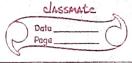
Genetics.



Genetics: - Genetics Ps a branch of biology which concerned with the

Genetic materials: - The substance that gets transferred from one generation to the next generation in order to express Pts characteristics on porental characters.

the function of generic moterials are-

. It should be capable of replicating and being inherited to offspring.

It should be able to corry out all the information necessary for the func

It should be able to change Pts sequence by mutation.

DNA and RNA one the principal yenetic materials of living organism and chemically called nucleic acrids.

Opene: - The unst of heredity transmitted from one generation to the unext generation is called a gene. A gene represents the herodity unst which is responsible for inheritance of openetic and characters of sex

organism.

The term gene was colled by Danish Gene therst, wellelm

Jahannsen in 1909. Genes (so colled factors) transmits and induced

traits (called characters according to Hendel).

classical concept of gene

Bused on the classical concept, the gene is regarded a

The unit of junction. Acc to this defination gene one consider as the unit of chromosome responsible for the expression of a transfer

The unst of mutation. Acc to this elepination gene are the smallest segment of chromosomes capable of undergoing mutation.



Bush requirements of for DNA replication

The enzymes protes of factor and metalsons requered for this process are:

O DNA hellouse: It as an enzyme whach breaks the hydrogen bond and sep erates the DNA strands. Thus, a fork as formed at the junction known as replication fork.

B) stranded Binding (SSB) proteins: These are the molecules while affect tightly to the exposed bing le stranded only in order to state 919 ze the single -stranded DNIA long enough for replication.

C) Primose:- It is an enzyme responsible for synthetis of short RNA pris

mers. of RNA primers Ps a small strand of RNA whoch guides the process of replication.

(d) DNA polymerase: - It is an enzyme responsible for country new Pn/the DNA · (Nick means cutting or breaking of prosphodes ter bond)

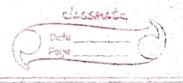
(1) ONA polymerase: It as an enzyme responsible for catalyzany the synthetis of DNA.

(e) Popo Psomerose: It is an enzyme responsible for Causing of Pick In the ONA. (Nick means cutting or breaking of phosphodieses bond)

RNASe: It is an enzyme which digest the RNA primers ofter the DN

DNA legase: It is an enzyme which seals the gap in the synthesis

(h) substrates: - The four deoxynibonucleonide thiphosphate (AN TPS) such



OI dATPS, OGTPS, OCTPS, OTTPS.

- Folic acid: It is an essential requirement for the synthetis of nation encous base.
- P Hg2t and Hn2t lons: These sons are essential for ONA synthetis.

The mechanism of and replication of a complex phenome

The mechanism of ONG replication as a complex phenome non whoch anulves the following steps:-



many replication ste! DNIA 9s long charn of poly nucleoticls. It has many replication units called replacens. Application is maked at each replican by producing a nick (cut) in one of the stronds at a specific substantial on point called 10x2-the! The nick as produced by an enzymb called endonuclease.

plasm as dearying on ucleatide monophosphates (dnihps) - damps, dam ps, damps, damps,

Unwinding of DNA helix: The unwind of two DNA strands occurs in the presence of an enzyme helicouse which breaks the hydrog en sonds between the nucleotides. Due to the unwinding of two DNA strands, a Y-shaped fork called replication fork. Is formed. Now, both separated DNA strands are called templates.

formation of RNA primes:

Replication is guissed by a RNA primer. RNA primer is a small strans

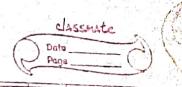
of RNA which is synthesized by an enzyme primase. primers is a the
ched on the template DNA at a site called initiation site from

where the DNA synthon's begins

Replication always and Paked from 51 dexchion to 31 direction.

(5) Elongation of new tranch.

Once, the primer strands is sommed, DNA replication begins with the help of DNA polymerase TIT (Pn protonuctes) (DNA polymerase TIT (Pn protonuctes) (DNA polymerase) along with ATP and my 2+



- · Nucleotick chain formation proceeds from the Instation stope by adding
- Replication proceeds on both the template ONA Strands: Therefore,

 the replication process Ps be direction. Replication Ps continuous on

 one template strand P.e. single DNA primer Ps responsible for the formation

 of whole strand 1 thus new strand Ps formed which Ps called a leading

 Strand:
- nor Ps removed and the gaps get folled with the completed, RNA pro
- (6) Termination: The replication is terminated whenever two replication forks meet.
- proof-reading and DNA repair. Sometimes, the wrong bases may be supprised of enserted during replication It is an error . The probability of which error is about once per 100000 nucleotids . The error is connected by inserting the correct nucleotides This process is called proof -reading.

conserved and half is the newly synthesized one is called semi-

DNA or RNA eens carries all the genetic enformation DNA or RNA & formed by the four alphabets A,G, C. Tory, and the alphabet for the DNA molecules are the not regeneous bases such as a adenage (A, quanque (G), cytosi ne (C) and thymange (T). sample (Y), cytosi ne (C) and thymange (D), cytosi ne (C) and Urasi (U). These four alphabets encocle the heredratary messages and are called as code letters or codons. The IPA each arrangment of not response bases on the RNA determines the sequence of amono acod.

Therefore , the genetic code 9s defined as da dictionary of nucleotides boses (A, Cy, c and u) that determines the sequences of anis no across in the protein of a cell. It is also be defined as the dictionary that helps in translating the language of the nucleic across or the language of protein. The group of nucleoteds that specifies or codes for one amino aid is known as coden or code word.

There are four nucleotide bases; nomely the adentine (A), guarane (CT), cynthyne (C) and unael (U). These four bases from 64 clifferent combinations (4x4x4=43=64) of three base codors. Out of 64 codors, tixty one codors code for the 20 amino acids found in proteins. The remaining three codors und supposed for amino acids. Rather they act as Stop signals in the protein synthem's.

1. The code 9s triplet: A codon 9s triplet in nature. It means that for any amino acid Pt Ps necessary to have a triplet codon. A triplet codon codes for a particular amino acids.

2.	The cocle 9s clegen arate; Most of the amono ands how more that
	one triplet codon. For example: glucine has four triplet codons. B
	molarly, arganage has nox troplet codons. That as called degenerate codon

- The code Ps not overlappang: A base Ps a part of only one codon.

 The same base letter Ps not used for two dayserent codon. the sat part

 example: a nucleotide sequence cat, wat as read as cat and yat.

 It represents only two codons are cat and cyaj which as not overlapped.
- us and doesn't possess any powe pause or gap ofter the taplets 2/4 nucleotide as deleted or added, the whole genetic code and read of ferently.
- 5. The code as non-ambigous: It means that there as no ambiguisty about a particular coden. A particular coden will always code for the sume amano and, hence the genetic code as highly specific or unambigous.
- 6. The code es universal: the genetic code es appliable universally i.e a codon specifies the some ameno form a virus to a plant or ju man being.
- collinearity p.e. 9+ explopers the specific relationship between DNA,

 RNA and popularised chara. The linear order of nucleotids Prong

 determines; the linear order of codons in many which in turn

 determines the linear order of amino acids in a polypeptide char

 ns.

Thorn Bage Second Base TA (31 end) forst Base U A (s'end)UCU UGU UAU UUU UCYA UCA UAA UUA ÜCC UUA UUC 4 UCG UAG 000 0 AGU ACU AUU AAU ACA AUA AAA ACIC ACGC AUA AAC 9 A ACG AUG AAG CCU CUU CUA A CAA CCA CUA CAC CCC CUC CUIC CUUT CCG CAG CIUU A GUA CICA Cylly Cycc 709 Grenetic code Triplet)