Past papers

بسم الله الرحمن الرحيم

FINAL – Lecture #16-20

Molecular Biology

﴿ وَإِن تَتَوَلَّوْا يَسْتَبْدِلْ قَوْمًا غَيْرَكُمْ ثُمَّ لَا يَكُونُوا أَمْثَالَكُم ﴾

اللهم استعملنا ولا تستبدلنا

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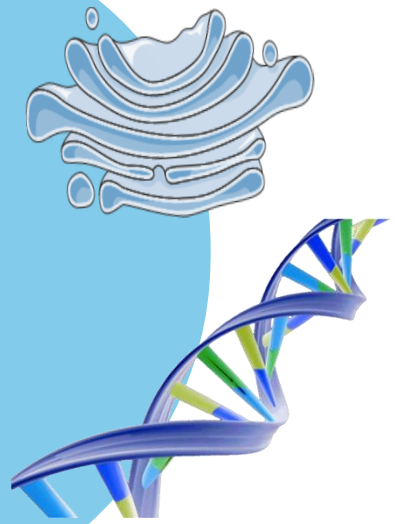


Past Papers for Lectures (16+17)

Q1) How long is the peptide that is generated from this eukaryotic mRNA knowing that the first U is the 5'-end of the mRNA (UGUGUGUCACUUAUAAUGGCGCAUAUGAGG)

- A.4
- B.3
- C.5
- D.10
- E.2

Answer :C

Q2) Which of the following would not DIRECTLY affect protein translation?

- A. Dysfunctional miRNA
- B. A mutation in the genes responsible for the synthesis of rRNA
- C. Ubiquitination of proteins

Answer :C

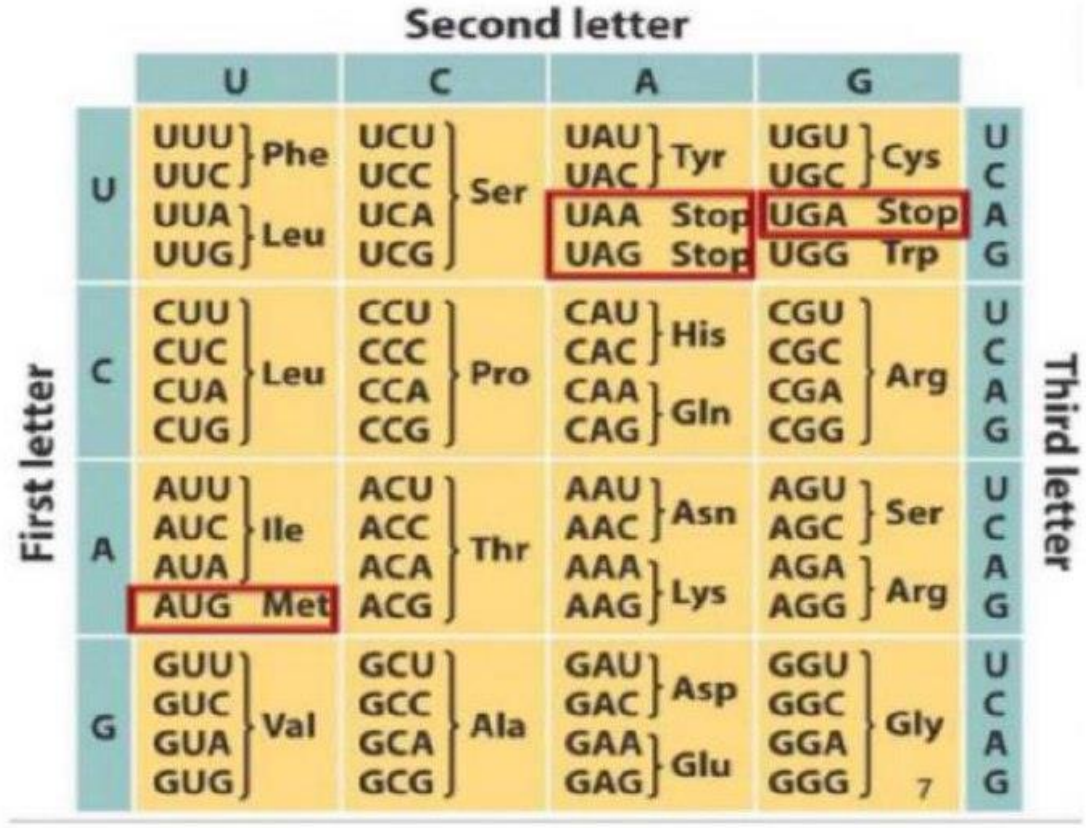
Q3) To which of the following structures in a typical molecule of tRNA is an amino acid attached?

- A.Anticodon loop
- B.Variable loop
- C.CCA tail
- D.D loop

Answer :C

Q4) According to the table, which amino acid would result from the anticodon ACG?

- A. Thr
- B. Arg
- C. Cys
- D. b+c



Answer :B

Q5)one of the following is NOT true in regards to human ribosomes?

- A. the large ribosomal subunits are the sites of forming peptide bonds
- B. they can bind up to two transfer RNA (tRNA) molecules at a time
- C. ribosomal RNA (rRNA) molecules catalyze peptide bond formation
- D. small ribosomal subunits are responsible for identifying the translation start codon
- E. RNA polymerase I is responsible for synthesis of all rRNA molecules

Answer:E

Q6) This is NOT a mechanism we discussed by which non-coding RNA molecules can ultimately regulate proteins:

- A. Phosphorylation of translation initiation factor
- B. Binding to the 3’-end of mRNA causing its degradation
- C. Binding to mRNA blocking translation
- D. Coating and condensation of DNA
- E. Recruitment of transcriptional regulatory proteins to the promoter region

Answer :A

Q7) the main function of proteasomes is:

- A. RNA degradation
- B production of ubiquitin
- C RNA processing
- D . regulation of translation
- E. protein degradation

Answer :E

Q8) the main function of eukaryotic translation initiation factor 4 (eIF4) proteins is:

- A. stabilizing the complexing of small and large ribosomal subunit
- B. linking the mRNA cap to the poly-A tail
- C. guiding ribosomes to the translation start codon
- D. recruiting transfer RNA molecules to the mRNA
- E. chemically modify mRNA to initiate translation

Answer :B

Q9) the following mRNA (ACGAUGAUGAUCGUUGAA) is translated starting at the first codon. How many amino acids exist in the produced peptide?

- A. 6
- B. 1
- C. 2
- D. 0
- E. 5

Answer :A

Q10) the anti-codon of the methionine-carrying tRNA is:

- A.UGA
- B. CAU
- C. UAC
- D. GUA
- E . AUG

Answer :B

Q11) regeneration of active eukaryotic initiation factor (eIF2) is blocked by?

- A. empty tRNA molecules
- B. phosphorylation
- C. binding to eIF2B
- D. release factors
- E. binding to GDP

Answer :B

Q12) one of the following is NOT true in regards to microRNA molecules?

- A. they are synthesized by RNA polymerase II
- B. they can bind to 5’- and 3’- untranslated regions
- C. only one strand is needed for action
- D. they result in reduction of protein levels
- E. they are synthesized as single-RNA molecules

Answer :B

Q13) In eukaryotes, all of the following steps happen during translation elongation stage EXCEPT:

- A. Hydrolysis of GTP into GDP to provide energy
- B Translocation of tRNA from A site to P site
- C. Binding of aminoacyl-tRNA to the A site
- D.Exit of aminoacyl-tRNA from E site
- E. Formation of a peptide bond

Answer :D

Q14)What is the anticodon that is complementary to the codon UAC (directions from 5’- to -3’)?

- a. GUA
- b. GAU
- c. GTA
- d. UTG
- e. UAG

Answer :A

Q15) Which of the following is NOT correct about tRNA?

- A. tRNA contains a three-nucleotide sequence known as an anticodon
- B. The match between tRNA anticodon and the mRNA codon ensures the fidelity of translation
- C. Some tRNAs can bind to more than one codon due to wobble base pairing in the second base of the codon
- D. Charging tRNAs with amino acids is mediated by aminoacyl-tRNA synthetases .
- E. tRNA is a short single-stranded RNA (ssRNA).

Answer :C

Q16) At which points can gene expression be regulated?

- A.During transcription
- B. Post transcription
- C. During translation
- D.Post translation
- E.All of the above

Answer :E

Q17) What is the function of P site?

- A. Exit of tRNA
- B. Facilitate the formation of peptide bond
- C. Stabilize the interaction between mRNA and rRNA
- D. Stabilize the interaction between mRNA/ tRNA and the ribosome
- E. Holds the tRNA that carries the next amino acid

Answer: B

Q18) According to wobble base pairing, the anticodon for this codon (GGA) is:

- A. CCU
- B. UCC
- C. UCU
- D. TCC
- E. UCC

Answer: C

Q19) A protein (ferroxide) functions in storing iron, and its mRNA is regulated in a similar way to ferritin and transferrin, its IRE is on the _____ and it does this: _____ when iron levels are low:

A. 5’ end of the mRNA, IRP binds to the IPE and enhances translation

B. 5’ end of the mRNA, IRP binds to the IPE and prevents translation

C. 3’ end of the mRNA, IRP binds to the IPE and enhances translation

D. 3’ end of the mRNA, IRP binds to the IPE and prevents translation

E. 5’ end of the mRNA, it doesn’t affect translation

Answer: B

Q20) Not True about IRES:

- A.Recognized by 40s ribosome or eIF4G
- B. Similar to shine dalgarno sequence
- C. Located downstream of AUG starting codon
- D. A and C
- E. B and C

Answer: C

Q21) Regeneration of active eukaryotic initiation factor (eiF2) is blocked by:

- A. Empty tRNA molecules
- B. Binding to elF2B
- C. Phosphorylation
- D. Binding to GDP
- E. Release factors

Answer: D

Q22) The main function of eukaryotic translation initiation factor 4 (eIF4) proteins is:

- A. Chemically modify MRNA to initiate translation
- B. Stabilizing the complexing of small and large ribosomal subunit
- C. Recruting transfer RNA molecules to the MRNA
- D. Guiding ribosomes to the translation start codon
- E. Linking the MRNA cap to the poly-A tail

Answer: D

Q23) removal of iron response elements from the ferritin mRNA results in :

A) production of different protein isoforms
B) increased binding of the iron regulatory protein to the mRNA
C) decreased stability of mRNA
D) increased half-life of the mRNA
E) increased translation regardless of iron levels

Answer: E

Past Papers for Lecture (18)

Q1) You have studied the possible interaction between two proteins, dumbness, and smartness. Dumbness has two domains X and Y. Smartness has two domains: A and B. You used the yeast two-hybrid system approach expressing different domain/protein combinations. You generated the following results (dumbness +smartness = blue colonies; A + X = blue colonies; A + Y = blucolonies; B + X =white colonies; B + y = white colonies). What is your interpretation?

- a. Domain B interacts with both domains X and Y
- b. Domain A interacts with both domains X and Y
- c. The two proteins do not really interact with each other
- d. Domain B interacts with X but not Y
- e. Domain A interacts with X but not Y

ANSWER: B

Q2) You suspect that the hormone binds to large number of proteins. How can you identify the interacting protein?

- A. Yeast-Two hybrid system
- B. Next -generation sequencing
- C. CRISPR-Cas9 system
- D. Reporter gene assay
- E. Protein tagging

Answer: A

Q3) You want to study the regulatory sequence of the hormone gene including the promoter, promoter proximal element and silencer. you perform a reporter gene essay. one of the following is true:

- A. you need to make cDNA from the hormone mRNA
- B. you need the coding region of the hormone without introns
- C. you need to use the LacZ as a reporter gene
- D. you need to create an expression vector that contains different regions of regulatory sequence
- E. you need to create a recombinant hormone with luciferase

Answer: D

Q4) A blue colony generated in yeast two-hybrid system indicates

- A. The enzyme beta-galactosidase is inactive
- B. The recombinant plasmid are successfully inserted into yeast
- C. No expression of LacZ gene
- D. A confirmation of protein -protein interaction
- E. Lactose is metabolized

Answer: D

Q5) The luciferase reporter assay is used to

- A. Identify transcription start sites
- B. Identify introns and exons within eukaryotic genes
- C. Identify termination sequences of genes
- D. Identify genes
- E. Identify regulatory sequences within promoters

Answer: E

Q6) Which of the following is true about the LacZ system?

- A. It gives a white color when activated
- B. It tests the binding of two proteins together
- C. It tests the binding of a protein with a DNA molecule

Answer: B

Q7) Which of the following is NOT a method used to study protein-protein interactions?

- A) Co-immunoprecipitation
- B) Luciferase reporter assay
- C) Yeast two-hybrid system
- D) Northern blot
- E) None of the above

Answer: D

Q8) Why is the LacZ gene important in yeast two-hybrid experiments?

- A) It synthesizes DNA ligase.
- B) It produces beta-galactosidase when activated.
- C) It binds to DNA directly.
- D) It fluoresces under UV light.
- E) All of the above

Answer: B

Q9) Which outcome indicates a positive interaction between two proteins in the yeast two-hybrid system?

- A) Formation of white colonies
- B) Formation of blue colonies
- C) No colony formation
- D) Dissolution of yeast cells
- E) All of the above

Answer: B

Q10) What is the purpose of X-gal in yeast two-hybrid systems?

- A) To generate a blue product if the interaction is positive
- B) To inhibit protein interactions
- C) To enhance luciferase activity
- D) To decrease yeast viability
- E) None of the above

Answer: A

Q11) What is the primary function of the UAS (upstream activating sequence) in yeast?

- A) It acts as a binding site for transcription factors.
- B) It inhibits transcription of adjacent genes.
- C) It is responsible for the degradation of mRNA.
- D) It is the primary site for DNA replication initiation.
- E) None of the above

Answer: A

Q12) In a yeast two-hybrid system, what role do the DNA-binding domain (BD) and activation domain (AD) play when they come into proximity?

- A) They initiate the cleavage of DNA.
- B) They activate transcription of a reporter gene.
- C) They directly interact with luciferase.
- D) They silence gene expression.
- E) All of the above

Answer: B

Q13) Which of the following is NOT a component of the co-immunoprecipitation technique?

- A) Antibodies specific to the protein of interest.
- B) Special beads to which antibodies are attached.
- C) Luciferase as a reporter enzyme.
- D) A mixture of cell proteins.
- E) None of the above

Answer: C

Q14) In the context of protein-protein interaction studies, what does Co- immunoprecipitation typically assess?

- A) The individual function of proteins outside of a cellular environment.
- B) The interaction between proteins by precipitating a protein complex.
- C) The activity levels of enzymes in metabolic pathways.
- D) The transcriptional activity of genes.
- E) All of the above

Answer: B

Q15) Which component is NOT typically involved in creating a yeast two-hybrid system?

- A) DNA-binding domain (BD) fused to one protein of interest.
- B) Activation domain (AD) fused to a second protein of interest.
- C) Luciferase to measure light emission.
- D) LacZ gene as a reporter.
- E) None of the above

Answer: C

Q16) What does the use of X-gal in yeast two-hybrid experiments help to determine?

- A) The effectiveness of antibiotics on yeast growth.
- B) The presence of DNA-binding proteins.
- C) The interaction between two proteins based on the color of yeast colonies.
- D) The rate of yeast cell replication.
- E) None of the above

Answer: C

Q17) Blue colony generated in yeast two-hybrid system, indicates:

- A) The enzyme beta-glactosidase is inactive
- B) The recombinant plasmid is successfully inserted into yeast
- C) No expression of LacZ gene
- D) A confirmation of protein -protein interaction
- E) Lactose is metabolized

Answer: D

Q18) Co-immunoprecipitaAon helps in determining

- a.Protein localizaAon inside cells
- • b.protein funcAon
- • c.Protein sequence
- • d.Proteins that form protein complexes
- • e.Protein structure

Answer : D

Q19) Why speciRcally are human proteins expressed in yeast instead of bacteria

- a.Yeast cells grow faster than bacterial cells
- • b.Larger vectors can be inserted into them
- • c.Yeast cells are larger and can handle higher amounts of proteins than bacterial cells
- • d.Proteins are folded and modiRed just like in human cells
- • e.Yeast cells are aiected by anAbioAcs like bacterial cells

Answer : D

Q20) This parAcular advantage of plasmids makes them favorable vectors for the producAon of large amounts of a recombinant human protein in bacteria

- a.They can be replicated in bacterial cells
- • b.The promoter they contain is human
- • c.They are small
- • d.They are bacterial in nature
- • e.They carry anAbioAc-resistance genes

Answer : A

Q21) In a yeast two-hybrid experiment, a known gene X is fused to the DNA binding domain (BD) and an unknown gene Y is fused to the activation domain (AD). When X-BD and Y-AD are coexpressed in yeast, the colonies turn blue in the presence of X-gal. What can be concluded about the result of the technique?

- a. The X and Y proteins do not interact
- b. The LacZ reporter gene is non-functional
- c. The X and Y proteins interact with each other
- d. The BD and AD are far away from each other
- e. The AD protein is able to function when it is free in the solution

Answer:C

Q22) Which of the following statements is true about co-immunoprecipitation?

- a. We use different types of antibodies for more than one antigen
- b. The used antibodies are free rather than attached to a surface
- c. The protein bound to the bead is precipitated with other proteins attached to it
- d. The antibodies are of the same idiotype but are specific for different types of proteins
- e. The proteins precipitated may or may not have the ability to interact with each other

Answer:C

Q23) What concept does the yeast two-hybrid system take advantage of?

- a. Domains are self-stabilizing
- b. Domains fold independently
- c. Domains have defined 3d structure
- d. Domains can be separated from proteins and mantain their functions

Answer:B

Past Papers for Lectures (19 & 20)

Q1) one of the following is TRUE in regards to silent point mutations :

A) they occur in noncoding regions
B) they involve change in chromatin structure
C) they cannot be detected
D) they involve changes in the DNA sequence but not the protein's amino acid sequence
E) they are considered epigenetic mutations

Answer: D

Q2) one of the following is NOT true regards to deamination reaction :

A) deaminated cytosine is inserted by DNA polymerase
B) they are considered spontaneous mutations
C) when deaminated, adenine becomes hypoxanthine
D) examples include deamination of methylcytosine in DNA
E) mutations persist following DNA replication if not repaired

Answer: A

Q3) A point mutation occurred in the coding DNA of this protein that results in the production of an abnormal protein with 112 amino acids. The mutation is :

A) Missense mutation
B) Nonsense mutation
C) Silent mutation
D) Conversion of a stop codon into Methionine codon
E) Insertion of three nucleotides in the promoter region

Answer: B

Q4) Strand breaks mainly results from :

A) Alkylation
B) Depurination
C) Replicating repeated sequences
D) Ionizing radiation
E) Deamination

Answer: D

Q5) A chemical that causes deamination of cytosine results in its conversion to :

A) Uracil
B) Methyl-thymine
C) Thymine
D) 5-bromouracil
E) Methyl-uracil

Answer: A

Q6) ionized 5-bromouracil results in :

A) Depurination
B) Intercalation into DNA
C) Pairing with guanine
D) Single-strand breaks
E) Thymine dimers

Answer: C

Q7) Below are two sequences of a segment of DNA.
CCG GTC TAG Normal sequence
CCG GTC GTAG Mutated sequence
Which type of mutation has occurred?

A) Substitution mutation
B) Deletion mutation
C) Nonsense mutation
D) Insertion mutation

Answer: D

Q8) DNA glycosylases cleaves the ..... and UVR complex cuts ..... :

A) phosphodiester, phosphodiester
B) phosphodiester, hydrogen bonds
C) glycosidic, phosphodiester
D) glycosidic, glycosidic

Answer: C

EXTRA INFORMATION: The Uvr complex, found in bacteria, resembles the function of XP proteins in eukaryotic cells. Good to know!

Q9) The UV light cause cell death in which of the following diseases :

A) Xeroderma pigmentosum (XP)
B) Cockayne's syndrome
C) Fragile X syndrome
D) A+B

Answer: D

Q10) Pyrimidine dimers are reversed by enzymes known as :

A) Ligase
B) DNA polymerase1
C) Photolyase
D) none of the above

Answer: C

Q11) Defective CSB protein causes Cockayne's syndrome. This protein is linked to this molecular process :

A) movement of transposons
B) Transcription
C) Translation
D) DNA replication
E) DNA recombination

Answer: B

Q12) Photolyases are known to :

A) Correct base mismatches in DNA
B) Join DNA ends
C) Exist in human cells
D) Remove pyrimidine dimers
E) Remove intercalating agents.

Answer: D

Q13) oxygen radical is reduced by the enzyme _____, this produces _____. which is still harmful for the cell :

A) Superoxide-dismutase, hydrogen peroxide(H_2O_2)
B) polymerases, H_2O_2
C) Superoxide-dismutase, H_2O
D) Superoxide-dismutase, CO_2.

Answer: A

Q14) regard to incorporation of base analogs which of the following is correct :

A) 5-bromouracil (5-BU) analog of adenine
B) 6-methylguanine pairs with thymine
C) creation of AP sites
D) Ionized form of 5-BU pairs with guanine.

Answer: D

Q15) The wrong statement about Deamination is :

A) The deamination of cytosine yields uracil.
B) The deamination of adenine yields hypoxanthine.
C) The deamination of thymine yields methylated cytosine
D) its induced mutation
E) C+D

Answer: E

Q16) The presence of 06-methylguanine is corrected by :

A) Mismatch repair system
B) Nucleotide excision repair system
C) BRCA1
D) A special enzyme
E) Transcription factor II H

Answer: D

Specific mispairing

Q17) DNA glycosylases have the following effect on DNA :

A) They remove pyrimidine dimers
B) They form phosphodiester bonds
C) They create AP sites
D) They add bases to DNA
E) They join broken DNA strands

Answer: C

Q18) Depurination is a spontaneous mutation that occurs only in purines :

A) True

B) False

Answer: B

Q19) nucleotide excision repair in bacteria does NOT require the following molecular components :

A) Primase
B) an endonuclease
C) a DNA ligase
D) a helicase
E) a DNA polymerase

Answer: A

Q20) Which of the following is correctly matched?

A) translocation mutation we have transfer of genetic material within the same chromosome.

B) all mutagens are carcinogens.

C) Macromutation involves small regions of the DNA.

D) none of the above is correct

Answer: D

Q21) Mutations can happen in which of the following?
I. in DNA replication
II. in meiotic recombination
III. As a consequence of the damaging effects of physical or chemical agents on the DNA :

A) II only
B) I only
C) III only
D) I, II, and III

Answer: D

Q22) the problem associated with translesion repair system is that :

A) it creates mutations
B) it is slow
C) it causes DNA nicks
D) it leads to cell death
E) it has low transcriptional efficiency

Answer: A

Q23) If a mutation occurred on the coding strand and changed the sequence from CAT into CAG, what will happen?

A) Silent mutation
B) Missense mutation
C) Nonsense mutation
D) Frameshift mutation
E) No mutation

Answer: A

Q24) Deamination of adenine will result in :

A) No change
B) Changing G base into T
C) AT pairing instead of GC
D) GC pairing instead of AT
E) More than one of the above

Answer: D

Q25) After replication, ionized 5-bromo uracil will result in :

A) Wild type sequence of DNA
B) It pairs with A
C) Changing AT pairing into GC
D) Changing GC pairing into AT
E) None of the above

Answer: C

Q26) Which of the following isn't true regarding DNA repair mechanisms?

A) Detoxification of oxygen radicals
B) Deamination of nitrogen base
C) Mismatch repair
D) Nucleotide excision through XP proteins
E) All of the above are false

Answer: B

Q27) True about base excision repair pathway :

A) Cleave N-glycosidic bonds resulting in AP sites
B) Cleaves phosphodiester bond
C) AP site is repaired by AP exonuclease
D) None of the above
E) More than one of the above

Answer: A

Q28) Defects in nucleotide excision repair pathway in humans can result in :

A) Cockayne's syndrome
B) Cystic fibrosis
C) Xeroderma pigmentosum
D) HNPCC
E) None of the above

Answer: C

Q29) What is the importance of the CRISPR part of the CRISPR/Cas9 system?

A) It cleaves bacteriophage DNA
B) It activates Cas9 enzyme
C) It contains molecular components of Cas9
D) It prevents bacteriophage entry into the cells
E) It activates the DNA repair system

Answer: B

Q30) One of the following is not true in regards to the CRISPR-Cas9 system :

A) It is transcribed and translated
B) It contains DNA fragments of bacteriophage DNA
C) It is part of bacterial genome
D) It encodes Cas9 protein
E) It contains repeated palindromic sequence

Answer: D

Q31) you aim to create mutations in the hormone gene. you can do this by :

A) activation of non-homologous end joining following introduction of CRISPER-Cas9 system
B) Target the gene with specific primers
C) Activation of homologous recombination following introduction of CRISPER-Cas9 system
D) Allow cells to express specific restriction endonucleases
E) Create a recombinant DNA with glutathione-S-transferase gene conjugated to the hormone gene

Answer: A

Q32) The CRISPR part of CRISPR-Cas9 system is :

A) The gene that encodes the nuclease that cleaves viral DNA
B) A RNA molecule representing viral genome
C) The enzyme responsible for replacing a gene by another
D) A genetic component that contains parts of viral genome
E) The RNA that guides the nuclease into the host genome

Answer: D

Q33) Which of the following is not true about the CRISPR/CAS9 system?

A) Cas9 is guided by an RNA molecule
B) Breaking double stranded DNA can be repaired by the system
C) Breaking double stranded DNA can cause a mutation
D) CRISPR is a bacterial genetic that constitutes the immune system of bacteria against phages

Answer: B

Q34) What does CRISPR stand for?

A) Clustered Regularly Interspaced Short Palindromic Repeats
B) Commonly Repeated Induced Sequence Palindromic Repeats
C) Clustered Randomly Interspaced Short Palindromic Repeats
D) Clustered Regularly Interspaced Short Polymorphic Repeats

Answer: A

Q35) What is the primary function of Cas9 in the CRISPR-Cas9 system?

A) To bind to DNA without cutting
B) To repair broken DNA strands
C) To create single or double-stranded breaks in DNA
D) To replicate viral DNA within bacterial cells
E) To enhance the transcription of certain genes

Answer: C

Q36) How does CRISPR-Cas9 function naturally in bacteria?

A) It enhances the replication of viral DNA.
B) It inserts bacterial DNA into viruses.
C) It cuts viral DNA to protect the bacteria.
D) It promotes the mutation of bacterial DNA.
E) It transports proteins across the cell membrane.

Answer: C

Q37) What is homology-directed repair (HDR) primarily used for in gene editing?

A) To delete large segments of DNA
B) To introduce specific mutations or gene insertions
C) To ligate broken DNA ends without a template
D) To create double-stranded breaks only
E) To eliminate all mutations from the genome

Answer: B

Q38) What outcome is expected when using non-homologous end joining (NHEJ) in CRISPR-Cas9 editing?

A) Precise gene editing without errors

B) Random insertions or deletions that may cause frameshift mutations

C) Enhancement of gene expression

D) Suppression of all mutations

E) Targeted gene duplication

Answer: B

Q39) Which application of CRISPR-Cas9 is considered controversial?

A) Creating disease-resistant crops
B) Gene editing in human embryos
C) Studying bacterial resistance
D) Research in non-human organisms
E) Developing gene therapies for cancer

Answer: B

Q40) What does a "dead" Cas9 (dCas9) do in gene regulation?

A) Cuts DNA
B) Replicates DNA
C) Binds to DNA without cutting
D) Repairs DNA
E) Integrates foreign DNA into the genome

Answer: C

Q41) Which of the following is a potential risk associated with CRISPR technology?

A) Increased crop yields
B) Treatment of genetic disorders
C) Bioterrorism
D) Development of new antibiotics
E) Improved understanding of genetics

Answer: C

Q42) What innovative use of CRISPR-Cas9 involves visualizing gene locations?

A) Attaching GFP to Cas9
B) Using Cas9 to cut non-essential genes
C) Editing genes to cure diseases
D) Modifying genes to resist pesticides
E) None of the above

Answer: A

Q43) What is NOT a component of the CRISPR-Cas9 system used in gene editing?

A) Cas9 enzyme
B) Guide RNA (gRNA)
C) Fluorescently labeled nucleotides
D) PAM sequence
E) CRISPR RNA (crRNA)

Answer: C

Q44) What happens when CRISPR-Cas9 system targets a DNA sequence in a cell?

A) It enhances gene expression
B) It silences all cellular genes
C) It inserts a new gene into the DNA
D) It creates a break in the DNA at a specific location
E) It removes all nucleotides from the DNA strand

Answer: D

Q45) Which of the following is a major ethical concern associated with CRISPR-Cas9 technology?

A) Its use in gene therapy for adults
B) Its application in agricultural biotechnology
C) Genetic modification of human embryos
D) The production of genetically modified bacteria
E) All of the above

Answer: C

Q46) What is the primary function of Cas9?

A) Degrades bacterial DNA
B) Degrades plant RNA
C) Degrades bacteriophage DNA
D) Degrades human proteins

Answer: C

Q47) CRISPR in the natural CRISPR-Cas9 system is :

A) A nuclease
B) A genetic material within a bacterial genome
C) Part of the human genome
D) A DNA repair mechanism
E) A bacteriophage DNA

Answer: B

Q48) During gene editing by the CRISPR/Cas9 system, the insertion/deletion mutations (INDELS) are created by :

A) The non-homologous end joining DNA repair system
B) The CRISPR part of the system
C) The Cas9 part of the system
D) The guide RNA (gRNA)
E) Homology-directed DNA repair system

Answer: A

Q49) One of the following is true about base editing with Cas9. Which statement is correct?

A) Base editing with Cas9 involves the use of the CRISPR-Cas9 system alone.

B) Base editing with Cas9 is carried out using a modifying enzyme other than Cas9.

C) Base editing with Cas9 does not require any enzymatic modification.

D) Base editing with Cas9 primarily relies on RNA interference

Answer: B

Q50) What is the natural function of Cas9 in bacteria?

A) Recognizes and cleaves bacteriophages' DNA
B) Cleaves bacterial DNA in the interspaced regions in CRISPR
C) Is involved in the cleavage of the centromere in the anaphase of cell division
D) Assists in the transcription of the guide RNA
E) Cleaves bacteriophages' DNA only at palindromic sequence

Answer: A

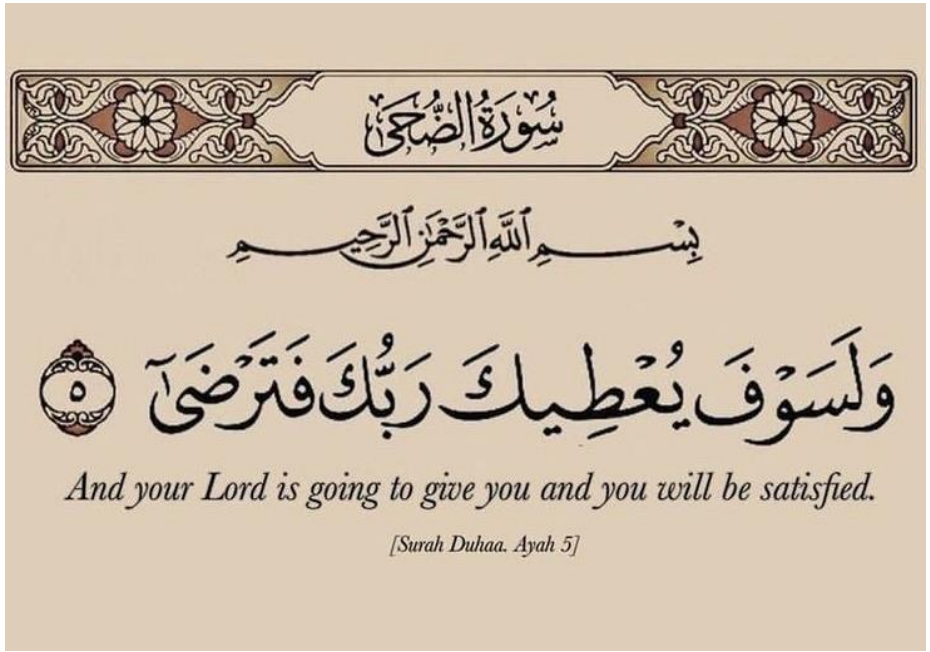
For any feedback, scan the code or click on

Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1			
V1 → V2			

Additional Resources:

رسالة من الفريق العلمي:



اللهم نستودعك أهالي غزّة وفلسطين فانصرهم واحفظهم بعينك التي لا تنام، واربط على قلوبهم وأمدهم بجُندك وأنزل عليهم سكينتك وسخر لهم الأرض ومن عليها.

اللهم إنّا نسألك باسمك القّهار أنْ تقهر من قهر إخواننا في غزة وفلسطين، ونسألك أن تنصرهم على القوم المجرمين.