AP Biology Unit 6 - Inheritance Cheat Sheet

by njags21 via cheatography.com/122373/cs/22836/

experiments

Griffith - transform-ation experiment	experiments w several deff strains of bacteria diplococcus pneumonia
some virulent	some harmless
discovered bacterial transform-ation	bacteria can transform harmless cells into virulent ones by transferring some genetic factor from one bacteria to another
Avery, MacLeod, McCarty	found out that transformation factor was DNA

DNA not protein was the genetic material

DNA was the agent that carried genetic characteristics from virulent dead bacteria to living nonvirulent bacteria

Hershey & Chase	supported that DNA was genetic material

tagged bacteriophages w radioactive isotopes ^{32}P which labeled DNA bc has phosphorus this leveled DNA f phage viruses

^{35}S for protein bc had sulfur and leveled protein coat of phage viruses

radioactive phosphorus in the phage always entered the bacterium while sulfur remained outside the cells

proved DNA from viral nucleus not protein from viral coat was infecting bacteria and producing thousands of progeny

experiments (cont)

rosalind franklin	DNA is helix (photo 51)

X ray crystallography analysis of DNA that showed DNA to be a helix

her work was critical to Watson and crick

watson and crick	but first model of DNA

popsed double helix structure of DNA and used to build model

used biochemical analysis of dna from Erwin chargaff

a nd x ray diffraction analysis of Rosalind Franklin

led to how we replicate dna

meselson and stahl	proved dna replicates in a semiconservative fashion

cultured bacteria in medium containing heavy nitrogen allowing bacteria to incorp-orate heavy nitrogen into dna as they replicate

bacteria then transfered to medium containing light nitrogen and allowed to replicate and dive only once

resulting bacteria were spun in centrifuge

found to be midway density bet bacteria grown in heavy nitrogen and light nitrogen

new bacteria contained one heavy and one light

structure of dna

double helix shaped like twisted ladder w two strands running in opp directions (antip-arallel)

one strand runs 5' to 3' right side up

other runs 3' to 5' upside down

has repeating units of nucleotides

nucleotide: 5 carbon sugar, phosphate, nitrogenous base

carbon atoms in deoxyribose are labelled 1 to 5

adenine and guanine purines	A G pure
cytosine and thymine pyrimidine	C T pyr

bases of opp chains are paired. by hydrogen bonds

C G covergirl // more makeup//triple hydro bond

AT double bc less makeup

DNA gets packed and unpacked as needed in nucleus

eukaryotic dna combines w proteins called histones

only separates from these BRIEFLY during replication

DNA + histones=chromatin

double helix wraps twice around a core of histones

forms nucleosomes	look like beads on a string

purines have double ring structure

pyrimidines have single ring structure

rna

single stranded helix

uracil replaces thymine

5 carbon sugar is ribose

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central dogma

from dna to protein

transcription, rna processing, translation

DNA replication in eukaryotes

making an exact replica of the dna molecule by semi conservative replication

predicted by watson and crick, proven by meselson

dna double helix unzips

each strand serves as a template fro the formation of a new strand composed of complementary nucleotides

two new molecules each consists of one old strand and one new

replication begins at origins of replication

where 2 dna strands separate to form replication bubbles

speed up process of replication along the giant dna molecule

bubble expands as replication proceeds in both directions at once

each end of replication bubble is replication fork

Y shaped region where new strands of dna are elongating

eventually all bubbles fuse

DNA polymerase catalyzes antiparallel elongation of new DNA strands

DNA pol builds new strand from eh 5' to 3' direction by moving along the template strand and pushing replication fork ahead of it

DNA pol canNOT initiate synthesis

can only add nucleotides to the 3' end of a preexisting chain

DNA replication in eukaryotes (cont)

preexisting chain consists of RNA and is called RNA primer

primate makes primer by joining rna nucleotides

DNA pol replicates two strands differently

builds both in 5' to 3' direction

one is formed TOWARD replication fork in unbroken linear fashion

(leading strand)

others formed AWAY from the replication fork in a series of segments called Okazaki fragments

(lagging strand)

joined into one continuous strand by enzyme DNA ligase

helicase — unzips double helix at replication fork

separate two parental strands, making them available as templates

single stranded binding protein

act as scaffolding holding dna strands apart

topoisomerase lessens the tension on tightly wound helix by breaking, swiveling, and rejoining DNA strands

DNA pol carries out mismatch repair

proofreading that corrects errors

damaged regions of dna are excised by dna nuclease

each time dna replicates some nucleotides from ends of chromosomes are lost

to protect against this possible loss of genes, eukaryotes have special nonsense nucleotide sequences (TTAGGG) at ends of chromosomes that repeat thousands of times

DNA replication in eukaryotes (cont)

called telomeres — protective ends

created and maintained by enzyme telomerase

normal body cells have little telomerase so every time the DNA replicates, telomeres get shorter, this serves as clock that counts cell divisions and causes the cell to stop dividing as cell ages