NUCLEIC ACIDS

1. The following are purine nucleotides:

a) ATP and CMP
b) CTP and GDP
c) NAD and TDP
d) GMP and ADP
e) UDP and GTP

2. Watson and Crick model of DNA structure implies that*:*

a) Thymine base pairs with adenine
b) Thymine base pairs with cytosine
c) DNA is a single strand
d) The purine content is not equal to the pyrimidine content
e) The nitrogenous bases from the backbone of the molecule

3. RNA*:*

a) Contains deoxyribose
b) Contains adenine, guanine, thymine & cytosine
c) Is usually single stranded
d) Guanine content is equal to cytosine content
e) Is not found in the nucleus

4. The bonds that stabilize the structure of DNA are:

a) Hydrogen bonds and peptide bonds
b) Phosphodiester bonds and hydrogen bonds
c) Glycosidic bonds and thioester bonds
d) Disulphide bonds and hydrogen bonds
e) Van der Waals forces

5. All the following compose a nucleoside *except*:

a) Phosphate group
b) Deoxyribose
c) Ribose sugar
d) Pentose sugar
e) Purine base

6. The following are purine nucleotides:

a) AMP and ADP
b) ATP and CMP
c) CTP and GDP
d) NAD and TDP
e) UDP and GTP

7. Select the incorrect statement. Messanger RNA:

a) Is translated in the direction 5'to 3'
b) Is oftend derived from a large precursor by processing in eukaryotes
c) Has a poly A tail in eukaryotes
d) Is a heterogeneous molecule
e) Is extensively processed posttranscriptionally in prokaryotes

8. Nucleotides in nucleic acids are linked together by:

a) Peptide bonds
b) 3' to 5' phosphodiester bond
c) 5' to 3' phosphodiester bond
d) Disulphide bonds and hydrogen bonds
e) Van der Waals forces

9. The following is a purine nucleotide:

a) Cytidylate
b) Guanosine
c) Cytidine monophosphate
d) Uridine
e) Adenylate

10. Regarding Watson-Crick model of DNA structure:

a) The bases are found to the outside
b) The two strands are parallel
c) (G+C / A+T) = 1
d) The opposing strands of DNA are said to be complementary
e) Adenine pairs with thymine by 3 hydrogen bonds

11. The following statement is correct:

a) DNA is a polymer of nucleosides
b) The two DNA strands are covalently linked
c) The genetic information is stored in the linear sequence of bases along the molecule
d) DNA is found only in the nucleus
e) Successive nucleotides are linked by 3'-5- thioester bond

12. rRNA:

a) Is the least RNA in the cell
b) Is the smallest among RNA's
c) Is the same in pro- and eukaryotic cells
d) Codes for protein synthesis
e) Has catalytic function in protein synthesis

13. tRNA:

a) Is the most abundant RNA in the cell
b) Acts as adaptor during protein synthesis
c) Is the most heterogeneous of all RNA's
d) Usually binds more than one amino acid
e) Has a catalytic role during protein synthesis

14. The following is correct about the genetic code:

a) 62 codons can code for amino acids
b) It is universal
c) Four codons can terminate protein sythesis
d) Many amino acids have multiple codons
e) All of the above is correct

15. The genetic code is said to be umambiguous, that means:

a) Several triplets code for one amino acid
b) Each triplet codes for one amino acid
c) One gene one protein
d) Each triplet specifies more than one amino acid
e) Each amino acid has one codon

16. If GUA specifies valine, UUA specifies leucine, AUU specifies isoleucine and ACA specifies threonine, it is most likely that AUA specifies:

a) Valine
b) Leucine
c) Isoleucine
d) Threonine
e) Proline

17. With regard to mitochondrial DNA:

a) It has a circular duplex of ribonucleic acid
b) It accounts for 25% of total human DNA
c) It codes for all mitochondrial enzymes
d) It is inherited exclusively from the mother
e) All of the above is true

18. The following is a purine nucleotide:

a) Cytidylate
b) Guanosine
c) Cytidine monophosphate
d) Adenine monophosphate
e) Guanosine monophosphate

19. Concerning the different types of RNA:

a) mRNA is the most abundant
b) rRNA is involved in formation of ribosomes
c) tRNA carries codons for amino acids
d) tRNA acceptor arm is found in the 5' end
e) mRNA is the most homogeneous type

18. Which of the following statement is correct:

a) DNA is a polymer of nucleosides
b) The two DNA strands are covalently linked
c) The genetic information is stored in the linear sequence of bases in DNA
d) DNA is found only in the nucleus
e) Successive nucleotides are linked by 3'-5- thioester bond

19. cAMP is:

a) Purine base
b) Involved in signal transduction
c) A synthetic nucleotide analogue
d) Is a nucleoside derivative of cytosine
e) Is the same as AMP

20. Synthetic nucleotide analogs:

a) Include cGMP
b) Include theophylline
c) Can be used as anti-tumor agents
d) 5-fluoro uracil is used for treatment of gout
e) Have only antiviral effect

21. Nucleotides:

a) Include NAD and FAD
b) Are involved in formation of coenzymes
c) Are involved in base plus sugar plus phosphate
d) Important in CHO biosynthesis
e) All of the above is correct

22. The following are the properties of the genetic code:

a) It is degenerate
b) It is commaless
c) It is non overlapping
d) It is a triplet
e) All of the above is correct

23. Concerning the 20 standard amino acids:

a) Each amino acid has two codons
b) Some amino acids have no codons
c) One codon can code for more than one amino acid
d) An amino acid can have more than one codon
e) None of the above

24. The codon is:

a) Three nucleotides (bases) in mRNA representing an amino acid
b) The sequence of bases in tRNA
c) The same as the gene
d) The base sequence in rRNA
e) None of the above

25. The gene is:

a) Polymer of amino acid linked by peptide bond
b) DNA segment carrying information about a protein
c) Only made of introns
d) The same as chromosomes
e) Only made of exons in eukaryotes

26. The flow of genetic information is the following order*:*

a) Translation→ replication → transcription
b) Replication → transcription → translation
c) Transcription → replication → translation
d) Replication → translation → transcription
e) Transcription → translation → replication

27. All of the following are involved in purine nucleotide synthesis*:*

a) Glycine, Serine, Glutamine
b) Aspartate, Formyl Tetrahydrofolate, Glutamine
c) Asparagine, Glycine, Glutamine
d) Carbon Dioxide, Pyridoxine, PRPP
e) Ribose 5 Phosphate, Glutamate, Formimino Tetrahydrofolate

28. The commited step in purine nucleotide biosynthesis is catalysed by*:*

a) PRPP Synthase
b) PRPP Glutamylamidotransferase
c) Glucose 6 Phosphate dehydrogenase
d) IMP Dehydrogenase
e) All of the above is correct

29. Denovo purine biosynthesis is inhibited by*:*

a) Antifolate drugs
b) Glutamine analogs
c) Azaserine and diazanorleucine
d) 6-mercaptopurine and mycophenolic acid
e) All of the above

30. The salvage pathway of purin nucleotide synthesis involves*:*

a) Conversion of adenine to AMP by adenosine kinase
b) Conversion of adenosine to AMP by phosphoribosyl transferase
c) Formation of GMP from guanine by HGPRTase
d) Formation of dATP by ribonucleotide reductase
e) C is the only correct answer

31. The following is correct about inherited disorders of purine metabolism*:*

a) Adenosine deaminase deficiency results in severe immunodeficiency
b) Gout results from decreased Km of PRPP synthase for Ribose-5-Phosphate
c) Complete deficiency of HGPRTase results in Lesch Nyhan Syndrome
d) Xanthinuria results from complete deficiency of xanthine oxidase
e) All of the above is correct

32. Allopurinol*:*

a) Lowers uric acid in the blood by increasing renal excretion
b) Is xanthine oxidase inhibitor
c) Increases formation of urate by increasing plasma pH
d) Is the natural substrate for orotate phosphoribosyl transferase
e) Inhibits purine and pyrimidine degradation

33. Methotrexate*:*

a) Inhibits reduction of dihydrofolate to tetrahydrofolate
b) Inhibits TMP synthesis
c) Is an anticancer drug
d) A,B and C are correct
e) C is the only correct answer

34. The end products of pyrimidine catabolism*:*

a) Include ammonia, beta alanine and CO2
b) Increase in leukemic patients
c) Increases as a result of mitochondrial damage to the liver
d) Are highly water soluble
e) All of the above is correct

35. Orotic Aciduria*:*

a) Type I reflects a deficiency in both Orotate Phosphoribosyl Transferase and Oritidylate Decarboxylase
b) Type II reflects deficiency of oritidylate decarboxylase only
c) Is transiently detected in allopurinol treated patients
d) Is detected in ornithine transcarbamoylase deficiency
e) All of the above is correct

36. Possible roles of covalent modification of histones include*:*

a) Acetylation of histones H3 and H4 is associated with the activation or inactivation of gene transcription
b) Methylation enhances transcription
c) Phosphorylation of H1 participate in octamer formation
d) ADP-ribosylation is associated with nucleosomal assembly
e) None of the above is correct