Al- Mustaqbal university collage
Department of radiology technologies
1.St stage
Lecture 4

NUCLEOLUS

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WHAT THE NUCLEUS ?

- Nucleus: in biology, a specialized structure occurring in most cells (except bacteria and blue-green algae) and separated from the rest of the cell by a double layer, the nuclear membrane
- This membrane seems to be continuous with the endoplasmic reticulum (a membranous network) of the cell and has pores, which probably permit the entrance of large molecules

WHAT THE NUCLEUS ?

- The nucleus controls and regulates the activities of the cell (e.g., growth and metabolism) and carries the genes, structures that contain the hereditary information
- Nucleoli are small bodies often seen within the nucleus.
- The gel-like matrix in which the nuclear components are suspended is the nucleoplasm.

WHAT THE NUCLEUS

- The cell normally contains only one nucleus. Under some conditions, however, the nucleus divides but the cytoplasm does not
- This produces a multinucleate cell (syncytium) such as occurs in skeletal muscle fibers
- Some cells—e.g., the human red blood cell—lose their nuclei upon maturation The cell nucleus contains all of the cell's genome, except for the small amount of mitochondrial DNA and, in plant cells, plastid DNA

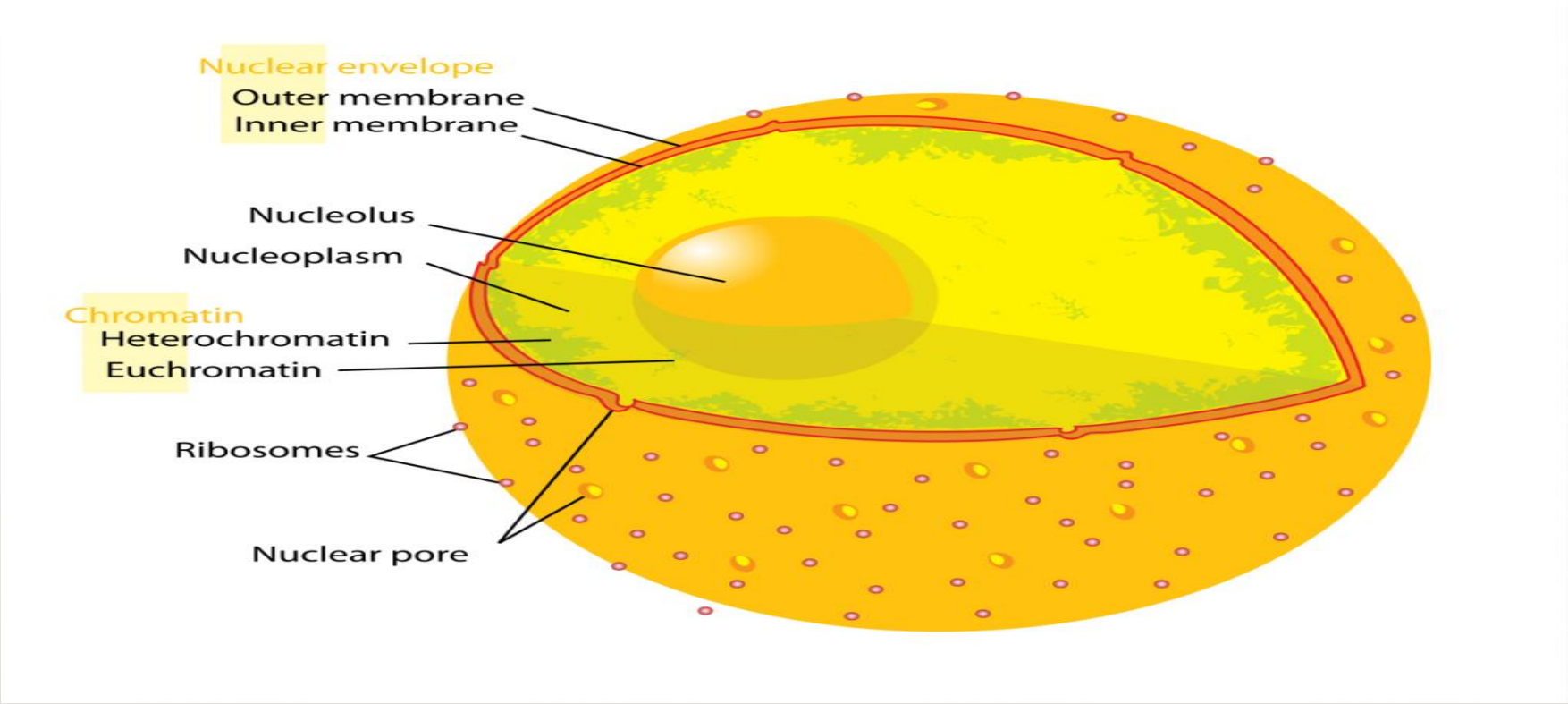
WHAT THE NUCLEUS

- Nuclear DNA is organized as multiple long linear molecules in a complex with a large variety of proteins, such as histones, to form chromosomes
- The genes within these chromosomes are structured in such a way to promote cell function.
- The nucleus maintains the integrity of genes and controls the activities of the cell by regulating gene expression—the nucleus is, therefore, the control center of the cell

STRUCTURE OF NUCLEUS

- Typically, it is the most evident organelle in the cell.
- The nucleus is completely bound by membranes.
- It is engirdled by a structure referred to as the nuclear envelope.
- The membrane distinguishes the cytoplasm from the contents of the nucleus
- The cell's chromosomes are also confined within it.
- DNA is present in the Chromosomes, and they provide the genetic information required for the creation of different cell components in addition to the reproduction of life.

STRUCTURE OF NUCLEUS



NUCLEUS FUNCTION

- It contains the cell's hereditary information and controls the cell's growth and reproduction.
- The nucleus has been clearly explained as a membrane-bound structure that comprises the genetic material of a cell.
- It is not just a storage compartment for DNA, but also happens to be the home of some important cellular processes.

NUCLEUS FUNCTION

- First and foremost, it is possible to duplicate one's DNA in the nucleus. This process has been named DNA Replication and produces an identical copy of the DNA.
- Producing two identical copies of the body or host is the first step in cell division, where every new cell will get its own set of instructions.
- Secondly, the nucleus is the site of transcription. Transcription creates different types of RNA from DNA. Transcription would be a lot like creating copies of individual pages of the human body's instructions which may be moved out and read by the rest of the cell.
- The central rule of biology states that DNA is copied into RNA, and then proteins.

NUCLEAR ENVELOP

- The nuclear envelope, also known as the nuclear membrane that in eukaryotic cells surrounds the nucleus, which encloses the genetic material
- . The nuclear envelope consists of double membrane composed of an outer and an inner phospholipid bilayer
- The thin space between the two layers connects with the lumen of the rough endoplasmic reticulum (RER), and the outer layer is an extension of the outer
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NUCLEAR ENVELOP

- Because the nuclear envelope is impermeable to large molecules, nuclear pores are required to regulate nuclear transport of molecules across the envelope
- The pores cross both nuclear membranes, providing a channel through which larger molecules must be actively transported by carrier proteins while allowing free movement of small molecules and ions
- Movement of large molecules such as proteins and RNA through the pores is required for both gene expression and the maintenance of chromosomes.
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FUNCTION OF THE NUCLEAR MEMBRANE

- The nuclear membrane is a barrier that physically protects the cell's DNA from the chemical reactions that are occurring elsewhere in the cell.
- If molecules that stay in the cytoplasm were to enter the nucleus, they could destroy part of the cell's DNA, which would stop it from functioning properly and could even lead to cell death.
- The envelope also contains a network of proteins that keep the genetic material in place inside the nucleus.

WHAT NUCLEIC ACID

- Nucleic acids are biopolymers, macromolecules, essential to all known forms of life.
- They are composed of nucleotides, which are the monomers made of three components: a 5-carbon sugar, a phosphate group and a nitrogenous base.
- The two main classes of nucleic acids are deoxyribonucleic acid and ribonucleic acid.

WHAT NUCLEIC ACID

- naturally occurring chemical compound that is capable of being broken down to yield phosphoric acid, sugars, and a mixture of organic bases (purines and pyrimidines)
- Nucleic acids are the main information-carrying molecules of the cell, and, by directing the process of protein synthesis, they determine the inherited characteristics of every living thin

TYPE OF NUCLEIC ACID

- The two main classes of nucleic acids are deoxyribonucleic acid (DNA) and ribonucleic acid (RNA)
- DNA is the master blueprint for life and constitutes the genetic material in all free-living organisms and most viruses
- RNA is the genetic material of certain viruses, but it is also found in all living cells, where it plays an important role in certain processes such as the making of proteins.

TYPE OF NUCLEIC ACID

- The nucleic acids, the vital constituents of living beings, are long-chain polymers composed of nucleotides.
- Nucleic acids were named based partly on their chemical properties and partly on the observation that they represent a major constituent of the cell nucleus

THANK YOU