phosphorus compounds, sugar or CHO and nitrogenic compounds, other compounds presented are nucleoprotein, and it's a protein discovered in the nucleus for first time and therefore called by this name "nucleoproteins" are conjugated proteins resulted from nucleic acid connected with protein.

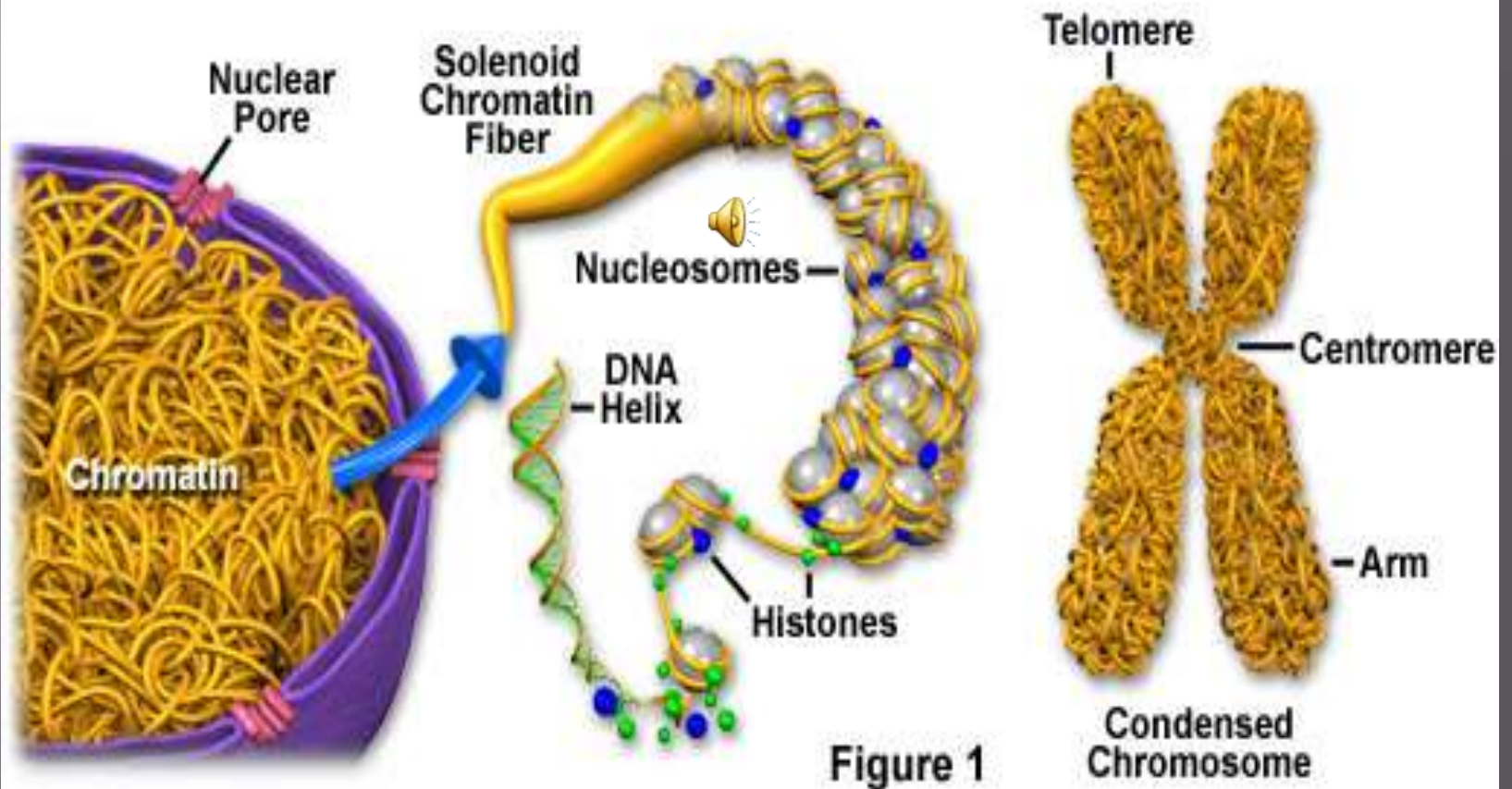


# Chromatin:

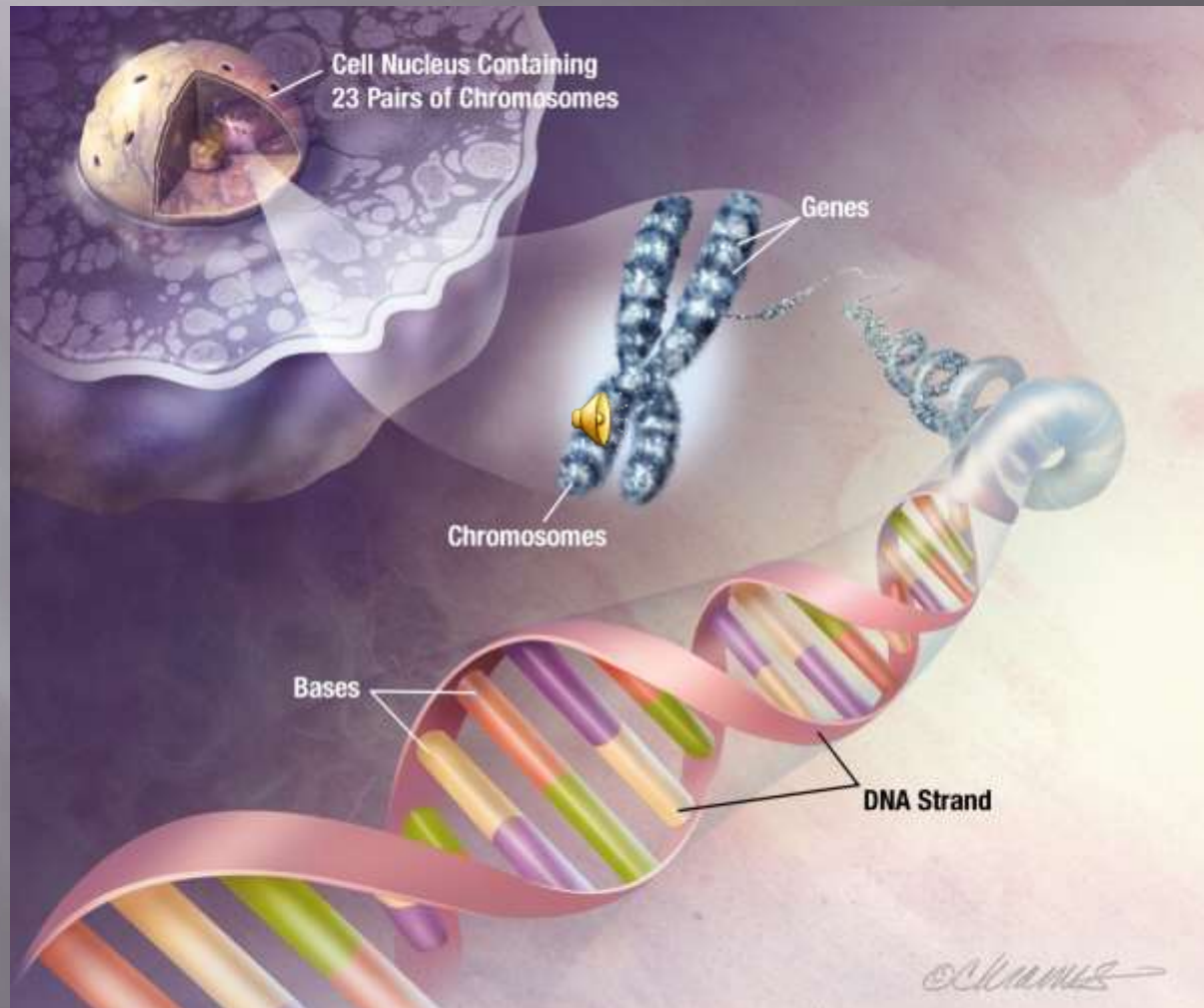
- ▣ When you look at the nucleus, even in an electron micrograph you cannot see DNA molecule but see chromatin, looks grainy, but actually it is thread like material that undergoes coiling into rod like structure called **chromosomes**, chemical analysis shows that chromatin and therefore chromosomes ,contains DNA and much protein and some of RNA.

# Chromatin

## Chromatin and Condensed Chromosome Structure



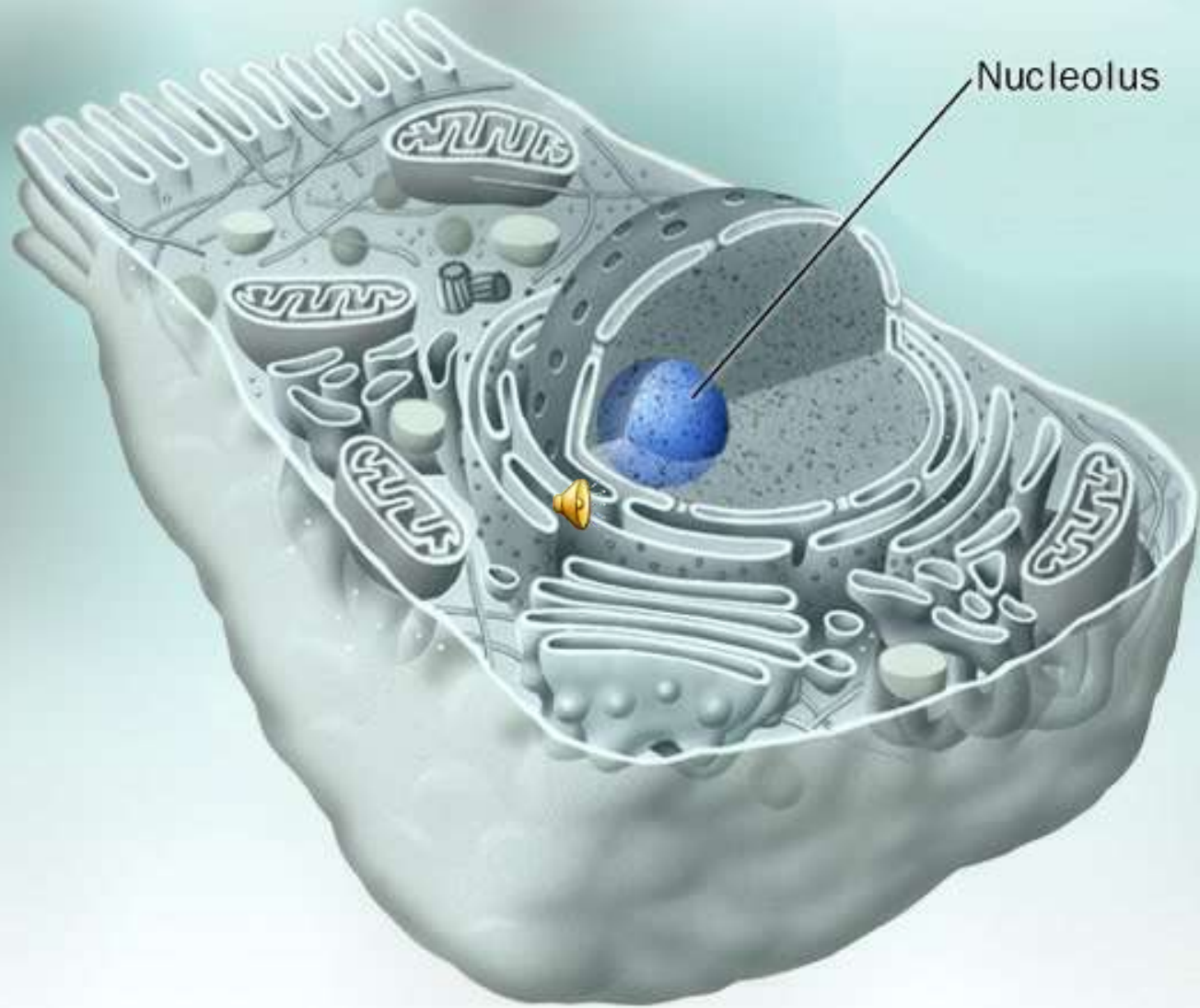
# DNA Molecule



# Nucleolus

When you see the nucleus by electron micrograph, you will see one or more regions that look darker than the rest of chromatin, these are **nucleoli**, type of RNA called ribosomal RNA (rRNA) were produced and when rRNA joins with protein to form another subunit called **Ribosomes**, another nucleic acids were presented in nucleoli called messenger RNA (mRNA).

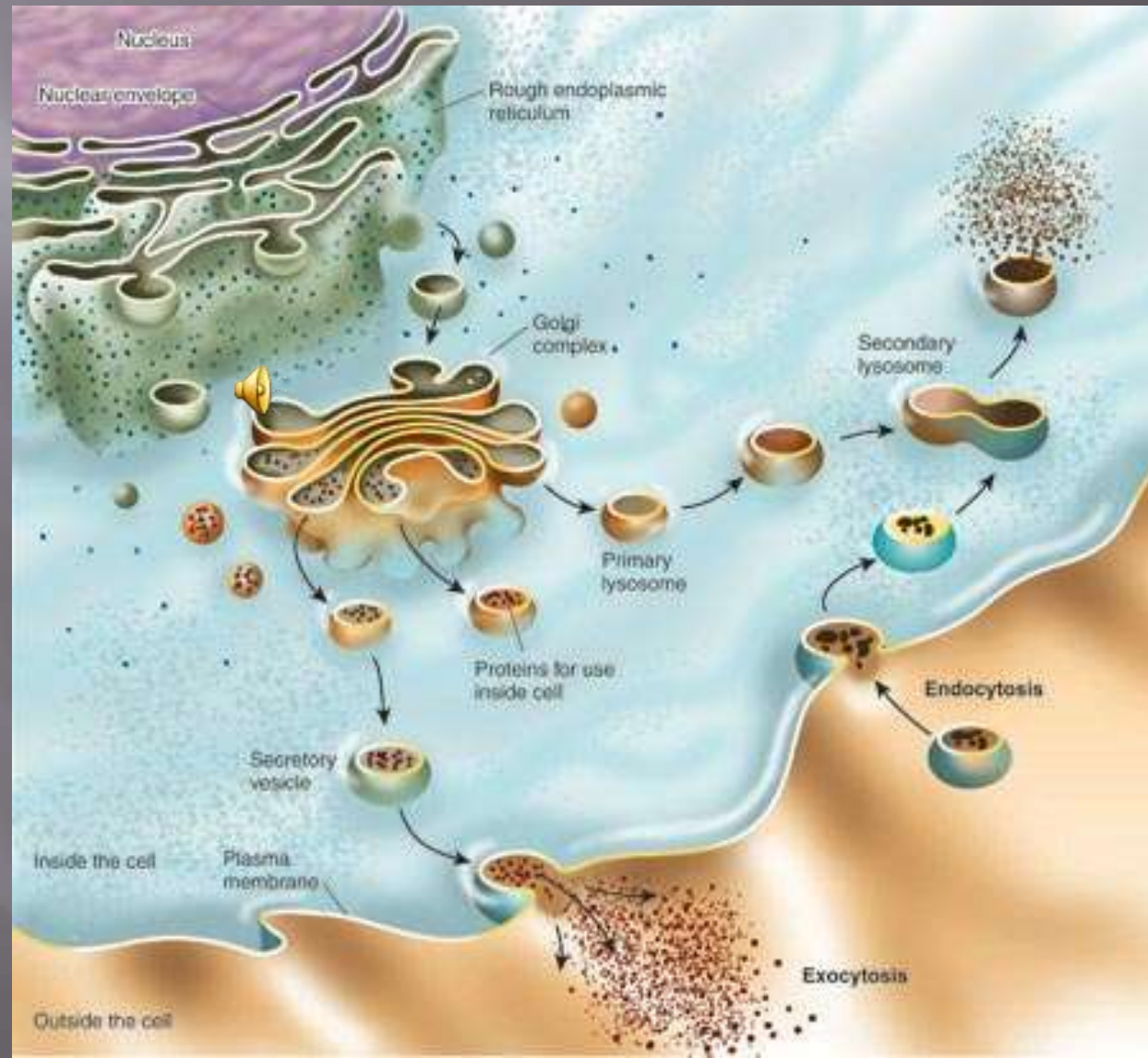
The later carry a specific genes information (message) from chromosome to Ribosomes in order to building specific protein.



Nucleolus

# Endomembrane system:

This system consists of the nuclear envelope, the endoplasmic reticulum, the Golgi apparatus and several vesicles, this system compartmentalizes the cell.



# Cytoskeleton

The network of inter connected filaments and microtubules that extends from the nucleus to the plasma membrane in eukaryotic cells, before 1970 it was believed that the cytosol was unorganized mixture of bio-molecules, then a high voltage electron microscope showed that the cytosol was instead highly organized, and the technique of immunofluorescence microscopy identified the nature of specific protein fibers within cytoskeletal network.



