1)Nucleotides:
a. Forms the monomer of both DNA & RNA.
b. Serve as carriers of activated intermediate of metabolism.
c. are important regulatory compounds of metabolic pathways.
d. Play an important role as " energy currency " of the cell.

2) (DNA) (purine { A,G}) (Pyrimidine { C ,T})
3) (RNA) (purine { A,G}) (Pyrimidine { C ,U})

T & U differ only in one methyl group which is present in(T) BUT absent in(U)

4) unusual bases are found in some species of DNA & RNA .
It may aid in :
a) recognition by specific enzyme
b)protect from being degraded by nucleases
e.g, viral DNA
All the following are considered unusual bases, EXCEPT:
a. Acetylcytosine
b. 5-methyluracil. (answer)
c. Dimethyladenine.
d. Dihydrouracil.
e. Hydroxymethlguanine.

5) Nucleosides :
a)(sugar { ribose (OH on C2) } + base) ----------→ Ribonucleoside
(ADENOSINE , GUANOSINE , CYTIDINE & URIDINE)
Q-- Adenosine & cytosine are both ribonucleosides. F
Adenosine & CYTIDINE are both ribonucleosides. T

b)(sugar { 2-deoxyribose (H on C2) } + base) ---------→Deoxyribonucleoside

(deoxyADENOSINE ,deoxy GUANOSINE ,deoxy CYTIDINE & deoxythymidine (thymidine)

Pyrimidine ring from (1 to 6)
Purine ring from (1 to 9)
Pentose ring from (1 to 5)

NOTE : PURINE OR PYRIMIDINE bases are attached to C1 OF PENTOSE RING .

6) Nucleotide : (base + sugar + 1,2,3 P) :
a) The first phosphate group is attached by an ester linkage to the 5 OH of the pentose .
cuz this we said 5, nucleotide
- nucleoside monophosphate e.g. (AMP , CMP)
b) the 2 & 3 P group are connected to nucleotide by " high energy bond "
c) P group are responsible for :
- negative charge
- DNA & RNA to be referred to as nucleic acid

Synthesis of purine nucleotides :

- ASPARTATE (N 1)
- GLUTAMINE (N 3 , 9)
- CO2 (C 6)
-GLYCINE (N 7 & C 4,5)
- N10 – FORMYLTETRAHYDROFOLATE (C 2,8)

A) RIBOSE 5 PHOSPHATE ----------→ PRPP
- ENZYME : PRPP SYNTHETASE
- ACTIVITOR: Pi
- INHIBITOR : purine ribonucleotide
- IRREVERSIBLE because it use ATP
-sugar moiety is ribose so the end product is ribonucleoside (NOT DEOXYRIBONUCLEOSIDE)

B) PRPP + GLUTAMINE ----------→ 5 PHOSPHORIBOSYLAMINE + GLUTAMATE
- ENZYME : GLUTAMINE phosphoribosyl pyrophosphate amidotransferase
- It is the commited step
- ACTIVATOR : PRPP
- INHIBITOR : AMP , GMP , IMP
-(the amide group of glutamine replace the pyrophosphate group attached to C 1 of PRPP)
- Note : glutamine (not glutamate) & PRPP control the rate of the reaction .
- PRPP IS NORMALL below km of the amidotransferase

C) synthesis of IMP (**PARENT** PURINE NUCLEOTIDE)
- need 4 ATP
- two step require N10- formyltetrahydrofolate
- base is : hypoxanthine

NOTE : (inosine is nucleoside BUT IMP is nucleotide)

المحاضرة الأولى ،،،،،،،،،،،،،،،

DONE BY

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