

What is the Cell Nucleus?

Worksheet

The nucleus is a membrane-bound organelle that stores a cell's DNA and controls gene expression by regulating which genes are transcribed into RNA.

Questions

1. What is the main function of the nucleus?
 - A) Producing ATP
 - B) Storing and controlling access to DNA
 - C) Digesting waste
 - D) Synthesizing lipids
2. What structure surrounds the nucleus?
 - A) Cell wall
 - B) Nuclear envelope
 - C) Golgi membrane
 - D) Plasma membrane
3. Where are ribosome subunits assembled?
 - A) Mitochondrion
 - B) Nucleolus
 - C) Lysosome
 - D) Cytoplasm
4. What molecule exits the nucleus to direct protein synthesis?
 - A) DNA
 - B) tRNA only
 - C) mRNA
 - D) Glucose
5. Why does a cell losing its nucleus (like a mature red blood cell) stop producing new proteins?
6. A skin cell and a nerve cell have identical DNA but very different functions. Why?
7. What structure in the nucleus is responsible for assembling ribosomes?
8. Define: What does the nucleus store?
9. Define: What is the nuclear envelope?
10. Define: What is the nucleolus?

Answer Key

1. B) Storing and controlling access to DNA - The nucleus houses DNA and regulates which genes are expressed.
2. B) Nuclear envelope - The nuclear envelope is a double membrane with pores that encloses the nucleus.
3. B) Nucleolus - The nucleolus, inside the nucleus, assembles ribosomal subunits.
4. C) mRNA - mRNA is transcribed in the nucleus, then exported to the cytoplasm for translation.
5. Protein production starts with transcribing genes from DNA into mRNA DNA is stored only in the nucleus Without a nucleus there is no DNA to transcribe, so no new mRNA or proteins can be made
6. Both cells' nuclei contain the exact same complete genome Each nucleus turns on (transcribes) only the specific genes needed for that cell type, and silences the rest This selective gene expression, controlled in the nucleus, produces very different proteins and functions
7. The nucleolus is a dense region inside the nucleus It transcribes ribosomal RNA (rRNA) and combines it with proteins This produces ribosomal subunits, which are exported to the cytoplasm to become functional ribosomes
8. The cell's DNA (genetic material), organized into chromosomes.
9. The double membrane that separates the nucleus from the cytoplasm, with pores for molecule transport.
10. A dense region inside the nucleus where ribosomal RNA is made and ribosome subunits are assembled.

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