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### **Fill in the blanks**

- 1. Watson and crick** discovered the double helical structure of the DNA molecule.
- Watson and Crick were awarded Nobel Prize in **1962**.
- Nucleic acid** store transmit and help express hereditary information.
- The Amino acid sequence of a polypeptide is programmed by s unit of inheritance called a **gene**.
- Hundred of y-shaped region of replication DNA molecule where new strand are growing called **Replication Fork**.
- Topoisomerase** are enzyme which relieves stress on the DNA molecule by allowing free rotation around a single strand.
- Genetic code** is a dictionary that corresponds with sequence of nucleotides and sequence of Amino acids.

8. **Charging** is a the process of covalently attaching an Amino acid to the tRNA .
9. **Single stranded binding (SSB)** are protein which attach and help keep the separated strands apart.

**Q.2 :- write short notes on the following ?**

**1. Molecular biology:-**

The branch of biology in which we study the gene, structure, hereditary and also gene expression.

**Common tools of molecular biology:-**

- Nucleic acid fractionation.
- Polymerase chain Reaction (PCR)
- Hybridization vector, molecular cloning nucleic acid enzyme microrray ,probes
- DNA sequencing
- Electrophoretic separation of nucleic acid detection of gene.
- DNA southern blotting,insitu hybridization,FISH Techniques.
- RNA Northern blotting.
- Protein westein blotting,Immunohisto chemistry.

## 2. Chargaff,s Rule:-

- This rule state that if DNA from any cell of any organism must have a ratio 1:1 it mean ( base pair rule) of purine and pyradimine bases and more specific the amount of guanine should equal to cytosine. And amount of Adenine equal to amount of thymine.

And it must keep in mind that pattern is found in both the strand of DNA.

**Example:-**

$$G=C$$

$$A=T$$

## 3. Wobble hypothesis:-

This hypothesis was given by Francis Crick in 1966.

- Statement:- this hypothesis State that why multiple codes can for a single Amino acid.  
One tRNA molecules can recognise and bind to more than one codon due to less precise base pair that can arise between the 3<sup>rd</sup> base of codon and base at the first position on the anticodon .

## 4. Name of steps of transcription and translation:-

### 1.Names of steps of transcription:-

The formation of mRNA from DNA is called transcription.

**Steps.**

- A. Intiation phase
- B. Elongation phase or polymerization
- C. Termination

**1. Names of steps of translation:-**

The formation of protein with help of RNAs is called translation.

**Steps.**

- A. Activation of Amino acid
- B. Formation of initiation complex
- C. Polypeptide elongation
- D. Termination

**5. Nucleic Acid:-**

The polynucleotide chain (polymer) formed by the linkages or organization of monomer units called nucleotides.

**Types of nucleotides**

- 1. DNA( Deoxyribonucleic Acid)
- 2. RNA( Ribo nucleic acid)

## **Nucleotides:-**

A nucleotide is made up or composed of three components.

- Pentose sugar (five carbon monosaccharide )
- Nitrogenous bases (Adenine, guanine, cytosine, thymine)
- Phosphoric acid phosphate group.

We classification Nucleotides into three types.

### **1. Mononucleotide:-**

Which is consist of single nucleotide.

Example:- ATP

### **2. Dinucleotide:-**

The types of nucleotide which is made of 2 nucleotide.

Example:-. NAD

### **3. Polynucleotide:-**

When more then one nucleotide are liked together.

Example:- DNA

RNA

**Q No 3:- Explain the DNA Replication.?**

**DNA Replication:-**

Def.the production of new copies of DNA is called DNA Replication.

Or.the production of new copies of DNA molecule which have same base sequence (pairs).

### **Location or where and when :-**

The DNA Replication occurred in S.phase during the interphase of cell cycle in the nucleus of eukaryotic cell.

### **Model of DNA Replication:-**

There are many model or hypothesis regarding to DNA Replication .some are given below.

- Conservative model
- Semi conservative model
- Dispersive model

**Note .it** must keep in mind that DNA Replication followed the semi conservative model which states that each strands of DNA molecule s separate (unzipped) and each act as template for the formation of new strand.

### **Process of DNA Replication:-**

- **Origion of DNA Replication:-**
  - 1. Replication fork:**

The hundred of Y shape regions of replicating DNA molecules where the new strands are growing.

**2. Replication bubbles :-** in replication bubbles The hundred of replicating bubbles (eukaryotes) and single replication fork are formed.

- **Strand separation:-**the DNA strand can be separated by the following enzymes.

**1. Helicase.**

These enzymes are involved in the unwinding and separation and breaking of Hydrogen bond of the parental double helix.

**2.single stranded binding proteins (SSB).**

The protein which stabilize the unwind strand or keep separate strand apart.

**3.topoisomerase.**the enzymes which relieves the stress of DNA molecules.

- **Priming.**

**1. RNA primer:**the small free.existing primer(RNA) which start addition of new nucleotides before the new strand are formed.

**2. Primase:**the enzyme which synthesis the RNA primers.

- **Synthesis of new strand.**

**1.DNA polymerase:-**the enzymes which synthesis of new strand in 5 to 3 direction.

**2. Leading strand:-**in leading strand synthesis of a single polymer in 5 to 3 direction.

**3.lagging strand:-** also synthesis occure in 5 to 3 direction but in discontinue manner against the direction of replication.

- **Okazaki fragments:-**

These are series of short segment on leggings strand.

- **DNA ligase** :the enzymes which are involved in the formation of covalent bond from 3 to 5 end joining strand.

**Example.** Joining of okazaki fragments together.

- **Proofreading:-**

In proofreading the initial base pairing error are usually corrected by DNA polymerase.

(End off paper)