CH 12 Review

p. 288 **Griffith's Experiment**

↳ transformation

→ "some factor" containing information being transferred

p. 289 **Avery**

→ identified DNA as "transforming factor" through process of elimination

p. 289 **Hershey - Chase**

- bacteriophages
- radio-active markers
→ P versus S

→ concluded DNA was the genetic material, NOT protein

p291 **Structure of DNA**

(1) 5 carbon sugar - deoxyribose

(2) phosphate group

(3) Nitrogenous base

A - Adenine
G - guanine
→ purines (2 rings)

C - cytosine
T - Thymine
→ pyrimidines (1 ring)

p. 292 Chargaff's Rules

A with T
C with G

p293 Rosalind Franklin

- X-ray diffraction
- 2 strands
- helix structure

p. 293 Watson & Crick

- Duble-helix
- sugar-phosphate on outside
- nitrogenous bases the steps of ladder, based-paired and bonded by, Hydrogen-Bonds

→

p. 296 Chromatin

- DNA and protein tightly packed together
- HISTONES ⇒ the proteins that the DNA is coiled around.

↓↓

create a bead-like structure called a NUCLEOSOME!

p. 297 **DNA Replication**

- DNA making a copy of itself
- starts at Replication Fork
- single point in prokaryotes
- hundreds of places in eukaryotes

Each strand of the Double Helix serves as a TEMPLATE for the new strand !

How ??

ENZYMES !!

DNA Polymerase is one of the main ones
- joins new nucleotides and "proof reads"

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p 300 **RNA**

(1) single instead of double stranded
(2) ribose instead of deoxyribose
(3) URACIL in place of Thymine

3 Types –
- mRNA – messenger
- rRNA – ribosomal
- tRNA – transfer.

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TRANSCRIPTION — in nucleus → DNA to RNA !!

- RNA polymerase separates the strands and uses ONE of the strands as a template for a single-stranded RNA in RNA "letters"
- RNA Polymerase binds at a specific region called a PROMOTER

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RNA EDITING

pre-mRNA

1. INTRONS get cut out by enzymes
2. EXONS get spliced back together
3. 5' CAP gets added
4. Poly-A tail gets added

★ alternative splicing gives many possibilities.

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CODONS

- three consecutive bases that specify a specific AMINO ACID

AUG — start — also methionine

UGA
UAA
UAG
STOP

$4^3 = 64$ possible codons for 20 AA's, plus start and stop

p 303 **TRANSLATION**

- takes place in cytoplasm at A ribosome

- mRNA → protein !!

(1) mRNA leaves nucleus and attaches to RIBOSOME

(2) Each codon is read and tRNA (transfer RNA) brings in the appropriate AMINO ACID

[tRNA has an "anticodon" on the front which corresponds to the codon on the mRNA]

(3) the AA's get peptide bonded to each other and then released as a polypeptide

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p 307 **MUTATIONS**

POINT Mutations

⇒ one or a few nucleotides

(1) Substitution
(2) Insertion
(3) Deletion

] very bad !!

Insertions & Deletions
- can change the "reading frame" and are called Frameshift Mutations
  ↳ can be catastrophic !! ☹

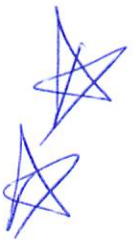
p308 Chromosomal Mutations
→ entire chromosome is damaged
1) Deletion
2) Duplication
3) Inversions
4) Translocations

Mutations
(1) CAUSE DISORDERS
but . . .
(2) Are A source of genetic VARIATION for natural selection.

(i.e. polyploidy is a plant mutation giving extra sets of chromosomes which make them easy to breed)

p309 Gene Regulation

⇒ the genetic code is selectively expressed by different cells and at different times



Prokaryotes

- OPERONS ⇒ on/off switch
  - ↳ lac operon
  - ↳ repressor protein

Eukaryotes

⇒ regulatory sequences more complex than operons

⇒ promoter sequences

⇒ TATA box

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D. Differentiation

- cells become specialized in structure & function.

Hox Genes

- control the differentiation process.
- "master control genes"

PAX 6 – controls eye growth in Drosophila

⇒ but also MICE !! old gene ☺