Structure of DNA

-DNA is a double helix

-DNA consists of 2 strands that run antiparallel

-one strand run 5' to 3' the other strand runs 3' to 5'

-DNA is a polymer consisting of repeating units of nucleotides

-Nucleotides consists of a 5-carbon sugar, phosphate, and nitrogen base

-4 nitrogen bases: adenine + thymine / cytosine + guanine

-nitrogenous bases are paired together by hydrogen bonds

-a chromatin is when DNA combines with histones (proteins)

-a nucleosomes is when double helix of DNA wraps around a core of histones

Mendel's Laws

Law of Segregation	Law of Independent Assortment
-law of segregation states that the 2 alleles of heritable character separate and segregate during gamete formation and end up in different gametes	-law of independent assortment states that each pair of alleles segregates independently into gametes
-this law accounts for the 3:1 ratio that Mendel noticed in the F2 generation	-Mendel identified this law by following 2 characteristics at the same time (dihybrid cross)

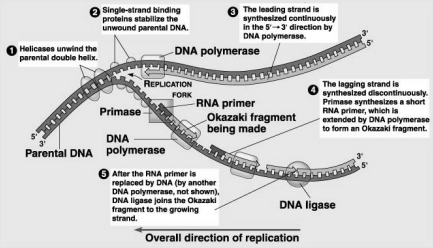
Scientists

scientists	experiment	conclusion
Frederick Griffith	he injected mice with different strands of pneumococcus	somehow the R strand transformed into S strain by the transforming principle
Oswald Avery	He exposed the R strand of pneumococcus to streptococcus to purify the S strain protein	

Scientists (cont)

Alfred Hershey & Martha Chase	They used radioactive sulfur and phosphorus to determine if protein or DNA was the transforming principle using bacteriophages	the phage coat packages and delivers phage DNA into bacteria and that DNA carries the instructions needed to replicate the phages in the bacteria. DNA is the genetic material
Erwin Chargaff	worked with nitrogenous bases to determine structure of DNA	he concluded his two rules: purines go with pyrimidines and all species have different amount of nitrogenous bases
James Watson & Francis Crick	studied Franklin's X rays of the structure of DNA	DNA is a double helix
Rosalind Franklin & Maurice Watkins	used X-ray crystallography to complete experiment	the X ray proved DNA to be a helix

DNA Replication



Vocab

alleles	any of the alternative versions of a gene
character	an observable heritable feature
dominant allele	an allele that is fully expressed in phenotype of a heterozygote
F1 generation	the first filial, or hybrid, offspring in a series of a genetic cross (children)
genotype	genetic makeup, or set of alleles, of an organism
heterozygous	having two different alleles for a given gene

Vocab (cont)

homozygous	having two identical alleles for a given gene
linked genes	genes located close enough together, on a chromsome that they tend to be inherited together
P generation	the original organism that you started studying (parents)
phenotype	the physical characteristics of an organisms, which are determined by genotype
trait	a detectable variant in a genetic character

Mendel's experiment

Facts	Advantages of Garden Pea
-mendel discovered the basic principles of heredity by breeding garden peas	-available in many varieties
-experiment started with varities that were true-breeding	-distinct heritable traits
-F2 plants revealed 2nd law of segregation and the law of independent assortment	-pea plants can be controlled by cutting off stamen
	-each pea plants have male & female organs
	-Mendel could cross-fertilize to produce many progeny

Non-Mendalion Genetics

Incomplete Dominance	when two alleles of the same gene blend together EX: pink flower
Epistasis	when one gene depends on another gene for it to be expressed
Sex-linked Genes	genes found only on the sex chromsomes; mainly found on X chromosome because X is larger
Co-dominance	when two genes work together and both show through EX: speckled chicken
Polygenic Trait	many genes control one trait

DNA Replication in Eukaryotes

There are 4 main steps in replication: initiation, elongation, termination, and proof-reading

1) replication begins at origin of replication, where 2 strands of DNA seperate to form replication bubbles	2) bubble expands as replication proceeds in both directions at once	3) at each end of the replication bubble is a replication fork. Eventually, replication bubbles fuse	4) the enzyme DNA polymerase catalyzes the antiparallel elongation of the new DNA strands
5) DNA polymerase builds a new strand (going 5' to 3') by moving along the template strand and pushing the replication fork ahead of it.	6) DNA polymerase cannot initiate synthesis, it can only add nucleotides to the 3' end of the preexisting chain. This preexisting chain consists of RNA and is called RNA primer. A Primer (which is a enzyme) makes the primer by joining together RNA nucleotides	7) DNA polymerase replicates the 2 original strands of DNA differently. although it builds both new strands in the 5' to 3' direction	8) The leading strand forms toward the replication fork in a linear fashion
9) the lagging strand forms in the direction away from the replication fork in a series of fragments called Okazaki fragments	10) helicases (which are enzymes) untwist the double helix at the replication fork. Helicases seperate the 2 parental strands, making the strands available	11) The single-stranded biding proteins hold the 2 DNA strands apart	12) Topoisomerases lessen the tension on the tightly wound helix by breaking, swiveling, and rejoining the DNA strands

DNA Replication in Eukaryotes (cont)

13) DNA polymerase proof reads the work of matching the right nucleotides together (adenine + thymine//guanine+ cytosine)

14) damaged regions of DNA are excised by DNA nuclease

15) each time DNA replicates some nucleotides from the end of the chromosomes are lost. To prevent the lost of genes, eukaryotes have specific nucleotide sequences (TTAGGG) at the end of chromsomes that repeat

16) these protective ends are called telomeres. telomeres are created and maintained by the enzyme telomerase

17) Body cells conatin little telomerase, so every time DNA replicates, the telomeres get shorter