Griffith and Transformation

- Fredrick Griffith (British scientist)
- wanted to learn how bacteria makes you sick
- isolated two different strains (types) pnumenia
- disease-causing strain -> smoothing colonies on culture plates -> mice got pneumonia -> dies
- harmless strain -> colonies with rough edges -> lived
- but smooth + rough = pnumonia
- transformation: one strain of bacteria changed permanently to another

Avery & DNA

- Oswald Avery (canadian biologist)
- avery & other scientists discovered that nucleic acid DNA stores & transmits the gentic nfo from one generation to the next

Hershey-Chase Experiment

- Alfred Hershey & Martha Chase (American scientists)
- bacteriophage: one kind of virus that infects bacteria
- concluded that the genetic material of the bacteriophage was DNA not protein

Components & Structure of DNA

- DNA is a lomg molecule made up of units called nucleotides
- nucleotides: 5-carbon sugar called deoxyribose, phosphate group, and a nitrogenous base
- 4 nitrogenous bases: adenine, guanine, cytosine, thymine
- Watson & Crick's model of DNA was a double helix where two strands were wound around each other
- base pairing: for every adenine in a double stranded DNA molecule, there had to be one thymine molecule & for every cytosine molecule, there had to be one guanine molecule
- base pairing explained why Chargaff's rules (% of G and C was equal & A and T were equal)

DNA and Chromosomes

- prokaryotic cells lack nuclei
- eukaryotic DNA is located in the cell nucleus in the form of a number of chromosomes
- humans have 46 chromosomes
- eukaryotic chromosomes carry DNA & protein in chromatin
- chromatin has DNA that is coiled around proteins called histones
- nucleosomes: fold DNA into tiny space of cell nucleus

DNA Replication

- strands of base pairing are complementary

-before a cell divides, it duplicates its DNA in a copying process called replication

- replication -> DNA molecules separate into 2 strands -> produce 2 new complementary strands thru base pairing -> each strand of double helix is a model for new strand
- DNA polymerase is a key enzyme in replication: joins individual nucleotides to produce DNA molecule

Structure of RNA

DNA:	RNA:
nucleotides	nucleotides
rdeoxyribose	ribose
double stranded	single stranded
thymine	uracil

Types of RNA

- RNA molecules -> protein synthesis (assembly of amino acids)
- messenger RNA, ribosomal RNA, transfer RNA
- mRNA: carry copies of instructions for assembling amino acids into proteins
- rRNA: where proteins are assembled
- tRNA: transfers amino acid to ribosome by its coded messages

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Transcription

- transcription: process where RNA molecules are produced by copying part of the nucleotide sequence of dNA into complementary sequence in RNA
- transcription requires RNA polymerase (enzyme)
- transcription -> RNA polymerase binds to DNA and separated DNA strands -> RNA polymerase uses one strand of DNA to assemble strand of RNA
- RNA polymerase only binds into regions of DNA called promoters (indicate where to bind)

Translation

- translation: decoding of mRNA message into a polypeptide chain
- translation -> cell uses info from mRNA -> produce proteins
- anticodon bases are complementary to codons
- RNA release into cytoplasm -> mRNA ttatches to cytoplasm -> tRNA brings amino acid into ribosome -> translation begins -> codon breaks -> replaced by anticodon -> polypeptide chain grows -> newly formed polypeptide molecule is released -> translation is over

RNA Editing

- DNA of eukaryotic genes contains introns (sequences of nucleotides) and exons (sequences that code for proteins)

Kinds of Mutations

- mutations are changes in genetic material
- point mutations: changes in one or few nucleotides at a single point in DNA sequence
- frameshift mutations: changes that shift the "reading frame of the genetic message"
- frameshift mutations can change a protein so much that it cannot perform its functions

Genetic Code

- proteins made by joining polypetides (amino acide chains)
- codon: has three consecutive nucleotides that specify a single amino acid that will be added to the polypeptide
- AUG + start codon
- three stop codons

Significance of Mutations

- mutatios are source of genetic variability in a species
- polyploidy: condition in which an organism has extra sets of chromosomes