

Molecular Genetics Revision Paper



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المزيد من مادة
علوم:

إعداد: Basim Alrahman-Abd

التواصل الاجتماعي بحسب الصف الحادي عشر العام



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف الحادي عشر العام والمادة علوم في الفصل الثالث

Complex Inheritance and Human Heredity Revision Paper Solution

1

Complex Inheritance and Human Heredity Revision Paper

2

ملخص التنفس الخلوي

3

ملخص عملية البناء الضوئي

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Energy Transformation and Metabolism

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BIOLOGY

MOLECULAR GENETICS

Revision Paper

BY ABD-ALRAHMAN BASIM

SECTION 1:
DNA THE GENETIC MATERIAL

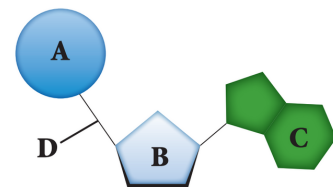
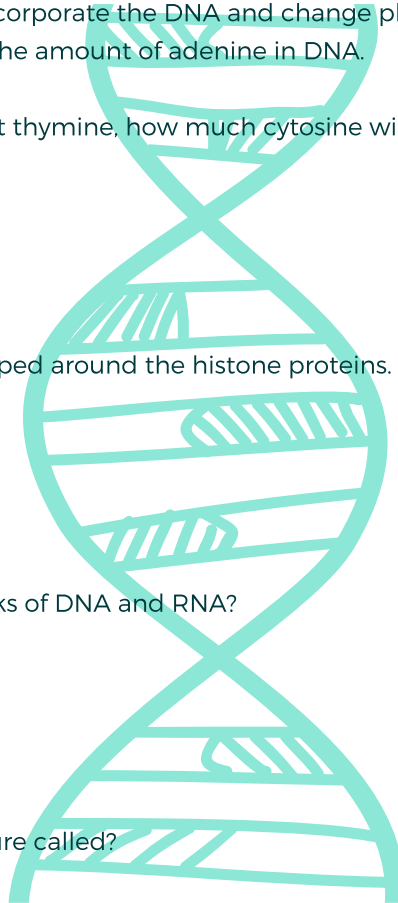
SECTION 2:
REPLICATION OF DNA

SECTION 3:
DNA, RNA AND PROTEINS

SECTION 4:
GENE REGULATION AND MUTATION

DNA THE GENETIC MATERIAL

1. The twisted ladder shape of DNA is called a(n) _____.
 - nucleotide
 - double helix
 - chromosome
 - nucleosome
2. Which was a conclusion of Griffith's work with *Streptococcus pneumoniae*?
 - DNA is the genetic material in viruses.
 - The structure of DNA is a double helix.
 - Bacteria exposed to DNA can incorporate the DNA and change phenotype.
 - The amount of thymine equals the amount of adenine in DNA.
3. If a section of DNA has 27 percent thymine, how much cytosine will it have?
 - 23 percent
 - 46 percent
 - 27 percent
 - 54 percent
4. A _____ consists of DNA wrapped around the histone proteins.
 - nucleotide
 - double helix
 - chromosome
 - nucleosome
5. What are the basic building blocks of DNA and RNA?
 - ribose
 - nucleotides
 - purines
 - phosphorus
6. What is the entire labeled structure called?
 - nucleotide
 - base
 - RNA
 - phosphate
7. Which label represents the coding part of DNA?
 - A
 - B
 - C
 - D
8. Which label represents the 5' carbon in the five-carbon sugar?
 - A
 - B
 - C
 - D



DNA THE GENETIC MATERIAL

9. Which scientist found that one strain could be transformed into other form?

- Frederick Griffith
- Dr. Archibald Garrod
- Oswald Avery
- Erwin Chargaff

10. Which scientist was the first to conclude that the DNA is the transforming substance?

- Oswald Avery
- Erwin Chargaff
- Frederick Griffith
- Dr. Archibald Garrod

11. Which scientists determined the specific structure of the DNA as double helix?

- Wilkins and Franklin
- Watson and Crick
- Hershey and Chase
- Griffith and Avery

12. Which bases are double ringed bases?

- Pyrimidine
- Cytosine
- Uracil
- Purine

13. _____ used the radioactive labeling to determine the genetic material?

- Wilkins and Franklin
- Watson and Crick
- Hershey and Chase
- Griffith and Avery

14. Which scientist isolated DNA, proteins, and lipids from killed S cells?

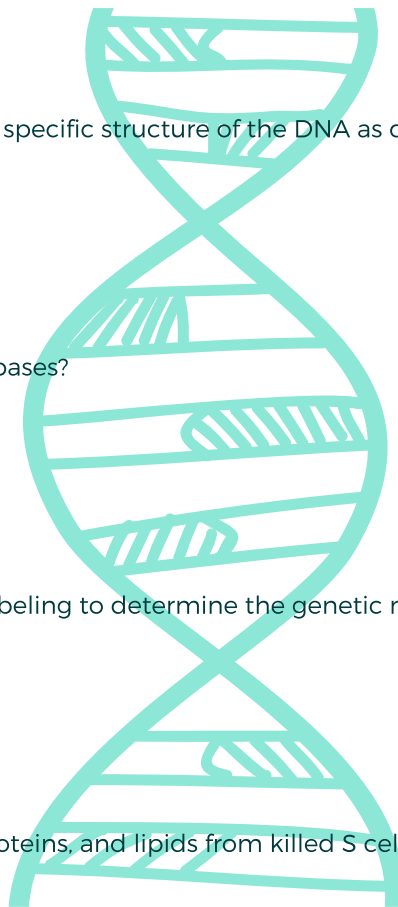
- Frederick Griffith
- Dr. Archibald Garrod
- Oswald Avery
- Erwin Chargaff

15. Match each scientist(s) with their discoveries:

- | | |
|-----------------------------------|---|
| • Frederick Griffith | • DNA was the transforming factor. |
| • Oswald Avery and colleagues | • DNA, and not protein, is the genetic material. |
| • Alfred Hershey and Martha Chase | • A transforming factor changed the live bacterial R strain into the deadly S strain. |

16. What are the 2 radioactive isotopes used in Hershey and Chase experiment?

- ^{32}P for protein, ^{35}S for DNA
- ^{32}P for DNA, ^{35}S for protein
- ^{32}S for proteins, ^{32}P for DNA
- ^{35}S for DNA, ^{32}P for protein



REPLICATION OF DNA

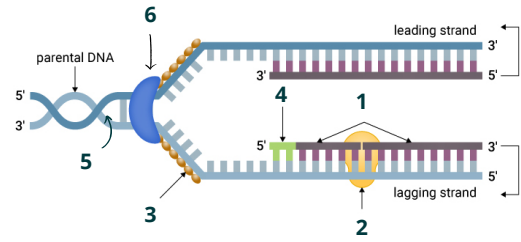
1. _____ are short sequences of DNA nucleotides which are synthesized discontinuously.
 - Semiconservative replication
 - DNA polymerase
 - Okazaki fragment
 - Lagging strand
2. _____ an enzyme that catalyzes the addition of appropriate nucleotides to the new DNA strand.
 - DNA ligase
 - RNA primase
 - DNA helicase
 - DNA polymerase
3. _____ a method of DNA replication in which parental strands act as templates and produce new double-stranded DNA molecules made of a parental strand and a new strand.
 - Semiconservative replication
 - Conservative replication
 - Continuous replication
 - Complete replication
4. What enzyme is responsible for “unzipping” the DNA strand during replication?
 - DNA helicase
 - DNA ligase
 - DNA polymerase
 - RNA primase
5. Which is true about the elongation of the lagging strand?
 - does not require a template strand
 - produces Okazaki fragments
 - requires the action of RNA ligase
 - proceeds by continually adding nucleotides to the 3' end
6. With what does the synthesis of a new strand of DNA begin?
 - RNA primer
 - nucleotide unit
 - messenger RNA
 - transfer RNA
7. In what direction does DNA polymerase synthesize the new nucleotides?
 - 5' to 3'
 - 5' to 5'
 - 3' to 5'
 - 3' to 3'



REPLICATION OF DNA

8. Label the diagram:

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____



9. Which of the following represents the correct sequence of steps in the table to show the order of main events in DNA replication?

- B - D - C - A - F - E
- B - D - A - C - F - E
- B - A - D - C - F - E
- B - D - A - F - C - E

Step	Action
A	DNA polymerases bind to each separated chain of nucleotides.
B	Helicase enzymes separate DNA's two nucleotide chains.
C	One nucleotide at a time, DNA polymerase constructs a new complementary strand of nucleotides.
D	Single-stranded binding proteins attach to strands to keep them apart.
E	One parent strand and a new complementary strand twist together to form double helix identical to the original.
F	Okazaki fragments are joined together by ligase.

10. In which stage does the RNA primer bind to the DNA strand?

- Unwinding
- Joining
- Base Pairing
- Replication

11. In Which stage does DNA replication occur?

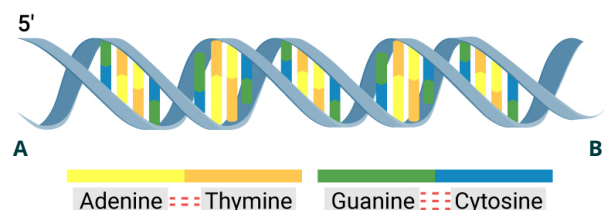
- Prophase
- Metaphase
- Interphase
- Anaphase

12. DNA replication is said to be _____.

- Semicontinuous
- Semidiscontinuous
- Continuous
- Conservative

13. What is the correct labeling for the diagram?

- A (5') - B (3')
- A (5') - B (5')
- A (3') - B (3')
- A (3') - B (5')



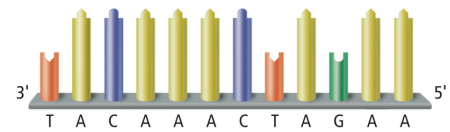
DNA, RNA AND PROTEINS

1. Which correctly lists the changes to eukaryotic pre-mRNA to form mRNA?

- cap added, introns excised, and poly T tail added
- cap added, exons excised, and poly T tail added
- cap added, introns excised, and poly A tail added
- cap added, exons excised, and poly A tail added

2. What is the mRNA sequence for the template strand DNA sequence in the figure?

- 5' ATGTTTGATCTT 3'
- 5' AUGUUUGAUCUU 3'
- 5' TACAACTAGAA 3'
- 5' UACAAACUAGAA 3'

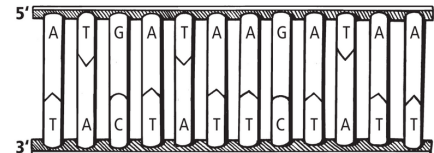


3. What is the sequence for the nontemplate strand of the DNA in the figure?

- 5' ATGTTTGATCTT 3'
- 5' AUGUUUGAUCUU 3'
- 5' TACAACTAGAA 3'
- 5' UACAAACUAGAA 3'

4. Which sequence is possible for mRNA formed from the DNA strand shown in the illustration?

- 5' AATAGAATAGTA 3'
- 5' AAUAGAAUAGUA 3'
- 5' ATGATAAGATAA 3'
- 5' AUGAUAAGAUAA 3'



5. _____ is a sequence of three DNA or RNA nucleotides.

- mRNA
- Intron
- Codon
- Exon

6. _____ are long strands of RNA nucleotides that are formed complementary to one strand of DNA.

- R1NA primer
- tRNA
- mRNA
- rRNA

7. What are the steps of the central dogma?

- translation, transcription, protein
- transcription, protein, translation
- transcription, translation, protein
- translation, protein, transcription

DNA, RNA AND PROTEINS

8. What are the three major types of RNA?

- transfer RNA, manager RNA, ribosomal RNA
- transfer RNA, ribosomal RNA, messenger RNA
- messenger RNA, ribosomal RNA, translation RNA
- messenger RNA, rearranging RNA, transfer RNA

9. Which codon is a stop codon?

- AUG
- GUA
- UCG
- UAG

10. Which is not a stop codon?

- AUG
- UAA
- UGA
- UAG

11. The strand of DNA that is read by RNA polymerase is called _____.

- Leading strand
- template strand
- lagging strand
- nontemplate strand

12. Beadle and Tatum came up with what is known as _____.

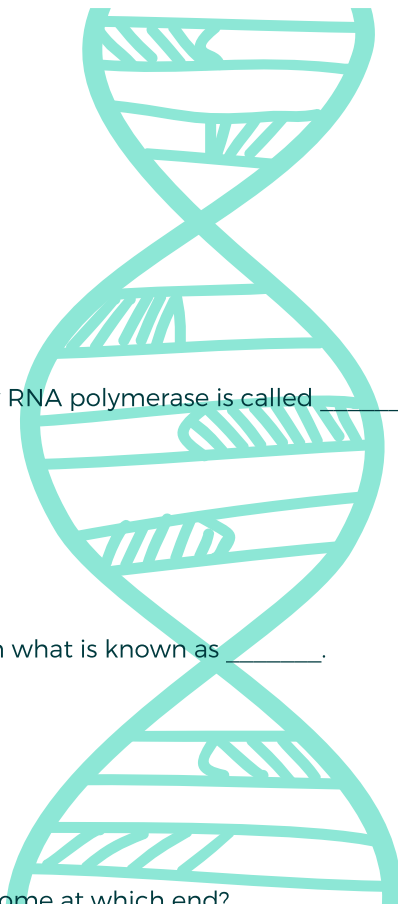
- one Gene-one Polypeptide
- one Gene-one Protein
- one Gene-one Enzyme
- one Gene-one Amino acid

13. The mRNA connects to the ribosome at which end?

- 3' and 5'
- 5' and 3'
- 3' only
- 5' only

14. In which site does the tRNA exit the ribosome in the translation process?

- site A
- site E
- site C
- site P



GENE REGULATION AND MUTATION

1. Which term describes the regulation of a prokaryotic genome?

- gene expression
- operon
- gene regulation
- mutation

2. Which term describes the control of the functional units of DNA?

- mutation
- gene regulation
- operon
- gene expression

3. Which term describes the changes in DNA sequence?

- gene regulation
- mutation
- gene expression
- operon

4. Which demonstrates an insertion mutation of the sequence 5' GGGCCCAA 3' ?

- 5' GGGGCCCAA 3'
- 5' GGGCCCAA 3'
- 5' GGGAAACCC 3'
- 5' GGGCCCAAAAA 3'

5. Which is true about eukaryotic gene regulation?

- Eukaryotic gene regulation is exactly like prokaryotic gene regulation.
- Replication factors guide the binding of eukaryotic RNA polymerase to the promoter.
- Activator proteins fold DNA to enhancer sites that increase the rate of gene transmission.
- Repressor proteins bind to activators, preventing them from binding to the DNA.

6. Which is not a type of mutation?

- base substitutions
- RNA interference
- insertions
- translocation

7. What regulatory protein helps RNA polymerase and general transcription factors bind to a promoter?

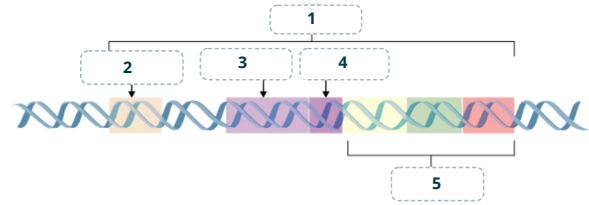
- codon
- repressor
- activator
- histone



GENE REGULATION AND MUTATION

8. Label the diagram:

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____



9. The *trp* operon is referred to as a _____ operon.

- inducible
- repressible
- inducer
- repressed

10. _____ determine the body plan of an organism.

- Hox genes
- Dicer genes
- Promoter genes
- Transcribing genes

11. What process enables multicellular organisms to develop cells with different structures and functions?

- mitosis
- miosis
- replication
- differentiation

12. Match the term with its definition.

- | | |
|------------------------|--|
| • transcription factor | • an enzyme that cuts the RNA into smaller segments called small interfering RNA |
| • Hox gene | • protein that binds to DNA to turn a gene on or off |
| • dicer | • sequence of genes that determine the body plan of many organisms |

13. Which is not one of the three main types of mutations?

- duplication mutations
- expanding mutations
- substitution mutations
- frameshift mutations

14. Tandem repeats is another name for which type of mutation?

- nonsense mutation
- insertion mutation
- expanding mutation
- duplication mutation

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