王子堅老師部分(中醫系、醫學系共同)

1.Which of the following statement is the most precise modern definition

of gene?

(A)a segment of genetic material that determines one phenotype

(B)a segmemt of genetic material that codes for one enzyme

(C)a segment of genetic material that codes for one polypeptide

(D)a segment of genetic material that codes for one polypeptide

or RNA product

ANS:(D)

2.Nucleosomes:

(a) are important features of chromosome organization in eukaryotes and

bacteria.

(b) are composed of proteins rich in acidic amino acids,

such as Asp and Glu.

(c) are composed of proteins and RNA

(d) occur in chromatin at irregular intervals along the DNA molecule.

Ans:王子堅老師表示這題送分!

3.Approximately what function of the human genome arre transposable elements?

(a) 1.5% (b) 5% (c) 45% (d) 80%

Ans:(c)

4.

5.The histone core of a nucleosome is consister of:

(A)one copy each of histones H1,H3 and H4

(B)two copies each of H1,H3 and H4

(C)one copy each of H2A,H2B,H3 and H4

(D)two copies each of H2A,H2B,H3 and H4

ANS:(D)

6.E.coli DNA Pol1, but not Pol2, Pol3 can conduct "nick translation"

synthesis of DNA. This is because Pol1 possesses?

(A) 3'to 5' exonuclease

(B) 5'to 3' exonuclease

(C) endonuclease

(D) polymerase activity

ANS:(B)

7.Which of the following statements is incorrect?

A.RNA may be used as primer for DNA synthesis

B.DNA chain elongation is 3' to 5'

C.DNA polymerase III is the replicating enzyme used in E.coli

D.primers,DNA template and all 4 dNTPs are required for DNA synthesis

Ans:(B)

8.

9.

10. Which protein is involved in the initiation of DNA replication

process in E.coli cells?

(A) DnaA

(B) DnaB

(C) primase

(D) SSB

Ans:(A)

11.When a DNA molecule is described as replicating bidirectionally,

it means that it has?

(a)chain (b)independently replicating segments

(c)origin (d)replication forks

Ans:(D)

12.The DNA in a eukaryotic chromosome is best described as :

(A)A single circular double-helix molecule.

(B)A single linear double-helix molecule.

(C)A single linear single-stranded molecule.

(D)Multiple linear double-helix molecules.

Ans:(B)

13.the major constituents of the E.coli primosome are:

(a).the DnaB helicase and DnaG primase

(b).the DNA gyrase and DnaB helicase

(c).the DNA gyrase and DnaG primase

(d).the DnaG primase and DnaA protein

Ans: (a)

14.

15.The function of the eukaryotic DNA replication factor PCNA (proliferlating

cell nuclear antigen) is similar to that of the beta-subunit of bacterial

DNA polymerase III in that it

(a)facilitates replication of telomeres

(b)form a circular sliding clamp to increase the processivity of

replication

(c)has a 3' to 5' proofreading activity

(d)increase the speed but not the processivity of the replication complex

16. Can be distinguished from other types of recombination in that the target

site in the recipient DNA sequences:

(a)deleted

(b)replication and located in each type of the insertion with the same

orientation

(c)replication and located in each type of the insertion with the inverted

orientation

(d)amplified

Ans: (b)

17. Recombination between two inverted repeats in the same DNA molecule can

generate:

(A)inversion of the DNA fragment flanked by the repeats

(B)deletion of the DNA fragment flanked by the repeats

(C)duplication of the DNA fragment

(D)none of above

ANS:(A)

18. Which of the following DNA repair process is used to repair the presence of

uracil in the DNA?

(A)nucleotide excision repair

(B)mismatch repair

(C)methyl transferase

(D)base excision repair

Ans: (D) 忘記選項順序但答案是base excisiom repair

19. What type of DNA damages are recognized and repaired by nucleotid-excision

repair system?

(A)DNA double-strand breaks

(B)Abnormal bases

(C)Lesions that cause large structure changes

(D)AP sites

ANS:(C)

20.

21.The Ames test is used to

(a)detect the bacterial viruses

(b)determine the rate of DNA replication

(c)examine the potency of antibiotics

(d)measure the mutagenic effects of various chemical compounds

Ans:(d)

22.It is correct to say that DNA supercoil cannot

(a)be induced by strand seperation

(b)be induced by underwinding double helix

(c)occur when a closed-circular double-strand DNA has a nick

(d)result in DNA compacting

Ans:(c)

23.In base-excision repair, the first enzyme to act is

(a)AP endonuclease

(b)Dam methylase

(c)DNA glycosylase

(d)DNA polymerase

Ans:(c)

24.In homologous genetic recombination, RecA protein is involved in

(a)formation of Holliday intermediates and branch migration

(b)nicking the two duplex DNA molecules to initiate the reaction

(c)pairing a DNA strand from one duplex DNA molecule with sequences

in another duplex, regardless of complementarity

(d)resolution of the Holiday intermediate

Ans：(a)

醫學系:柯博元老師部分

2.Which is not needed for transcription?

(a)DNA template (b)DNA-dependent RNA pol (c)5'primer (d)?

ANS:C

3.Which enzyme is involved in synthesizing mRNA in eukaryotic cells?

(a)RNA polymerase II (b)RNA-dependent RNA polymerase (c)RNA polymerase I

(d)RNA polymerase III

ANS:(a)

4. which sequence signature determines the initiation \_\_\_ of translation in

bacteria

a) TATA box

b) shine-dolgarno sequence

c) kozak sequence

d) 5' capping region

ANS:B

6.Which is the resource used in the mRNA elongation

(A)ATP (B)CTP (C)GTP (D)TTP

8.Which of the following statements is correct about lac operon in bacteria?

(A)The lac operon is a positive inducer-dependent manner.

(B)Lactose is truly the inducer of the operon.

(C)The activated lac operon turns on the translation of lac Z, Y and A

genes.

(D)The lac operon consist of a single operator.

ANS:C

9.lac operon的catabolite repression中，哪一個是regulatory molecules?(大概題意)

(A)allolactose

(B)cAMP

(C)beta-galactoside(題目拼錯了~應該是beta-galactosidase)

(D)catabolite inducer protein

ANS:(B)

原因:glucose↓，cAMP(為inducer)↑，與catabolite repressor protein(CRP,為

activator)結合，bind to promoter sequence→transcription

10.Which biological reaction is additionally necessary for gene

regulation in eukaryotic cell?

(A)chromatin remodeling

(B)recognition of promoter sequence

(C)constitutive gene expression

(D)regulated gene expression

Ans:(A)

問答題

1.Please describe three types of RNA processing and their biological functions.

5’capping

Alternative splicing: exclude noncoding intron and form mature RNA

3’ poly A tail

5’capping&3’ poly A tail prevent RNA from degradation

2.How would you design an experiment to identify the location of a promoter?

3.please briefly describe the major types of RNA in eukaryotic and provide

the biological significance of them.

mRNA: a template for translation

rRNA: a machinery for synthesizing protein

tRNA: to read the information of mRNA

4.Please briefly describe the biological reactions involved in the initiation

stage of translation in bacteria.

Small subunit(30s) of ribosome first bind to the mRNA.

IF-1 occupy A site to prevent the entrance of tRNA

IF-3 bind on 30s subunit to prevent too early combination of 30s and 50s.

IF-2 bring the fMet-tRNA with GTP to P site.

Then, 50s subunit bind to this complex, GTP hydrolyzed, and initiation factor release.

5.Please provide three types of protein post-translational modification and

provide their biologicsl significance of gene regulation.

1. N-terminal & C-terminal modification

Acetylation (active translation)/ deacetylation (inactive translation)

1. Loss of signal sequences

Signal peptidase

1. Modification of individual amino acid
2. Ubiquitination and degradation