

BIO-302 MOLECULAR BIOLOGY MCQs FOR FINAL TERM

1. During Elongation RNA polymerase synthesized a short stretch of RNA contain ____ Bases
a) 10 bases b) 8 bases c) 6 bases d) 6 to 10 bases
2. During elongation the enzyme performs tasks beside RNA synthesis are.
a) Unwinds DNA b) Dissociates RNA from Template
c) Proof Reading d) All of these
3. The 3rd step of Transcription is
a) Elongation b) Termination c) Elongation and termination d) Initiation
4. in some cells specific , well characterized sequences trigger termination in others its is _____ what instructs the enzyme
a) More Clear b) Less clear c) Not clear d) unpredicted
5. once the newly RNA is created during transcription which factor is reassessed as well
a) Alpha factor b) beta factor c) gama factor d) sigma factor
6. RNA polymerase initiates transcription in bacteria from
a) Specific point b) middle of the DNA c) start of the DNA d) Any point of DNA
7. Which factor recognize that from which point the transcription have to start
a) Alpha b) Beta c) Sigma d) Omega
8. Bacterial Core enzyme is consist of
a) Alpha 2 Beta Beta Prime Omega b) Sigma alpha2 Beta Beta Prime Omega
c) Alpha2 Beta Beta Prime Sigma d) Alpha2 Beta Omega
9. in the case of E. coli the predominant Sigma factor is called
a) Sigma 50 b) Sigma 60 c) sigma 70 d) Sigma80
10. Promoters recognized by polymerase have ____ conserved sequence each of ____ nucleotides.
a) 2 – 6 b) 2 – 7 c) 3 – 6 d) 3- 7
11. the defined sequences are centered respectively at ____ and ____ upstream of the site where RNA synthesis starts
a) 10 bp and 35 bp b) 10bp and 30bp c) 17bp and 19 bp d) 17bp and 35bp

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12. the sigma 70 factor can be divided into _____ regions during transcription in bacteria
a) one b) two c) three **d) four**
13. Which sigma70 factors regions recognize the -10 and -35 elements of the promoters?
a) 1 and 4 **b) 2 and 4** c) 1 and 3 d) 2 and 3
14. Two helices within region 4 of Sigma factors form DNA binding Motif called a
a) Helix-turn-Helix b) Alpha-turn-Helix b) Helix-Alpha-Turn c) Helix-Helix-Turn
15. Two helices in region 4 one helices inserts into the _____ and interacts with bases in the -35 region
a) Minor Groove **b) Major Groove** c) Minor and Major Groove d) none
16. in which region the DNA starts separating during transcription
a) -10 region b) -35 region c) both -10 and -35 d) -30
17. The a Helix involved in the recognition of the -10 region contains several essential _____ amino acids that can interact with bases.
a) Aliphatic **b) Aromatic** c) Acidic d) Basic
18. Transition to the open complex involves _____ in RNA polymerase and in the Promoter DNA
A) Chemical changes b) Physical changes **c) structural changes** d) All of these
19. Melting occurs between positions ___ and ___ with respect the transcriptions start site
a) -11 and +2 b) +11 and -2 c) -10 and +2 c) +2 and -11
20. in case of the bacterial enzyme bearing sigma70 this transition is often called _____
a) Ionization b) Decomposition c) Transcription **d) Isomerization**
21. The energy required for RNA polymerase in Bacteria derived from
a) ATP hydrolysis **b) Conformation Changes** c) No requirement of energy d) A&B
22. Isomerization in transition of open complex is a
a) Reversible **b) Irreversible** c) associated d) none of these
23. Formation of closed complex in contrast is readily _____
a) Reversible b) Irreversible c) associated d) All of these

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24. There are _____ channels into the open complex
a) 3 b) 4 **c) 5** d) 6
25. The _____ uptake channel allows ribonucleotides to enter the active center
a) (Non Template)NTP channel b) RNA- Exit c) 2 pincers d) All of these
26. Within the active center cleft , the DNA strands separate from position
a) +5 **b) +3** c) -11 d) +7
27. In the open complex region 1.1 shifts _____ position allows to DNA to access
a) 40 A b) 30 A **c) 50 A** d) 70A
28. Region 1.1 of sigma is highly _____ charged thus in the holoenzyme region 1.1 acts as molecular mimic of DNA
a) Positively charged **b) negatively charged** c) neutral d) Highly Negatively charged
29. The space in the active center cleft occupied by region 1.1 or DNA is highly ____
a) Positively charged b) negatively charged c) neutral d) highly positive charged
30. RNA polymerase can initiate a new RNA chain on a DNA template and thus does not need a ____
a) Template **b) Primer** c) Active site d) All of these
31. RNA polymerase start most transcripts with
a) Adenine c) Cytosine c) guanine d) thymine
32. during initial transcription , RNA polymerase produces and releases short RNA transcripts of <10 nucleotides called
a) complete synthesis **b) abortive synthesis** c) incomplete synthesis d) All of these
33. The _____ model proposes forward and reverse translocation of RNA polymerase
a) Transient excursion b) inchworming c) scrunching d) None of these
34. The experiments have shown that during transcriptoin the polymerase remains _____ on the promoter.
a) Stationery b) not stationary c) move along with promoter d) All of these
35. Which of the following is not the function of elongating polymerase
a) Synthesis RNA b) Proof Read RNA **c) Synthesis DNA**

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36. Double stranded DNA enters the front of the enzyme between the ____
a) catalytic cleft **b) pincers** c) active site d) All of these
37. During elongations the enzyme adds _____ nucleotide at a time to the growing RNA transcript.
a) one b) Two c) three d) Four
38. The size of the bubble length of DNA that is not double helical remains _____ throughout the elongation
a) Variable b) Non variable **c) Constant** d) none of these
39. RNA polymerase performs _____ proofreading functions on the growing transcript
a) one **b) two** c) three d) four
40. The sequences called _____ trigger the elongating polymerase to dissociate from the DNA and release the RNA chain it has made
a) Primer b) Promoter **c) Terminators** d) Template
41. There are _____ Types of terminators in bacteria
a) one **b) Two** c) Three d) Four
42. Rho-dependent terminators have rather ill-defined RNA elements called
a) Tuff sites b) ill sites **c) Rut sites** d) All of these
43. Rho binds the single stranded RNA as it _____ the polymerase
a) Enter **b) Exit** c) inside the polymerase d) in the cleft
44. The collision pushes polymerase forward causing dissociation of ternary complex of
a) RNA polymerase b) Template DNA c) RNA transcript **d) All of these**
45. Rho independent terminators sequence elements contain repeat of _____ nucleotides followed by the stretch of about eight _____ base pairs
a) 20 and A:T b) 18 and A:T c) 20 and G:C d) 18 and G:C
46. The hairpin works as an efficient terminator only when it s followed by a stretch of _____ base pair
a) A:T **b) A:U** c) G:U d) C:U

Topics 111 to 120

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47. Bacteria have only _____ RNA polymerase but eukaryotes have _____ RNA polymerase
a) one and three b) one and five c) one and four d) one and one
48. RNA Polymerase IV and V are present in....
a) Prokaryotes b) Eukaryotes c) Plants d) All of these
49. In Vitro, the general transcription factors are all that required together with _____ to initiate transcription on a DNA template
a) RNA Pol-II b) RNA Pol-III c) RNA Pol-IV d) RNA Pol-V
50. In vivo, GTF are not alone sufficient to bind promoter sequence so the additional factors required are..
a) Mediator complex b) chromatin modifying enzymes c) DNA template d) A&B
51. The eukaryotic core promoter refers the minimal set of sequence elements required for accurate transcription initiation by the _____ machinery
a) Pol I b) Pol II c) Pol III d) All of these
52. A core promoter is typically _____ nucleotides long, extending either _____ from the transcription start site.
a) ~40 to ~60 and Upstream b) ~40 to ~60 and downstream
c) ~40 to ~60 and upstream or downstream d) ~40 to ~50 and downstream
53. The Elements found in Pol II core promoter include the...
a) TFIIB b) BRE c) TATA Box d) Inr and DPE e) All of these
54. TATA box containing promoter also contains a _____
a) DCE b) DPE c) BRE d) All of these
55. the most common element found in combination with both TATA and DPEs
a) DCE b) Inr c) DPE d) BRE
56. Many Pol II promoters contain TATA element some _____ upstream of the transcription start site.
a) 20 Bp b) 30 Bp c) 40Bp d) 50Bp
57. The TATA element recognized by the general transcription factor called
a) TFIID b) TFIID c) TFIVD d) TFVD

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58. The component of TFIID that binds to the TATA DNA sequence is called____
a) DPE **b) TBP** c) BRE d) All of these
59. During the abortive initiation the polymerase synthesizes a series of _____ transcripts
a) short b) Long c) Very long d) wide
60. In eukaryotes promoter escape involves _____ steps.
a) one **b) Two** c) Three d) Four
61. The large subunit of Pol II has a corbyx-Terminal Domain (CTD) which is referred as3
a) Head **b) Tail** c) Midpoint d) start Point
62. The CTD contains a series of repeats of the _____ sequence
a) Octapeptide b) Pentapeptide **c) heptapeptide** d) Decapeptide
63. Series of repeats of the heptapeptide sequence in yeast Pol II CTD are
a) 25 **b) 27** c) 29 d)37
64. Series of repeats of the heptapeptide sequence in worm Pol II CTD are
a) 37 b) 25 **c) 32** d) 35
65. Series of repeats of the heptapeptide sequence in human Pol II CTD are
a) 36 b) 46 **c) 52** d) 53
66. Series of repeats of the heptapeptide sequence the number of repeats correlate with the complexity of the ____
a) Genes b) Genetic Makeup **c) Genome** d) none of these
67. Heptapeptide sequence repeat contains sites for phosphorylation by specific enzyme called
a) RNA pol II b) RNAase **c) Kinase** d) All of these
68. Regulating the _____state of the CTD of Pol II controls subsequent steps elongation and processing of RNA
a) Methylation b) Acetalytion **c) Phosphorylation** d) All of these
69. Enzyme the remove phosphate group from CTD Is called
a) RNA Polymerase b) Kinase **c) Phosphatase** d) None of these

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70. General Transcription Factors are complexes made up of
a) Two sub units b) three sub units **c) two or more subunits** d) none of these
71. TBP is associated with about ____ TAFs ____ of the TAFs bind DNA elements at the promoter.
a) 10 – 2 b) 8 – 2 c) 2 – 10 d) 2 – 8
72. Several of the TAFs have structural homology with _____ proteins
a) Adenine **b) Histone** c) Cytosine d) All of these
73. TAF42 and TAF62 from Drosophila have been shown to form a structure similar to that of the _____ tetramer of Histones
a) H2.H3 **b) H3.H4** c) H1.H2 d) All of these
74. Structural studies suggest that segments of TFIIB insert into the RNA-exit channel and active center cleft of Pol II in a manner analogous to the σ region _____ linker in the bacterial case.
a) 3/4 b) 3/3 c) 1/2 d) 4/3
75. _____ controls the ATP-dependent transition of the preinitiation complex to the open complex.
a) TFII E b) TFII A **c) TFII H** d) TFII F
76. Within TFIIH are two subunits that function as _____ and another that is a protein _____, with roles in promoter melting and escape
a) ATPases and Kinase b) ADPase and Phosphatase
a) ATPase and Phosphatase c) Kinase and Phosphatase
77. It is now believed that a subunit of TFIIH acts as an ATP-driven translocator of _____
A) double –stranded RNA **b) Double – Stranded DNA**
c) Single – Stranded DNA d) Single – Stranded RNA
78. TFIIH subunit binds to DNA downstream from polymerase and feeds double-stranded DNA, with a _____ threading, into the cleft of the polymerase.
a) right-handed b) left – Handed c) Right and Left handed both d) None
79. Transcriptional regulatory proteins called _____ help recruit polymerase to the promoter, stabilizing its binding there
a) inhibitor **b) Activator** c) Preactivator d) Stoper

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80. The yeast and human Mediators each include more than _____ subunits of which ____ show significant sequence homology between the two organisms
a) 20 – 7 b) 7 – 20 c) 10 – 20 d) 20 – 10
81. The mediator from both yeast and humans are organized in _____
a) Packets b) Templates c) Modules d) All of these
82. Modules called head, middle and tail can be dissociated from one another under certain condition in
a) In vivo b) in vitro c) both A & B d) None of these
83. Crystal structure of the head module of yeast mediator reveals that it contains _____ subunits
a) 5 b) 6 c) 7 d) 8
84. 3 domain structure that binds the Transcription complex in such a way as juxtapose TFIIH and the CTD tail of RNA polymerase promoting _____ of the latter by the former
a) Phosphorylation b) ATP Hydrolysis c) Methylation d) All of these
85. Once polymerase has escaped the promoter and initiated transcription, it shifts into the
a) Initiation phase b) elongation phase c) termination phase d) All of these
86. Which of the following factors are the Elongation Factors?
a) TFIIIS b) SPT5 c) TFIIH d) A&B
87. Which factors are recruited during elongation phase?
a) Capping enzyme b) splicing machinery c) polyadenylatoin and cleavage d) All of these
88. CTD tail could potentially extended _____ from the body of the enzyme that is about _____ times the length of the rest of the enzyme
a) 800A – 7 b) 700A – 8 c) 600A – 7 d) 500A – 7
89. Which protein bound to Pol II that phosphorylates the serine residue at position 2 for the CTD REPEATS?
a) Phosphatase b) Kinase c) Kinase P-TEFb d) RNAase
90. In addition , P-TEFb phosphorylates and thereby activates another protein called
a) SPT5 b) TAT_SF1 c) TFIIIS d) All of these

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91. P-TEFb stimulates elongation in _____ separate ways
a) one b) two **c) three** d) four
92. NusG/SPT5 factors bind to their respective RNA polymerase at the _____ of the clamp
a) Top b) Bottom **c) Tip** d) Middle
93. The first human _____ protein was originally identified as the product of a gene that undergoes translocation in acute myeloid leukemia
a) ELL b) SPT5 c) TFIIIS d) NusG
94. Which factor that contributes to proofreading by polymerase
a) ELL b) SPT5 **c) TFIIIS** d) NusG
95. TFIIIS stimulates an inherent RNase activity in polymerase allowing an alternative approach to removing misincorporated bases through local
a) Limited RNA degradation b) Unlimited RNA degradation
a) Short limited RNA degradation d) All of these
96. The final RNA processing event, _____ of the 3' end of the mRNA is intimately linked with the termination of transcription
a) Phosphorylation **b) polyadenylation** c) Adenylation d) Ionization
97. If the end of the RNA is uncapped it is called
a) Genuine transcript **b) Not genuine transcript** c) partial genuine d) None of these
98. The highly processing RNase polymerase either pushes polymerase _____ the remains of the nascent RNA transcript from the enzyme.
a) Forward b) Pulls **c) Forward or pulls** d) none of these
99. Which factor is universally involved in initiating transcription by Pol I , Pol II and Pol III
a) TBP b) SPT5 c) ELL d) TFIIIS
100. _____ is required for the expression of only one gene that encoding the rRNA precursor
a) Pol I b) Pol II c) Pol III d) All of these

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101. The promoter for the rRNA gene comprises two parts _____ and _____
- a) Coat element and UCE
b) Core element and UCE
c) Core element and TBP
d) Core and ELL
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102. The former is located around the start site of transcription, and the latter between ___ upstream (in humans).
- a) Active site - 100 and 150bp
b) start site – 100 and 150bp
c) start site - 120 and 150 bp
d) active site – 120 and 150 bp
103. In addition to Pol I, initiation requires two other factors, called _____
- a) SFII b) UCE c) SL1 and UBF d) SL1 and TBP
104. SL1 comprises _____ specific for Pol I transcription
- a) TBP and 3 TAFs b) UBF and 2 TAFs c) ELL and 2 TAFs d) TBP and 2 TAFs
105. SL1 binds DNA only in the presence of UBF.
- a) ELL b) UBF c) TBP d) UCE
106. Pol III promoters come in various forms, and the vast majority have the unusual feature of being located _____ from the transcription start site
- a) Upstream b) downstream
c) up and downstream d) in btw up and downstream
107. Some Pol III promoters (e.g., those for the tRNA genes) consist of two regions, called ___ separated by a short element.
- a) Box A b) Box B c) Box A and Box B d) Box C
108. 5S rRNA gene contains box
- a) Box A b) Box B c) Box C d) Box A and box C
109. The TFIIC complex binds to the promoter region. This complex recruits TFIIB to the DNA just _____ of the start site, where it, in turn, recruits Pol III to the start site of transcription.
- a) Upstream b) Downstream c) A and B d) in btw up and Downstream

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110. The coding sequence of a gene is a series of _____ codons that specifies the linear sequence of amino acids in its polypeptide product
- a) 3 Nucleotides b) 4 nucleotides c) 5 nucleotides d) variable nucleotides
111. It is generally assumed that the coding sequence is _____ i.e., the codon for one amino acid is immediately adjacent to the codon for the next amino acid in the polypeptide chain
- a) Discontinuous b) Contiguous c) variable d) All of these
112. In eukaryotic genes the coding sequence is interrupted by stretches of _____
- a) Coding sequence b) non coding sequence
- c) Contiguous coding sequence d) discontinues coding sequence
113. The coding sequences are called _____ and the intervening sequences are called _____
- a) Exons and introns b) Introns and Exons c) Intron and Codon d) Exons and Codon
114. Once transcribed into an RNA transcript, the _____ must be removed and the _____ joined together to create the mRNA for that gene.
- a) Exons and introns b) Introns and Exons c) Intron and Codon d) Exons and Codon
115. The no of the introns in the case of the Titin gene of humans are.
- a) 360 b) 361 c) 362 d) 363
116. Introns are very often much _____ than the exons they separate
- a) Shorter b) longer c) very short d) very long
117. exons are typically on the order of _____ nucleotides, whereas introns—although they too can be short—can be as long as _____ nucleotides
- a) 150 and 800KB b) 150 and 700Kb c) 100 and 800kb d) none of
118. Example of mammalian gene Enzyme is
- a) dihydrofolate b) reductase c) dihydrofolate reductase d) Non of
119. The split genes of eukaryotes are transcribed into a _____ of the entire gene
- a) Single RNA copy b) Double RNA copy c) Tripple RNA copy d) All of these
120. The length and number of introns, the primary transcript (or pre-mRNA) can be _____
- a) Long b) Very long c) Short d) very short

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121. primary transcripts of intron-containing genes must have their introns ____ before they can be translated into proteins.
- a) Added **b) Removed** c) stopped d) no effect
122. RNA Splicing must occur with great precision to avoid the ____ of even a single nucleotide at the sites at which the exons are joined.
- a) Loss b) Addition **c) loss or addition** d) removal
123. Lack of precision in splicing will change the reading frames of ____
- a) Introns **b) exons** c) introns and exons d) codons
124. Alternative splicing strategy enables a gene to give rise to more than one polypeptide product. These alternative products are called
- a) Isomers b) Intromers **c) Isoforms** d) exons
125. It is estimated that 90% or more of the protein-coding genes in the human genome are spliced in alternative ways to generate more than one isoform
- a) 90% b) 80% c) 70% **d) 90% or more**
126. The borders between introns and exons are marked by specific nucleotide sequences within ____
- a) pre-mRNAs.** B) Mature mRNA c) post-mRNA d) All of these
127. The 5' and 3' splice sites were sometimes referred to as the ____ sites, respectively
- a) Acceptor and donor **b) Donor and acceptor**
- c) Receptor and donor d) Donor and receptor
128. The third sequence necessary for splicing. This is called the ____ site
- a) Active **b) branchpoint** c) Acceptor d) Donor
129. The most highly conserved sequences are the ____ in the 5' splice site, the ____ in the 3' splice site, and the A at the branch site.
- a) GU and AG** b) AG and GU c) AT and GC d) GC and AT
130. An intron is removed through two successive transesterification reactions in which ____ within the pre-mRNA are broken and new ones are formed
- a) ester linkage b) **phosphodiester linkages** c) Ether linkage d) Peptide linkage

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131. The first reaction is triggered by the 2'-OH of the conserved A at the branch site. This group acts as _____ to attack the phosphoryl group of the conserved G in the 5' splice site
- a) nucleophile b) Acetophile c) Acidic d) Basic
132. In this first reaction, the phosphodiester bond between the ____ and ____ at the 5' junction between the intron and the exon is cleaved.
- a) Amino and Sugar b) Sugar and Phosphate c) Amino and Phosphate d) All of these
133. In addition to the 5' and 3' backbone linkages, a third phosphodiester extends from the 2'-OH of that A to create a three-way junction hence its description as a ____
- a) Active point b) Active site c) Branchpoint d) at any point
134. In the second reaction, the 5' exon reverses its role and becomes a nucleophile that attacks the _____ at the 3' splice site.
- a) phosphoryl group b) Ester group c) Phosphodiester group d) none of these
135. The 5' end of the intron had been joined to branchpoint A in the first transesterification reaction, the newly liberated intron has the shape of a ____
- a) Oval b) linear c) Lariat d) Octagon
136. In the two reaction steps, there is no net gain in the number of chemical bonds ____ phosphodiester bonds are broken, and ____ new ones are made
- a) 2 and 2 b) 2 and 3 c) 3 and 3 d) 2 and 4
137. During the removal of introns two phosphodiester bonds are broken, and two new ones are made
- a) ATP required b) No energy required c) no change d) none of these
138. During the splicing reaction
- a) Less energy required b) no energy required
- c) large amount of energy required d) no change in energy
139. Point regarding the splicing reaction is direction: what ensures that splicing only goes forward—that is, toward the products
- a) Forward b) Backward c) A & B d) forward toward the product
140. The transesterification reactions are mediated by a huge molecular "machine" called ____
- a) Nucleosome b) cytosome c) spliceosome d) All of these

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141. The spliceosome machine size is similar to a
a) Lysosomes b) Neucleosome **c) Ribosomes** d) nucleus
142. The Spliceosome complex machine comprises about ____ proteins and ____ RNAs
a) **150 and 5** b) 130 and 5 c) 145 and 7 d) 145 and 5
143. In performing even a single splicing reaction, the spliceosome hydrolyzes ____
a) 10 ATP Molecules b) 30 ATP molecules c) 50 ATP molecules **d) Several ATP Molecules**
144. Many of the functions of the spliceosome are performed by
a) RNA component b) Protein component c) A & B d) None of these
145. ____ locate the sequence elements at the intron – exon borders and likely participate in catalysis of the splicing reaction itself.
a) RNA b) Protein c) RNA and Protein d) none of these
146. The five RNAs (U1, U2, U4, U5, and U6) are collectively called
a) siRNA **b) snRNA** c) snRNAs. d) mRNA
147. snRNAs is between ____ and ____ nucleotides long in most eukaryotes and is complexed with several proteins
a) 100 and 300 b) 200 and 300 c) 150 and 300 d) 200 and 250
148. snRNPs is stand for ... no option
Small nuclear Ribonuclear Proteins
149. The snRNPs have ____ roles in splicing
a) one b) two **c) three** d) four
150. During the splicesome which interactions are important?
a) RNA – RNA b) RNA – Protein c) Protein – Protein **d) All of these**
151. Some non-snRNPs are also involved in splicing. One example, ____ recognizes the polypyrimidine (Py) tract/3' splice site
a) U2AF b) U3AF c) U4AF d) U5AF
152. Proteins involved in the splicing reaction include
a) RNA-annealing factors b) DEAD-box helicase proteins c) Primase **d) A & B**

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153. Which enzyme helps load snRNPs onto the mRNA
a) RNA Annealing Factor b) Dead Box Helicase c) Primase d) All of these
154. The latter use their ___ activity to dissociate given RNA -RNA interactions, allowing alternative pairs to form and thereby driving the rearrangements that occur through the splicing reaction
a) Primase b) Helicase c) ATPase d) phosphatase
155. U4 is released from the complex, allowing U6 to interact with U2 through the ___ base pairing
a) RNA – RNA b) RNA – Protein c) Protein – Protein d) none of these
156. The second reaction, between the 5' and 3' splice sites, is aided by the U5 snRNP, which helps to bring the ___ exons together
a) one b) two c) three d) four
157. classes of splicing found in the cells are
a) Nuclear pre-mRNA b) Group II introns c) Group I introns d) All of these
158. self-splicing introns are
a) Nuclear pre-mRNA b) Group II introns c) Group I introns d) B and C
159. Group I introns splice by a different pathway. Instead of a branchpoint A residue, they use a free G
A) nucleotide b) nucleoside. C) Nucleotide or nucleoside d) Exon
160. This G species is bound by the RNA, and its ___ group is presented to the 5' splice site.
a) 3'-OH b) 2' – OH c) 5' – OH d) All of these
161. The structure of group I introns includes a binding pocket that will accommodate any ___ nucleotide or nucleoside
a) Guanine b) Adenine c) cytosine d) uracil
162. ___ are essential for splicing. They not only ensure the accuracy and efficiency of constitutive splicing but also regulate alternative splicing
a) ELL Protein b) UDE Protein c) SR Protein d) All of these
1. common form of Allternating splicing in which complete exons are included or excluded from the mature message
a) Cassette exon b) simple exon c) complex exon d) All of these

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2. Proteins that regulate splicing bind to specific sites called ____

- a) Exonic ESE or intronic ISE
- b) Silencers (ESS or ISS)
- c) A & B
- d) None of these

ESE – Exonic Splicing Enhancers

ISE – Intronic Splicing Enhancers

ESS - Exonic Splicing Silencers

ISS – Intronic splicing Silencers

3. Each SR protein has another domain, rich in arginine and serine, called

- a) SR domain
- b) RS domain
- c) A and B
- d) Non of these

4. Larry simpson and colleagues found the that editing system should add or delete UMPs when they discovered

- a) gRNAs
- b) hRNAs
- c) ssRNAs
- d) ggRNAs

gRNAs - Guide RNAs

5. kinetoplasts have a terminal ____ that could add extra UMPs (uridyates) to the mRNA during editing

- a) TUTAase
- b) TUTase
- c) TUMPase
- d) all of these

uridylyl transferase (TUTase)

6. During editing mRNA has to cut and add UMPs so kinetoplasts contain

- a) RNAase
- b) RNA ligase
- c) RNA protease
- d) non of these

7. information in nucleotides interpreted to generate sequence of amino acids is called

- a) Transcription
- b) termination
- c) replication
- d) translation

1. Many genes in higher eukaryotes encode ____ that can be spliced in alternative ways to generate two or more different ____ and thus different protein products

- a) RNAs – mRNAs
- b) DNAs – mRNAs
- c) RNAs – tRNAs
- d) RNAs – rRNAs

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2. what % Drosophila genes undergo alternative splicing

- a) 30% **b) 40%** c) 50% d) 60%

3. What % Human Genes undergo Alternative splicing

- a) 70% b) 80% **c) 90%** d) 95%

4. Many alternatively spliced genes generate only ___ alternative products

- a) one **b) two** c) three d) four

5. the number of potential alternatives that can be generated from a single gene is breathtaking -hundreds e.g., in the human ___

- a) Slo gene** b) XIO gene c) SLE gene d) All of these

6. The mammalian muscle protein is

- a) Troponin U **b) Troponin T** c) Troponin Q d) All of these

7. The pre mRNA made from troponin T gene contains ___

- a) 3 exons b) four exons **c) five exons** d) seven exons

8. The case of T antigen of the monkey virus SV40 shows an example of an

- a) Extended exon** b) skiped exon c) deleted exon d) retained exon

9. Both forms of T antigens are made in a cell infected by

- a) SV50 **b) SV40** c) SV30 d) SV55

10. ___ induce transformation and cell cycle re-entry, whereas ___ blocks the apoptotic response of cells forced down that path

- a) large T and small t** b) small t and large T c) Small t and small t

11. The ratio of the two forms produced differs depending on the level of the splicing regulator

- a) SF2/ASF** b) SF2/ASF2 c) SF2/AFS2 d) SF3/AFS

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12. In ___% of cases, cassette exons come in pairs, only one of which is included in the spliced message.

- a) 20% b) 30% c) 40% d) 10%

13. Most silencers are recognized by members of the

- a) hnRNP family b) hrNP family c) RNP family d) All of these

heterogeneous nuclear ribonucleoprotein (hnRNP) family.

14. In case of *Dscam*, for example, Hrp36 inhibits inclusion of ___ variants in the mRNA.

- a) Exon 5 b) Exon 6 c) Exon 7 d) Exon 3

15. isoforms have ___ functions

- a) simmilar b) distinct c) antagonistic d) All of these

16. alternative splicing is used simply as a way of switching expression of the gene as___

- a) on b) off c) on and off d) strat and off

17. mechanism of RNA editing is that partially edited transcripts have been isolated, and these are always edited at

- a) 3' end b) 5' end c) at any end d) non of these

18. RNA editing pceeds in a direction.....

- a) 3' to 5' direction. b) 5' to 3' direction c) in any direction d) non of these

19. RT-PCR stands for ... no options

reverse transcriptase Polymerase Chain reactions

20. Which RNA will provide signals for PCR

- a) Edited RNA b) Unedited RNA c) A & Bd) non of these

21. in ____, Scott Seiwert and Stuart used a mitochondrial extract and a gRNA to edit a synthetic pre-mRNA.

- a) 1990 b) 1994 c) 1996 d) 1998

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22. Scott Seiwert and Stuart observed that deletion of UPM required ___ enzymatic activities
- a) one b) two **c) three** d) four
23. During the deletion or insertion of UMPs occurs in the presence of
- a) Nuclease b) TUTase c) Ligase **d) All of these**
24. deamination of adenosine, which converts adenosine to ___
- a) Adeninosine **b) inosine** c) adenyosine d) non of these
25. deamination of adenosine changes the meaning of a ___
- a) Template b) Primer **c) Codon** d) All of these
26. an ACG (threonine) codon becomes an ICG codon, which would be read by the ribosome as
- a) GCG** b) GCC c) AGG d) GGG
27. Humans and mice contain ___ ADAR genes:
- a) one b) two **c) three** d) Four
28. GluR-B protein with a glutamine instead of an arginine is too permeable to
- a) Calcium ions** b) Sodium ions c) Potassium ions d) All of these
29. who mutated mouse stem cells to heterozygous mutant (ADAR^{+/-}).
- a) Kazuko Nishikura and coworkers** b) Peter Seeburg and colleagues
- c) Kenneth Stuart and colleagues first d) Stuart and coworkers
30. the synthesis of a single protein requires the coordinated action of well over ___ proteins and ___
- a) 200 and mRNAs **b) 100 and RNAs** c) 100 and tRNAs d) All of these
- 1 : Eukaryotes lack homologous to.....?
- A) MutH** B) MutSa C) MutL D) MutLa

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2 : Human has three mismatch repair ,these are...?

- A) MSH3 ,MSH4 ,MSH5 **B) MSH2 , MSH3 , MSH6** C) MSH4 ,MSH5 ,MSH6

3 : MSH2 and MSH6 combine to form a heterodimer called?

- A) MutH B) MutL **C) MutSa** D) MutSh

4 : Which protein participate in mismatch repair?

- A) MSH3 B) MSH6 C) MutH **D) MutL**

5 : Heterodimer containing two subunit MLH1 and PMS2 are called?

- A) MutLa** B) MutH C) MutSa D) None

6 : MutSa ,Exo1 and RPA are adequate to excise a mismatch .when the nick is on ...?

- A) 3 side **B) 5 side** C) Both side D) None

7 : The nick on the 3 side of the mismatch was very puzzling because Exo1 degrades in...?

- A) RNA 5 – 3 direction B) RNA 3 – 5 direction **C) DNA 5 – 3 direction** D) DNA 3 – 5 direction

8 : Genetic information flows from?

- A) DNA to RNA B) RNA to DNA C) RNA to DNA to Protein **D) DNA to RNA to protein**

10 : The protein never serve as templates for ...?

- A) DNA **B) RNA** C) mRNA D) rRNA

11 : The central dogma as originally proclaimed more than....?

- A) 30 years B) 40 years **C) 50 years** D) 60 Years

12 : Adenine , Uracil ,Guanine and cytosine should mostly interact with...?

- A) Water insoluble groups B) Thymine C) Both a and b **D) Water soluble groups**

13 : Which RNA carries the information DNA to ribosomal site of protein?

- A) mRNA** B) rRNA C) tRNA D) snRNA

14 : rRNA component of ribosomes , together with some differentribosomal protein?

- A) 40 **B) 50** C) 60 D) 70

15 : RNA polymerase function only in the presence of...?

- A) RNA B) mRNA **C) DNA** D) rRN