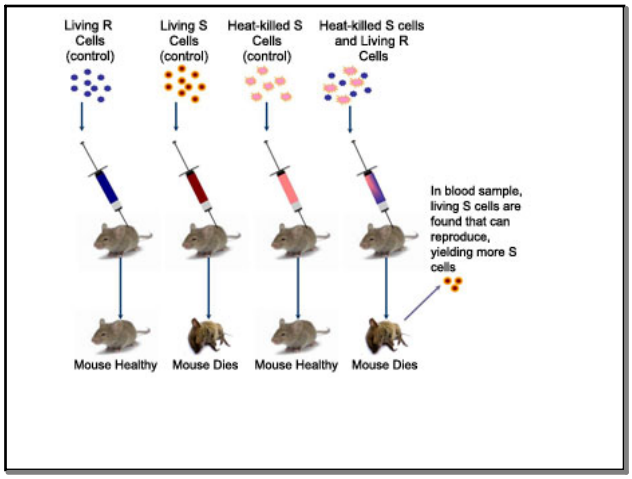
DNA Structure

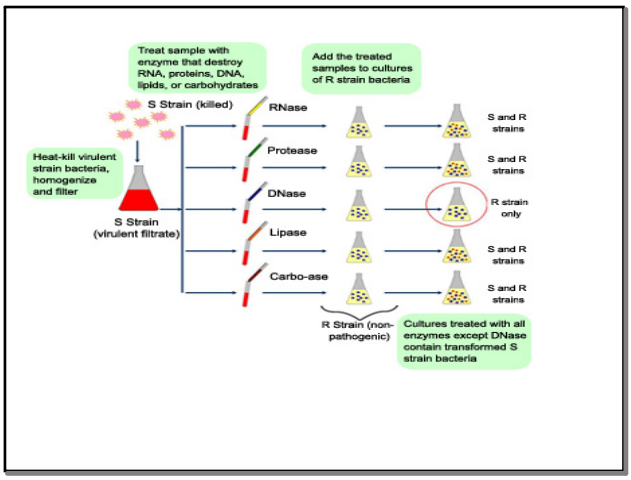
a. Discovery

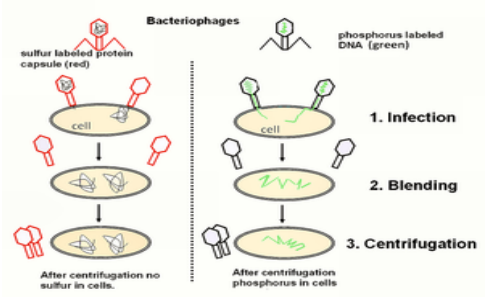
(1) Avery-MacLeod- Marty- 1944 isolated DNA from Griffith's transformaon experiment

(2) Hershey-Chase- 1952 elegant experiment with virus and bacteria showing DNA was injected not protein

(3) Watson, Crick, Wilkins, and Franklin- 1953 W atson and Crick published work showing structure of DNA (used Wilkins and Franklin's work to do so)







Structure of DNA

(1) Deoxyribose nucleic acid

(2) Double helix (two twisted stsrands) made of nucleodes (monomers)

(3) Nucleode = phosphate + 5C deoxyribose sugar + nitrogen base

(4) Anparallel strands- one runs 3' to 5' the other runs 5' to 3',sides of phosphates and sugars (backbone), rungs of paired bases with hydrogen bonds in between

(5) Purines (adenine,guanine; double rings) pair with Pyrimidines (cytosine, uracil, thymine; single ring)

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Locaon

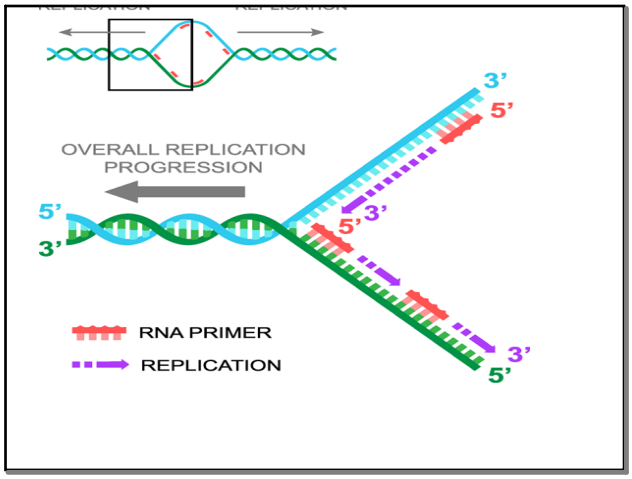
(1) In eukaryotes DNA is found in nucleus on mulple linear chromosomes (a chromosome IS a strand of DNA with proteins etc. associated).

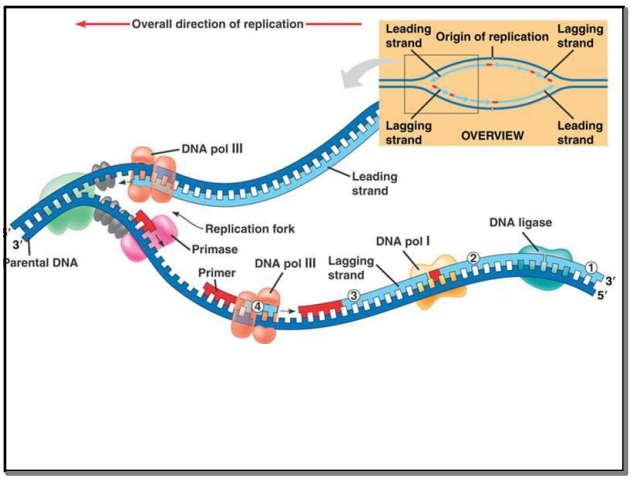
(2) In prokaryotes DNA is not in a nucleus and is usually a single circular chromosome

(3) Prokaryotes, viruses, and eukaryotes (yeast) can contain plasmids (small extra-chromosomal DNA that is double stranded DNA)

DNA replicaon

a. Process of making exact copies of DNA (i.e. for mitosis or meiosis)
b. Process is semi conservave (original strand is copied)
c. Steps
(1) Enzyme (helicase) unzip strands by breaking hydrogen bonds
(2) "Spare" nucleodes are added bidireconally to bond complementarily with use of DNA polymerases (DNA pol)





(3) DNA pol only can add to the 3' to 5' side and new DNA is made in the 5' to 3'direcon
(4) Replicaon bubbles open up and a replicaon fork is created because bubble is in half and it has one side 3/5 and one 5/3
(5) RNA primers must be laid down to start process (RNA primase makes primers)
(6) Leading strand makes DNA connuously (3/5)
(7) Lagging strand makes DNA disconnuously (5/3), Okazaki fragments
(8) Lagging strand requires enzyme (ligase) to fuse fragments

RNA

a. Ribonucleic acid
b. Single stranded, different sugar called ribose, different base called uracil INSTEAD of thymine
c. Base pair rules in RNA, A-U and C-G
d. messenger RNA or mRNA carries informaon from DNA to the ribosome
e. transfer RNA or tRNA bind amino acids and are used in translaon at ribosome
f. ribosomal RNA or rRNA are part of ribosomes that have catalyc funcon
g. RNAi are molucules that are used for regulaon of gene expression (turn on or off)