Topic 32. Enzymes and molecular mechanisms of transcription

Theoretical questions:

1. Characteristics of RNA polymerases: types of RNA polymerases in eukaryotic cells, catalyzed reactions, substrates, energy supply.
2. RNA synthesis or transcription. Initiation, elongation and termination of transcription.
3. Posttranscriptional modifications of the primary transcript (processing, or maturation). Processing of mRNA, tRNA, rRNA.
4. Antibiotics - inhibitors of replication and transcription. Their use in medicine as therapeutic agents.
5. DNA synthesis on an RNA template (reverse transcription). Biological role of the process. Revertases.

Study Questions and Tasks

1. Characteristics of RNA polymerases: types of RNA polymerases in eukaryotic cells and their biological roles

N	Name	Biological roles
1		_____ _____ _____ _____
2		_____ _____ _____ _____
3		_____ _____ _____ _____

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2. Stages of transcription:

Initiation

Elongation

Termination

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3. Posttranscriptional modifications of the primary transcript (processing, or maturation).

Processing of *m*RNAs. Capping, AAA-tailing, splicing.

Processing of *t*RNAs.

Processing of *r*RNAs.

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4. Antibiotics - inhibitors of replication and transcription. Mechanisms of action.

N	Antibiotics	Mechanism of action
Inhibitors of replication		
1	Aphidicolin	
2	Doxorubicin	
3	Melphalan	
Inhibitors of transcription		
1	Dactinomycin	
2	Rifamycin	
3	Rifampicin	

5. Reverse transcription. Revertases.

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Textbooks:

1. David Nelson, Michael Cox. Lehninger Principles of Biochemistry. — W. H. Freeman. — 2021. — 1248 p.
2. Yu.I. Gubsky, I.V. Nizhenkovska, M.M. Korda et al. Biological and Bioorganic Chemistry. Book 2. — Kyiv : AUS Medicine Publishing. — 2021. — 544 p.
3. Yu.I. Gubsky et al. Biological Chemistry. — Kyiv : Nova Kniga, 2020. — 488 p.
4. Denise R. Ferrier. Lippincott Illustrated Reviews: Biochemistry. — Wolters Kluwer. — 2017. — 1716.

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5. Prasad R Manjeshwar. Textbook of Biochemistry for Medical students. Revised Fourth Edition. – 2016. – 640 p.

Information resources

1. https://www.labster.com/
2. https://vlab.amrita.edu/

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