Past papers

بسم الله الرحمن الرحيم

FINAL – Lecture #

Molecular Biology

﴿ وَإِن تَتَوَلَّوْا يَسْتَبْدِلْ قَوْمًا غَيْرَكُمْ ثُمَّ لَا يَكُونُوا أَمْثَالَكُم ﴾

اللهم استعملنا ولا تستبدلنا

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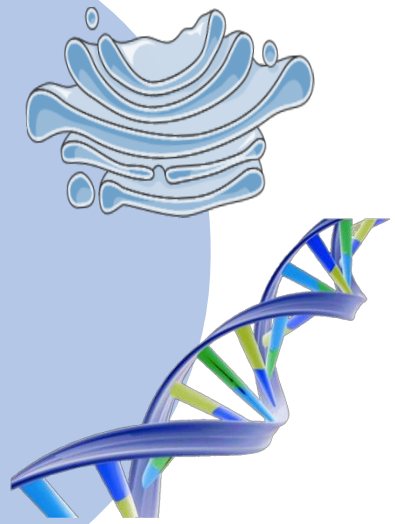


Past papers for the first 3 lectures

استعينوا بالله وأخلصوا النوايا

اللهم لا سهل إلا ما جعلته سهلا وانت تجعل الحزن إذا شئت سهلا

Q1) Which one of these statements about nitrogenous bases is TRUE?

A. Adenine and thymine are purines.
B. cytosine and guanine are pyrimidines.
C. guanine is a purine and Adenine is a pyrimidine.
D. Adenine is a purine and uracil is a pyrimidine

Answer: D

Q2) The sequence GCAGGCCTAGT exist in human genome ,One of the following is TRUE:

A. Its part of a minor groove

B. The opposite strand is CGTCCGGATCA

C. That last T in the sequence in a monophosphate form

D. It's made of telomeres (the ends of chromosome)

E. The first G in the sequence represent the free pentose end

Answer : C

B is incorrect because if they don't say the direction we start reading from 5' to 3'

Q3) RNA molecules contain an additional oxygen atom compared to DNA molecules located on which carbon atom of the pentose sugar:

A.1
B.2
C.3
D.4
E.5

Answer : B

Q4) A template of DNA is 5-ATCGGCTACAATGTA-3; what is the complimentary DNA sequence?

A. 5’UACAUUGUAGCCGAU3’

B. 5’TAGCCGATGTTACAT3’

C. 5’TACATTGTAGCCGAT3’

D. 5’TACAAAGTAGCCGAT3’

E. 5’ATCGGCTACAATGTA3’

Answer : C

Q5) One strand of a DNA segment contains 33 A, 25 G, 12 T, and 41 C. how many each base is found in the original double- stranded DNA molecule?

A. A-46, G-50, C-50, T-46

B. A 66, G 53, C-53, 7-66.

C. A-45, G-66, C-66 T-45

D. A-66, G-24, C-24 A 66

E. A-45, G-50, C50, T-45

Answer : C

Q6) Complementarity is a feature of DNA that indicates the following:

A. Bases are almost perpendicular to the side chains

B. DNA is anti-parallel

C. A minor groove is opposite to a major groove

D. DNA is helical

E. Number of (A+G) = number of (T+C)

Answer : E

Q7) Each nucleotide is attached to the other nucleotide by

A. ionic bonds

B. phosphodiester bonds

C. hydrogen bonds

D. glycosidic linkages

E. disulfide bridges

Answer : B

Q8) major and minor grooves in DNA structures are formed because of:

A. the anti-parallel nature of the tow strands of DNA

B. DNA packing by histones

C. the pattern of hydrogen bonding between nucleotides

D. DNA is not perfectly helical

E. the bending capability of DNA

Answer : D

Q9) Nitrogenous bases are attached to each other by:

A. hydrogen bonds

B. ionic bonds

C. glycosidic linkages

D. phosphodiester bonds

E. disulfide bridges

Answer : A

Q10)What is the maximum number of phosphate groups that can be attached to pentose sugars in nucleotides?

A. 1

B. 2

C. 3

D.4

E. there is no specific max number.

Answer : C

Q11) The plot shown illustrates the denaturation curve of three DNA samples,(X, Y and Z). One of the following is or can be a true statement:

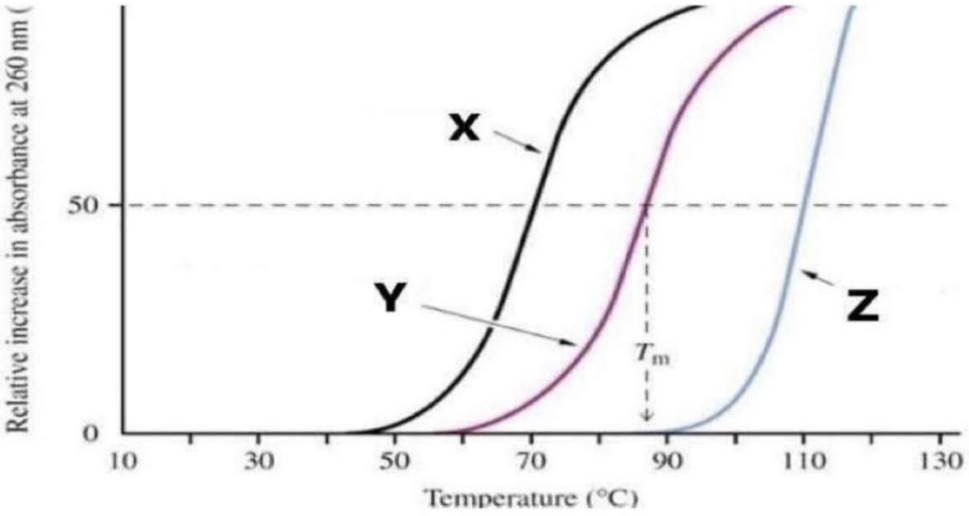
A . Sample Y has higher CT content than sample Z

B. At 50% absorbance, half of the DNA molecules are FULLY denatured and half are FULLY double-stranded

C. At 80°C, the majority of DNA in samples X and Y are denatured

D. The melting temperature of all samples is approximately 120°c

E. The increase in the absorbance at higher temperature is Because DNA becomes single stranded



Answer : E

Q12) A DNA sample has a concentration of 0.1 µg/ml. It was CONCENTRATED 1:50. What do you expect the absorbance of the CONCENTRATED SAMPLE to be at 260 nm of light?

A.5

B.50

C.1

D.0.1

E.0.5

Answer : D

Q13) All of the following regarding gel electrophoresis are true EXCEPT:

A. Agarose gel is used
B. Smaller molecules move faster than larger ones
C. Molecules move towards the positive electrode
D. The higher the density of the gel, the higher the resolution

Answer : D

Q14) what would the ABSORBANCE an ORIGINAL DNA sample be if the concentration of the sample, when diluted 1:5, is 2 µg/ml?

A.0.1

B.1

C.0.2

D. 0.5

E.5

Answer : C

Q15) melting temperature of DNA is:

A. The temperature at which the DNA strands are denatured completely

B. The temperature at which the DNA strands are half denatured.

C. The temperature at which the DNA strands renatured.

D . None of the above.

Answer : B

Q16) the melting temperature of DNA fragment (X) is 60oC, whereas it is 75oC for fragment (Y). This SURELY informs us that

A. fragment (X) is longer than fragment (Y)

B. fragment (X) exists in an alkaline solution but not fragment (Y)

C. the sources of both fragments are different

D. fragment (X) has less GC content than fragment (Y)

E. fragment (X) has weaker hydrogen bonding between the tow strands than fragment (Y)

Answer : E

Q17) A DNA sample has a concentration of 250 µg/ml. It was diluted 1:50.What do you expect the absorbance of the diluted sample to be at 260 nm of light?

A. 5

B.50

C.1

D.0.1

E.0.5

Answer : D

Q18) Which of the following double stranded DNA sequences needs higher temperature to separate into single-stranded DNA?

A. 5’-GGGCCATTGC-3’

B. 5’-ATTATTCTGC-3’

C. 5’-GGGCCATTTC-3’

D. 5’-GGGCCGTTGC-3’

E. 5’-GGGCCCCTGC-3’

Answer : E

Q19) Calculate the the concentration of double stranded DNA molecules if a concentrated solution of which (by a factor of 5) absorbed 2 units of light with a length of 260 nm :

A.10

B.20

C.500

D.100

E.50

Answer: B

Q20) one of the following is a feature of gel electrophoresis of DNA

A. the migration of DNA fragments is influenced by chromatin structure and total charge.

B. movement of DNA fragments is dependent of their length only.

C. DNA fragments appear as band because of the way they interact with each other.

D. the distinct color of DNA makes them observable.

E. (GC) content is an important factor in separation of DNA fragments.

Answer : B

Q21)which of the following about ASO is incorrect :

A . two types of probes are used

B . it’s used in the detection of cystic fibrosis

C . When a signal is produced on both membranes after DNA hybridization this indicates heterozygous person where only the dominant allele is expressed

D .the defection in cystic fibrosis is the deletion of 2 nucleotides in a specific gene

E . all of the above

Answer : D

Q22) one of the following is NOT true in regards to this DNA fragment AGCTGGCTCGAG:

A. all nucleotides are in the deoxysugar form

B. if transcribed, the RNA produced will be CUCGAGCCAGCU

C. the terminal A is located at 5’- end

D. its complementary strand is TCGACCGAGCTC

E. it has a higher melting point than TTAGCTACAATT

Answer : D

Q23) you have three individuals (A,B, and C) where A is homozygous for a normal allele, B is homozygous for a mutated allele, and C is heterozygous. You perform dot blotting using allele-specific oligonucleotides (ASO) for the normal (ASOX) and mutated (ASOY) alleles. One of the following is TRUE

A. signals will be seen for individual C by dot blotting when using either ASO

B. a signal will be seen for individuals A and B by dot blotting when using ASOX

C. ASOX cannot differentiate individuals A and B from each other by dot blotting

D. a signal will be seen for individual A only when using ASOY

E. ASOY is more specific than ASOX

Answer : A

Q24) Which of the following features of DNA is primarily responsible for movement of DNA molecules in an electric field?

A. Nitrogenous base
B. Deoxyribose sugar
C. Phosphate
D. Complementary base pairing
E. Antiparallel orientation

Answer : C

Q25) A human genomic DNA is cut by a restriction endonuclease and then analyzed by Southern blotting, you can know the following:

A. The numbers, but not sizes and sequences, of the fragments

B. The sizes and numbers, but not sequences, of the fragments

C. The sequences, but not the numbers or sizes, of the fragments

D. The sizes, but not the numbers or sequences, of the fragments

E. The sequences, sizes and numbers of the fragments

Answer : B

Mamoun Ahram
31 May 2022, 12:58 PM

Dot blotting and Southern blotting

Sender: Mamoun Ahram | ✳ Open | 🔓 Non-Anonymous

Q1: You have a 30-nucleotide probe that can bind to DNA fragments that are generated when the human genome is fragmented. The DNA fragments may have sizes of 1 Kb or 2 Kb (1 Kb = 1000 bp). When doing Southern blotting for s heterozygous person, the number and sizes of bands will be

everyone, what is the answer here? why?

👍

We have two bands and the size of these bands will be 2000bp and 1000bp

Mamoun Ahram 31 May 2022, 2:18 PM

we would know that the band (fragment) that the probe binds to has a sequence that is complementary to the probe. we wold not be able to know the sequence of the whole fragment

Ahram: when I say "number of fragments", I do not mean it literally. it means number of bands

👍

Mamoun Ahram

31 May 2022, 12:57 PM

Dot blotting and Southern blotting

Sender: Mamoun Ahram | ✳ Open | 🔓 Non-Anonymous

Q2: You have a 30-nucleotide probe that can bind to DNA fragments that are generated when the human genome is fragmented. The DNA fragments may have sizes of 1 Kb or 2 Kb (1 Kb = 1000 bp). When doing dot blotting for s heterozygous person, the sizes of bands will be

everyone, what is the answer here and why?

👍

ما بنقدر نحدد لانه احنا ما عملنا electrophoresis

💔

Q26) A dot plot hybridiation is carried out for the family shown this the pedigree which of the following statement is True?

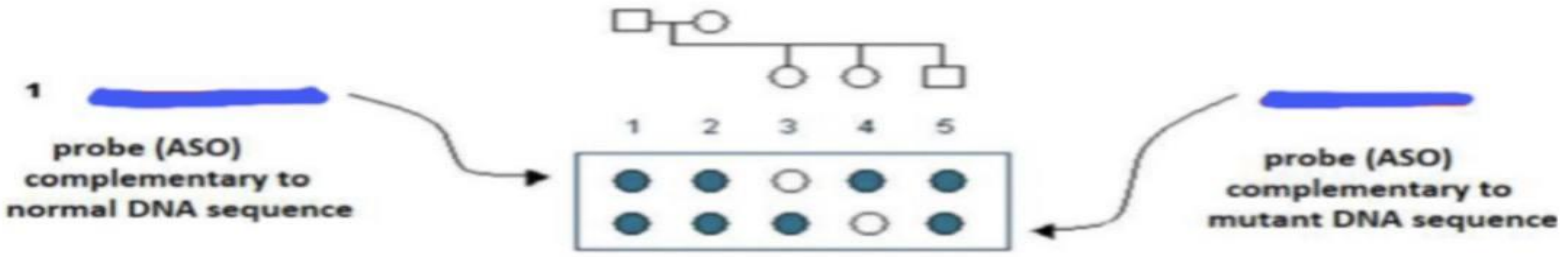
A. Both daughters are disease affected

B. Both daughters are heterozygous

C. The son is Homozygous for the mutant DNA sequence

D. Both parents are disease affected

E. Both daughters are Homozygous



Answer : E

Q27)A group of labeled probes (GCATCG) are added to denatured DNA fragments after cleavage by restriction endonucleases, supposing that the DNA strands have a sequence of (CGTAGCGGCTATCATGCC). If the cleavage occurred in three positions along DNA strands distributed as the following (CGTAGC/GGCTATC/ATG/CC) and a mutation affected the seventh nucleotide inhibiting the first cleavage. Which of the following resulting fragments will be detected after the addition of the probes considering dealing with a heterozygous mixture of both types of DNA (with / without mutation)?

A) CGTAGC only

B) CGTAGCGGCTATC only

C) C-ATG only

D) A&B

E) A&C

Answer: D

Q28). In order to know the killer in a crime, DNA fingerprint technique is used, according to the photo shown below, who's the killer?

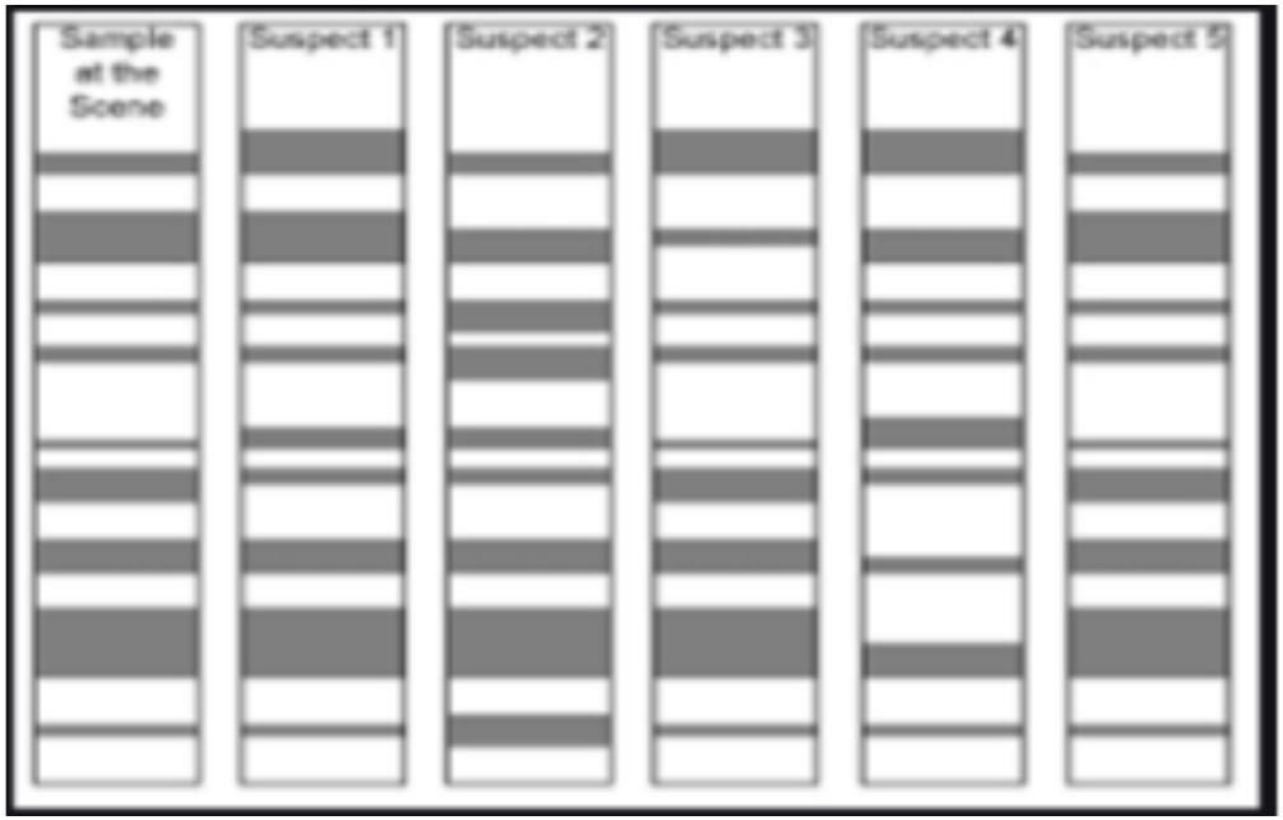
A) suspect 1

B) suspect 2

C) suspect 3

D) suspect 4

E) suspect 5



Answer: E

Q29).In order for a kid to be a son of a husband and a wife his DNA fingerprint must contain:

- A) At least fragments similar to the fragments represented in the DNA
- fingerprint of one of them
- B) fragments similar to the fragments represented in the DNA fingerprint
- for both

- Answer: B

Q30)Supposing that 3 fragments resulted from the cleavage of DNA lengthened as following (1.6 kb, 0.75 kb, 2.1 kb), a mutation occurred and inhibited the second cleavage, then of the following represent the lengths of the fragments resulting from the cleavage of the mutated DNA?

A) 2.35, 2.1

B) 1.6, 2.85

C) 1.6, 0.75, 1.2

D) 1.6, 0.75

E) none of the above

Answer : B

Q31). If there are 3 restriction sites, how many DNA fragments will be produced?

A) 1
B) 2
C) 3
D) 4

Answer : D

Past Papers for Lectures (4-6)

Q1) What is the function of reverse transcriptase?

A) Synthesizes RNA from DNA

B) Transcribes DNA from RNA

C) Synthesizes DNA from RNA

D) Transcribes RNA from protein

Answer: C

Q2) Which of the following types of RNA molecules is coding:

A) rRNA
B) mRNA
C) tRNA
D) ncRNA
E) miRNA

Answer: B

Q3) VNTR alleles are hypervariable regions of human DNA that differ from each other in:

A) location of internal sites recognized by restriction enzymes.

B) variable number of point mutations

C) number of copies of an internally repeated DNA sequence

D) variable location on different chromosomes

Answer: C

Q4) Which of the following is incorrect?

A) Alu is an example of a SINE.

B) L1 is an example of a LINE.

C) Tandem repeats are found more than interspersed elements in the human genome .

D) 2% of the human genome is protein coding gene exons.

E) All of the above are correct.

Answer: C

Q5) Which of the following are examples of Satellites?

A) Centromeres
B) Telomeres
C) Alu
D) A+B

Answer: D

Q6) Which of the following statements about genomes isn't correct?

A) almost 20% of the human genome isn't relevant.

B) greater number of nucleotides per genome indicates higher complexity.

C) It's not a necessity to have variations of mini-satellite sequences between different alleles of the same individual.

D) B&C.

Answer: B

Q7) Which of the following statements about transposons is incorrect?

A) RNA transposons amounts are fewer than DNA transposons within human genome .

B) 99% of transposons within human genome lost their ability of movement.

C) All the possible movements of transposons cause diseases.

D) A&C

Answer: D

Q8) Retrotransposons represent this percentage of our genome:

A) 30%
B) 10%
C) 5%
D) 45%
E) 21%

Answer: D

Remember that all numbers are approximate

Q9) If you knew someone was genetically predisposed to have a certain disease, the typeof SNP you expect to be responsible for this disease is:

A) Linked SNP
B) Causative SNP
C) Cannot be determined
D) Neither of the above
E) Both of the above

Answer: E

Q10) One of the following is TRUE in regards to the protein shelterin :

A) It is synthesized from centromeres
B) It creates Barr bodies of one of the X-chromosomes
C) It binds to telomeres protecting them from degradation
D) It converts euchromatin to heterochromatin
E) It increases the stability of centromeres

Answer: C

Q11) Replication fork is the junction between the two:

A) Newly separated DNA strands and the unreplicated DNA
B) Newly synthesized DNA
C) Newly separated DNA strands and newly synthesized DNA strands
D) Unreplicated DNA

Answer: A

Q12) the high accuracy of DNA replication PRIMARILY comes from :

A) the DNA repair system
B) replication protein A
C) the specific hydrogen bonding of nucleotides
D) the enzymatic specificity of the DNA polymerases themselves
E) the proofreading activity of the DNA polymerases

Answer: E

Q13) Which of the following is correct?

A) Two phosphate groups are removed from nucleoside triphosphate that are added to the growing RNA sequence because they are too long.

B) Transcription requires a primer.

C) DNA replication is more accurate than RNA transcription.

D) All of the above are correct.

Answer: C

Q14) telomerase is considered a reverse transcriptase because :

A) it can act as both a DNA polymerase and a RNA polymerase
B) it acts in 3'- to 5' direction rather than 5'-to-3’
C) it uses RNA as a template to synthesize DNA
D) it uses a RNA primer
E) A RNA molecule is pair of it

Answer: C

Q15) RNase H is important in this process :

A) termination of translation in eukaryotic cells
B) degradation of noncoding RNA
C) DNA repair in prokaryotic cells
D) removal of primers from a replicating DNA in eukaryotic cells
E) RNA processing in eukaryotic cells

Answer: D

Q16) when replicating DNA in bacteria, the number of leading strands is expected to be :

A) Unlimited
B) 1
C) 2
D) 4
E) cannot be determined

Answer: C

Q17) As far as we know, the origins of replication in human cells are determined by:

A) three-dimensional structures of DNA
B) noncoding RNA molecules
C) localization of nucleosomes
D) automatically replicating sequences
E) DnaA protein

Answer: A

Q18) DNA topoisomerase function through:

A) removing stem-loop structures in DNA
B) assembling nucleosome structural of DNA
C) breaking phosphodiester bonds in DNA
D) Separating the tow strands of DNA
E) altering DNA structures from heterochromatin to euchromatin

Answer: C

Q19) Which of the following is NOT correct about DNA replication?

A) The direction of synthesis is from 5'-to-3’
B) DNA polymerases require 5'-OH provided by the RNA primer
C) Single-stranded DNA-binding proteins help in protecting the ssDNA from degradation
D) DNA replication is semiconservative
E) Lagging strand results from joining Okazaki fragments by ligase enzyme

Answer: B

Q20) Inhibition of Topoisomerase results in:

A) Interrupting the fidelity of DNA replication
B) Suppressing the synthesis of primers during DNA replication
C) Inability to remove the winding of DNA that arises during replication
D) Breakage of chromosomes
E) Inhibiting the formation of the replication fork

Answer: C

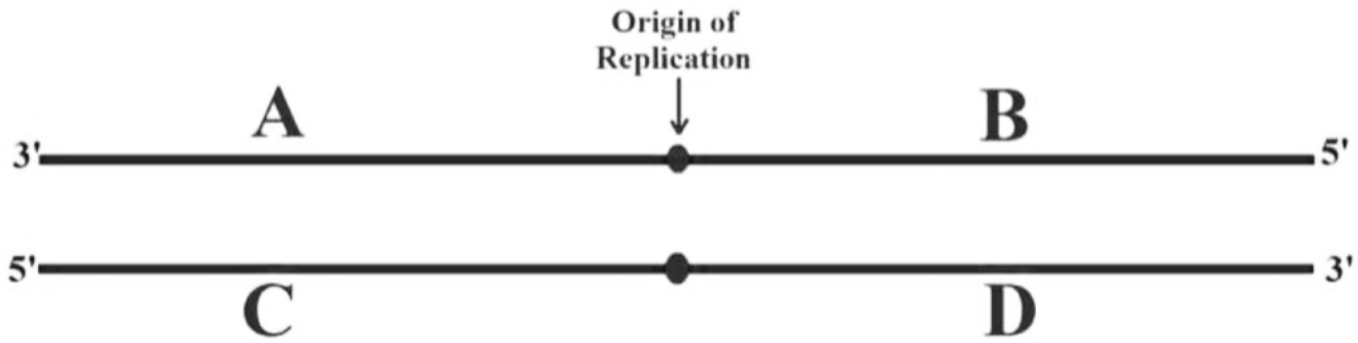
Q21) Which of the following is NOT correct about prokaryotic DNA polymerase I

A) It has 5'- to -3' exonuclease activity
B) It plays roles in repairing damaged DNA
C) It fills in the gaps between the leading strand fragments
D) It removes RNA primers of each Okazaki fragment
E) It participates in the prokaryotic DNA replication

Answer: C

Q22) in the following figure which regions will serve as template for leading strands ?

A) A and B
B) A and C
C) A and D
D) B and C
E) B and D



Answer: D

Q23) Which of the following enzymes play a role in the condensation of DNA ?

A) Ligase
B) DNA polymerase
C) topoisomerase 1
D) topoisomerase 2

Answer: D

Q24) A template of DNA is 5'-ATCGGCTACAATGTA-3'; what is the complementary DNA sequence that is created during DNA replication?

A) 5'-TAGCCGATGTTACAT-3’
B) 5'-TACAAAGTAGCCGAT-3’
C) 5'-ATCGGCTACAATGTA-3’
D) 5'-TACATTGTAGCCGAT-3’
E) 5'-UACAUUGUAGCCGAU-3'

Answer: D

Q25) What is the complementary DNA strand to this strand "AGCCTGTACT"?

A) AGAACAGGCT
B) AGTACAGGCT
C) TCGGACATGT
D) TCGGACTTGT
E) TGAACAGGCT

Answer: B

Q26) Experiments proved the right mode of DNA replication, which is :

A) Conservative
B) Dispersive
C) Semiconservative
D) Semi dispersive
E) None of the above

Answer: C

Q27) Which enzyme is crucial for synthesizing DNA from an RNA template?

A) DNA polymerase
B) Restriction endonuclease
C) Reverse transcriptase
D) Ligase

Answer: C

Q28) Primase in eukaryotes that initiates DNA synthesis:

A) Polymerase alpha
B) Polymerase Beta
C) Polymerase gamma
D) Polymerase delta

Answer: A

Q29) Which of the following is incorrect?

A) Single-strand DNA binding proteins prevent the formation of hairpin structures.
B) SSB proteins stabilize single strand DNA.
C) SSB proteins cover the nitrogenous bases.
D) All of the above are true.

Answer: C

Q30) In the case of a circular DNA synthesis how many replication forks are observed?

A) 1
B) 2
C) 3
D) 4

Answer: B

Q31) A select mutation is causing a cell lineage to be unable to replicate DNA successfully. When observed under a microscope, researchers observe that the DNA is able to be separated, but the template strands keep coming back together before the new strands can be replicated.
Based on this observation, which protein involved in DNA replication is most likely mutated?

A) Single-stranded binding protein
B) DNA primase
C) DNA helicase
D) DNA polymerase

Answer: A

Q32) Earlier detection of amplified DNA by SYBR-green-based real time PCR normally depends on :

A) The concentration of the substrates
B) The amount of SYBR green added at the start of the reaction
C) The amount of starting material of DNA sample
D) The activity of the DNA polymerase enzyme
E) The optimal temperature of SYBR green detection

Answer: C

Q33) The type of DNA polymerase used in PCR is isolated from this bacterial species :

A) Acidophilic
B) Thermophilic
C) Halophilic
D) Extremophilic
E) Metallophilic

Answer: B

Q34) In PCR, the annealing temperature changes per reaction in order to :

A) Allow for the best primer-binding condition
B) Activate the deoxyribonucleotides
C) Activate the DNA polymerase enzyme
D) Reach the optimal temperature of the DNA polymerase
E) Reach the optimal temperature for DNA denaturation depending on its size and GC content

Answer: A

Q35) the variation of the annealing temperature of PCR allows for :

A) better selectivity of amplified regions of DNA
B) amplifying GC- rich or AT- rich DNA sequences
C) synthesis of amplicons of certain lengths
D) activation of the taq polymerase
E) controlling speed of PCR reaction

Answer: A

Q36) Why cannot we detect any signal in the first few cycles of quantitativePCR?

A) SYBR green is not yet activated
B) The taq polymerase is not active
C) Limitation in the sensitivity of the instrument
D) There is no amplification taking place
E) The proper size of the amplicon has not been reached

Answer: C

Q37) What is SYBR green?

A) It is a molecule that terminate DNA synthesis in sequencing reaction
B) It is a molecule that activates and stabilize DNA polymerase
C) it is a molecule that binds to double-stranded DNA and fluoresces
D) it is a molecule that activates and stabilize DNA
E) it is a molecule that tags proteins

Answer: C

Q38) Taq polymerase is specifically used in PCR due to its :

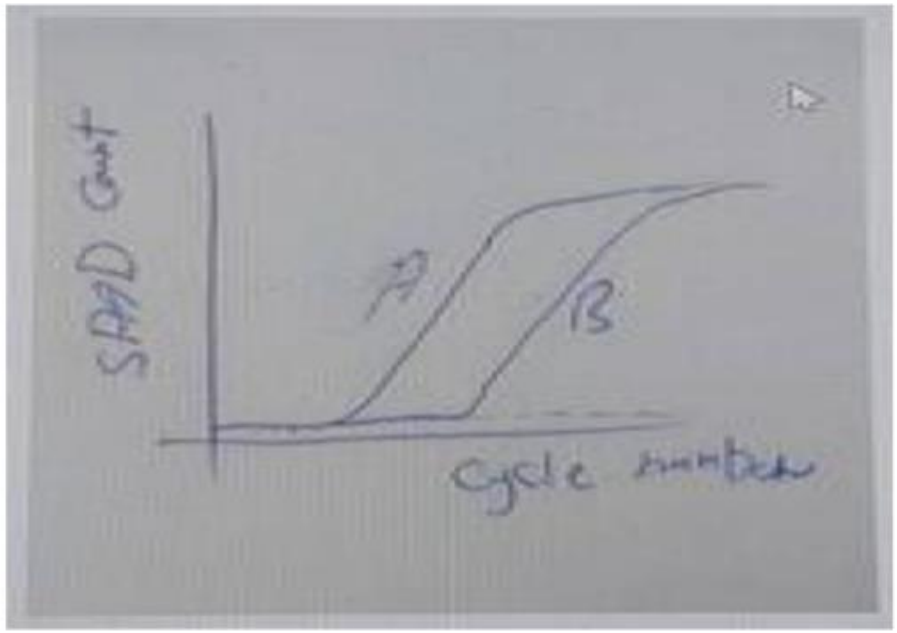
A) Accuracy
B) High efficiency
C) Low price
D) Availability
E) Stability at high temperature

Answer: E

Q39) A quantitative, error free, SYBR green real-time PCR assay is performed for two flu patients as shown in the chart, you can tell:

A) patient A has more viral content in his body than patient B

B) patient B has more viral content in his body than patient A



Answer: A

Q40) What is the primary purpose of PCR?

A) To decrease the quantity of DNA in a sample
B) To identify proteins
C) To amplify specific DNA fragments
D) To degrade RNA
E) To clone animals

Answer: C

Q41) Which enzyme is crucial for the PCR process?

A) Lipase
B) Heat-stable DNA polymerase
C) RNA polymerase
D) Sucrase
E) Lactase

Answer: B

Q42) What is the role of primers in PCR?

A) They degrade the DNA template
B) They initiate DNA synthesis
C) They prevent DNA replication
D) They cut DNA into smaller fragments
E) They replicate RNA

Answer: B

Q43) At what temperature does the denaturation step in PCR occur?

A) 4°C
B) 22°C
C) 37°C
D) 72°C
E) 95°C

Answer: E

Q44) Which of these is NOT a component of PCR?

A) DNA template
B) Primers
C) DNA ligase
D) Deoxyribonucleoside triphosphates
E) Heat-stable DNA polymerase

Answer: C

Q45) What determines the specificity of PCR amplification?

A) The length of the DNA polymerase
B) The size of the gel electrophoresis apparatus
C) The sequence of the primers
D) The concentration of the buffer
E) The type of thermal cycler used

Answer: C

Q46) What is achieved after 30 cycles of PCR?

A) About 250 molecules are amplified
B) About 250 thousand molecules are amplified
C) Over 250 million molecules are amplified
D) Only the original DNA molecules remain
E) No amplification occurs

Answer: C

Q47) Which statement about PCR is true?

A) PCR can only amplify circular DNA
B) PCR decreases the amount of DNA each cycle
C) Each cycle of PCR doubles the amount of DNA
D) Primers are optional in PCR
E) A DNA template is not necessary for PCR

Answer: C

Q48) What does an annealing temperature in PCR do?

A) It denatures the DNA strands
B) It enhances the degradation of primers
C) It allows primers to bind to the DNA template
D) It inactivates the DNA polymerase
E) It replicates RNA

Answer: C

Q49) What is a characteristic of Taq polymerase?

A) It is sensitive to heat and denatures at high temperatures
B) It is derived from a thermophilic bacterium and withstands high temperatures
C) It requires cold temperatures to function
D) It is used to break down proteins
E) It is primarily used in RNA replication

Answer: B

Q50) Which is NOT a use of PCR?

A) Genotyping
B) Protein synthesis
C) Detection of mutations
D) Prenatal diagnosis
E) Molecular archeology

Answer: B

Q51) What happens in the polymerization step of PCR?

A) DNA strands are separated
B) Primers are degraded.
C) New DNA strands are synthesized.
D) DNA is extracted from cells.
E) Primers are added to the reaction.

Answer: C

Q52) What is a common use of PCR technology?

A) Measuring blood sugar levels.
B) Amplifying specific DNA segments.
C) Increasing the size of DNA molecules.
D) Decreasing the number of DNA copies.
E) Observing cell behavior under a microscope.

Answer: B

Q53) What is the function of Taq polymerase in PCR?

A) It denatures the DNA double helix.
B) It binds the primers to the DNA strands.
C) It synthesizes new strands of DNA.
D) It cleaves the DNA into smaller fragments.
E) It identifies specific DNA sequences.

Answer: C

Q54) At which temperature does the annealing step of PCR occur?

A) 95°C
B) 72°C
C) 50°C to 70°C
D) 37°C
E) 25°C

Answer: C

Q55) Which statement correctly describes the denaturation step in PCR?

A) DNA strands are cooled to allow primer binding.
B) DNA strands are heated to separate them into single strands.
C) DNA strands are visualized under a microscope.
D) DNA strands are ligated together.
E) DNA strands are tagged with fluorescent markers.

Answer: B

Q56) How does the number of cycles affect PCR results?

A) Increases the DNA fragment size
B) Decreases the number of DNA fragments
C) Does not affect the amount of DNA
D) Exponentially increases the number of DNA copies
E) Changes the DNA sequence being amplified

Answer: D

Q57) Why is Taq polymerase used in PCR?

A) It is less accurate than other polymerases.
B) It works efficiently at low temperatures.
C) It is resistant to the high temperatures used in PCR.
D) It can replicate RNA as well as DNA.
E) It is cheaper than other DNA polymerases.

Answer: C

Q58) What is the purpose of using SYBR Green in qPCR?

A) To decrease the fluorescence
B) To stabilize the DNA double helix
C) To visualize the amplification of cDNA
D) To break down the mRNA
E) To inhibit enzyme reactions

Answer: C

Q59) Which of the following is NOT a characteristic of qPCR?

A) Measures the amount of DNA
B) Utilizes reverse transcriptase
C) Requires a helicase enzyme
D) Can detect single copies of DNA
E) Uses fluorescent markers

Answer: C

Q60) Which statement is true about the use of SYBR Green in qPCR?

A) It binds to single-stranded DNA only.
B) It fluoresces without binding to DNA.
C) It reduces the efficiency of PCR.
D) It fluoresces upon binding to double-stranded DNA.
E) It is used to break down DNA fragments.

Answer: D

Q61) What does the fluorescence detection in qPCR indicate?

A) Decrease in gene expression.
B) Increase in enzyme activity.
C) Presence and quantity of DNA or RNA.
D) The types of proteins expressed.
E) The lipid content of cells.

Answer: C

Q62) Why is SYBR Green used in real-time PCR?

A) It stabilizes the DNA
B) It inhibits DNA polymerase
C) It shows a signal when binding to double-stranded DNA
D) It degrades single-stranded DNA

Answer: C

Q63) Using PCR, detection of the SARS-CoV2 (the coronavirus) has a specificity of 100% due to :

A) The number of amplification cycles
B) The RNA polymerase
C) The polymerization temperature
D) The primers used
E) The means of detection of amplified fragments

Answer: D

Q64) In PCR, the annealing temperature changes per reaction in order to :

A) Activate the deoxyribonucleotides
B) Reach the optimal temperature for DNA denaturation depending onits size and GC content
C) Activate the DNA polymerase enzyme
D) Reach the optimal temperature of the DNA polymerase
E) Allow for the best primer-binding condition

Answer: E

Q65) Earlier detection of amplified DNA by SYBR-green-based realtime PCR normally depends on :

A) The activity of the DNA polymerase enzyme
B) The concentration of the substrates
C) The optimal temperature of SYBR green detection
D) The amount of SYBR green added at the start of the reaction
E) The amount of starting material of DNA sample

Answer: E

Q66) What step in PCR has different temperatures between different DNA's (or different PCR processes)?

A) The step at which the DNA is denatured
B) The step at which the polymerase functions
C) The step at which the primers anneal to the part of the DNA intended to be regulated
D) The step at which SYBR green fluoresces
E) The step at which the reporter fluoresces in taqman qPCR

Answer: C

For any feedback, scan the code or click on it.

Corrections from previous versions:

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

Additional Resources:

رسالة من الفريق العلمي: