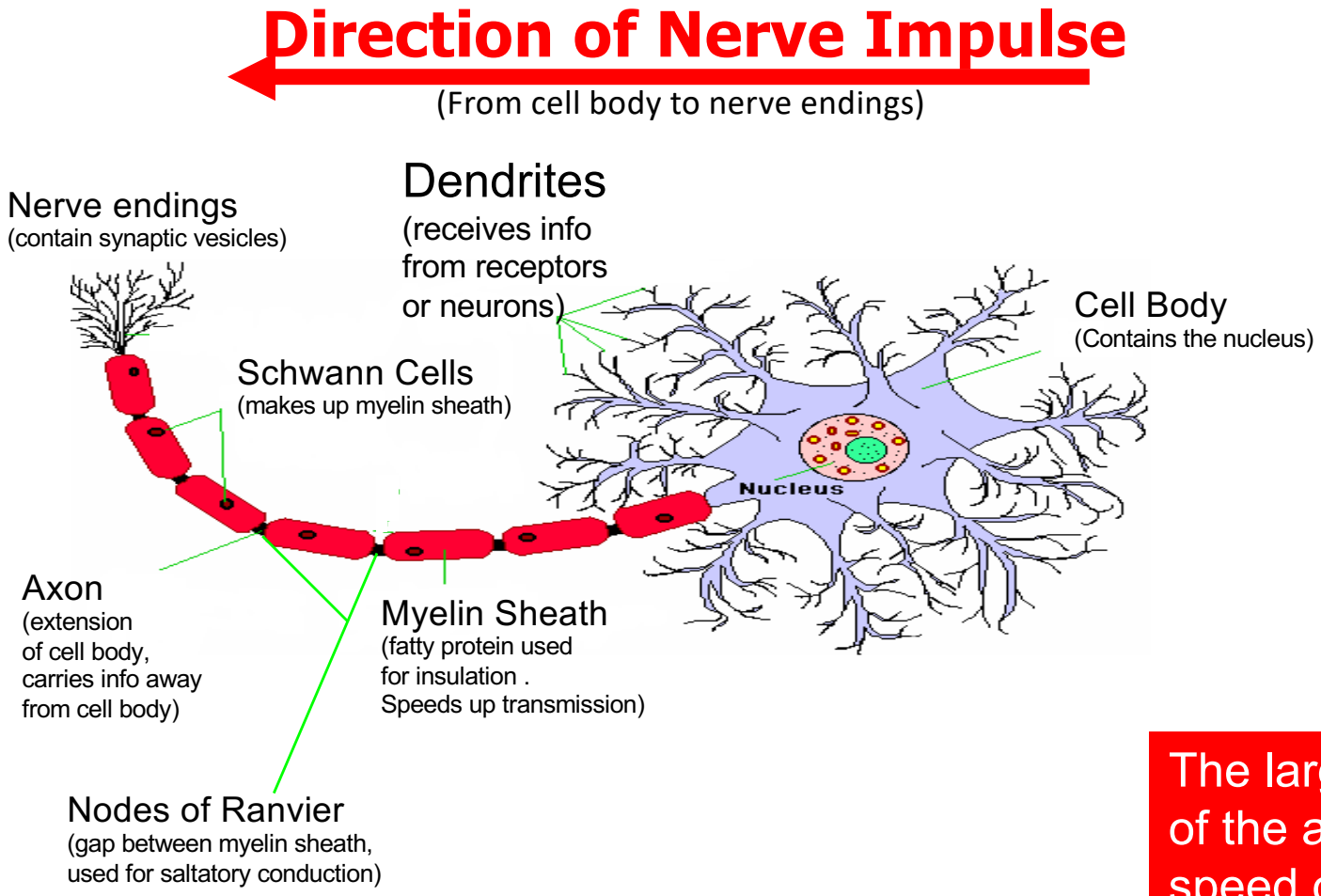
BIOLOGY 30 REVIEW

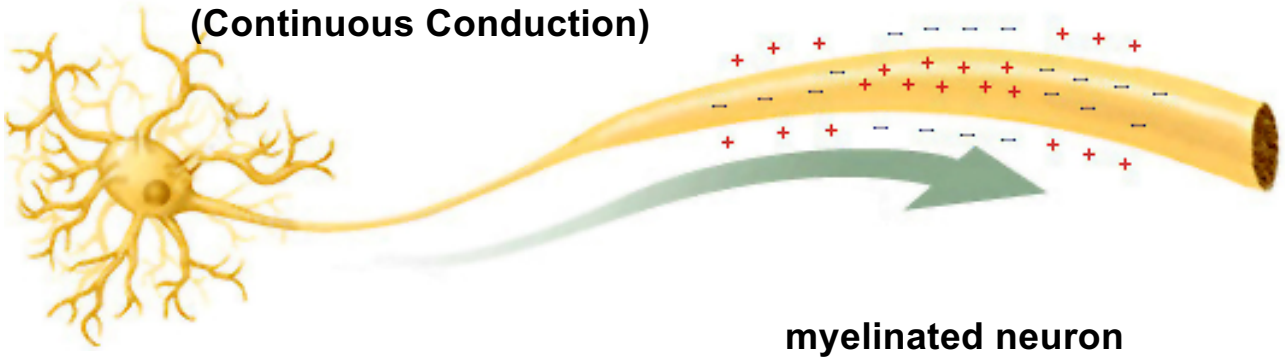
1. describe in general terms the structure and function of a neuron and myelin sheath.



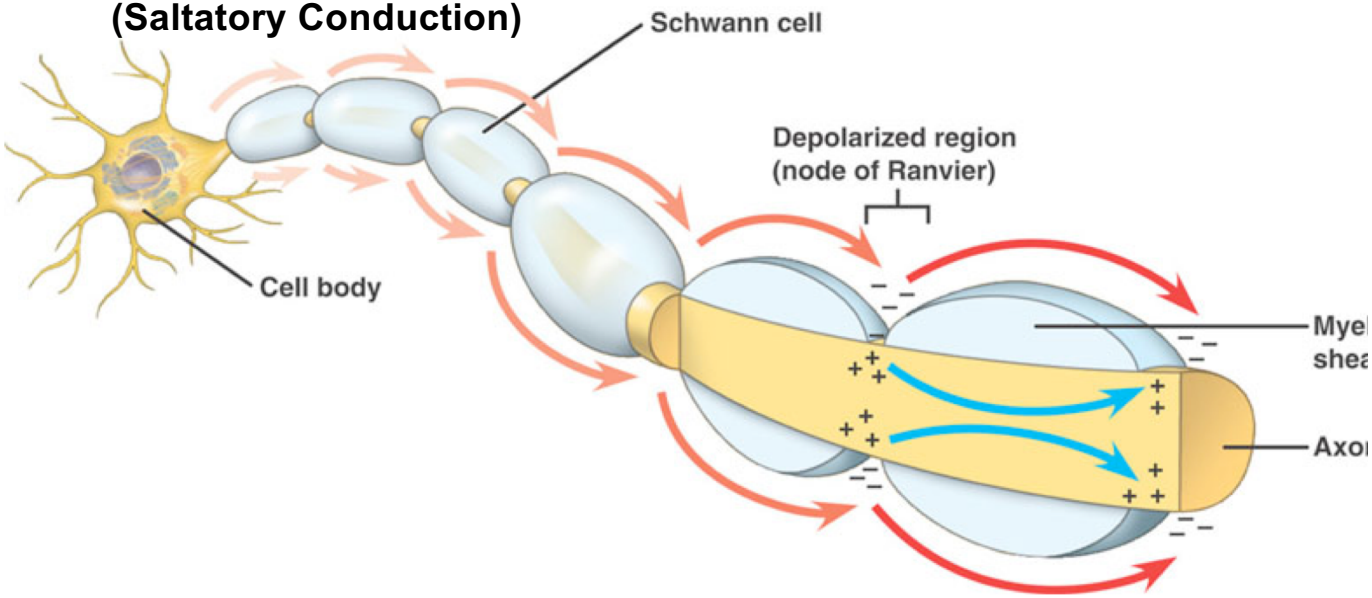
The larger the diameter of the axon, the faster the speed of nerve transmission

2. explain how an action potential is formed by electrochemical gradients and how it is transmitted along a neuron.

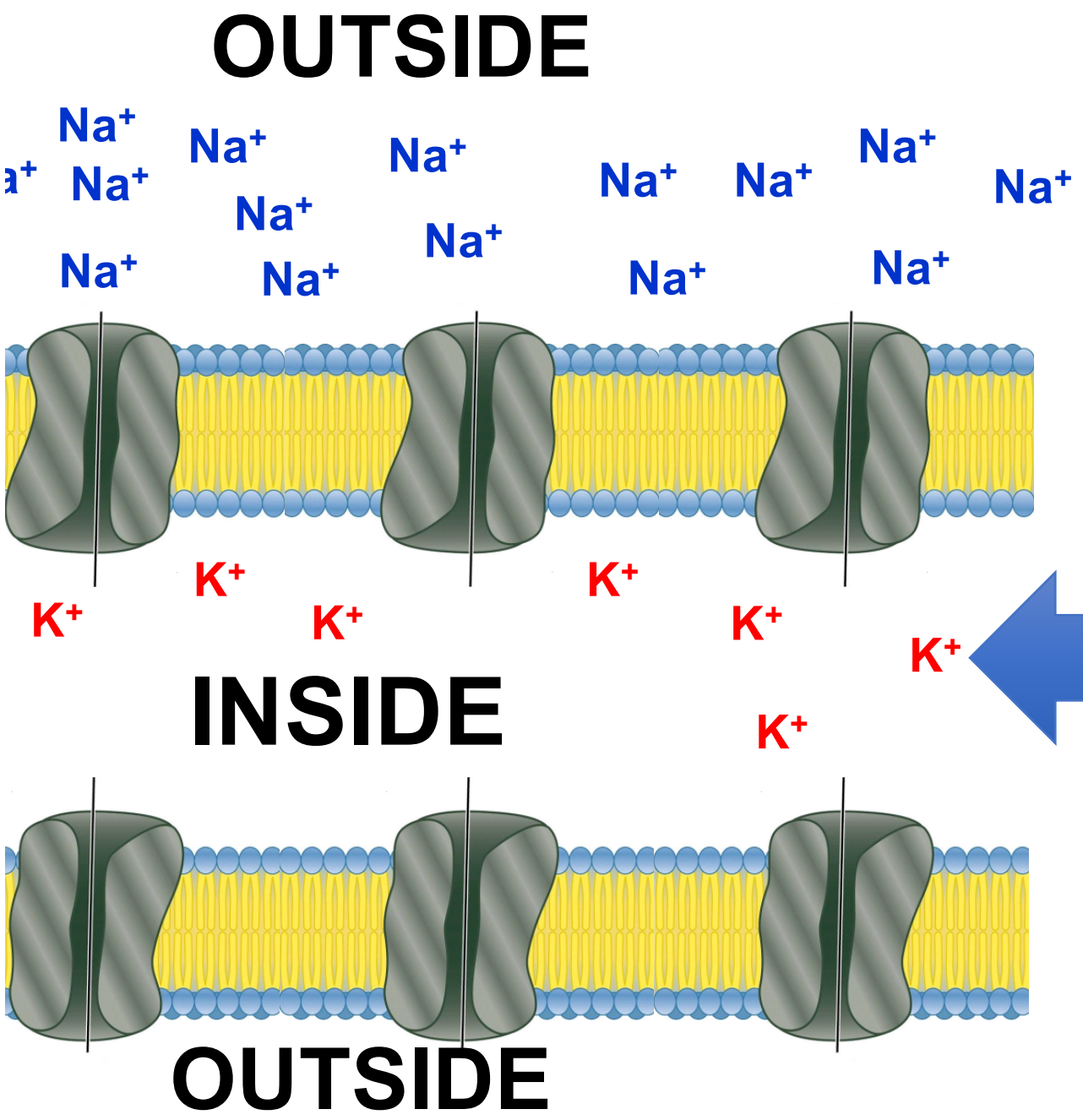
non-myelinated neuron
(Continuous Conduction)



myelinated neuron
(Saltatory Conduction)

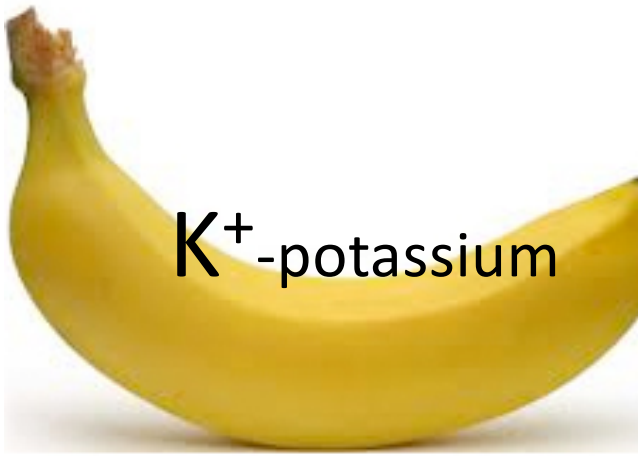


2. CON't explain how an action potential is formed by electrochemical gradients and how it is transmitted along a neuron.



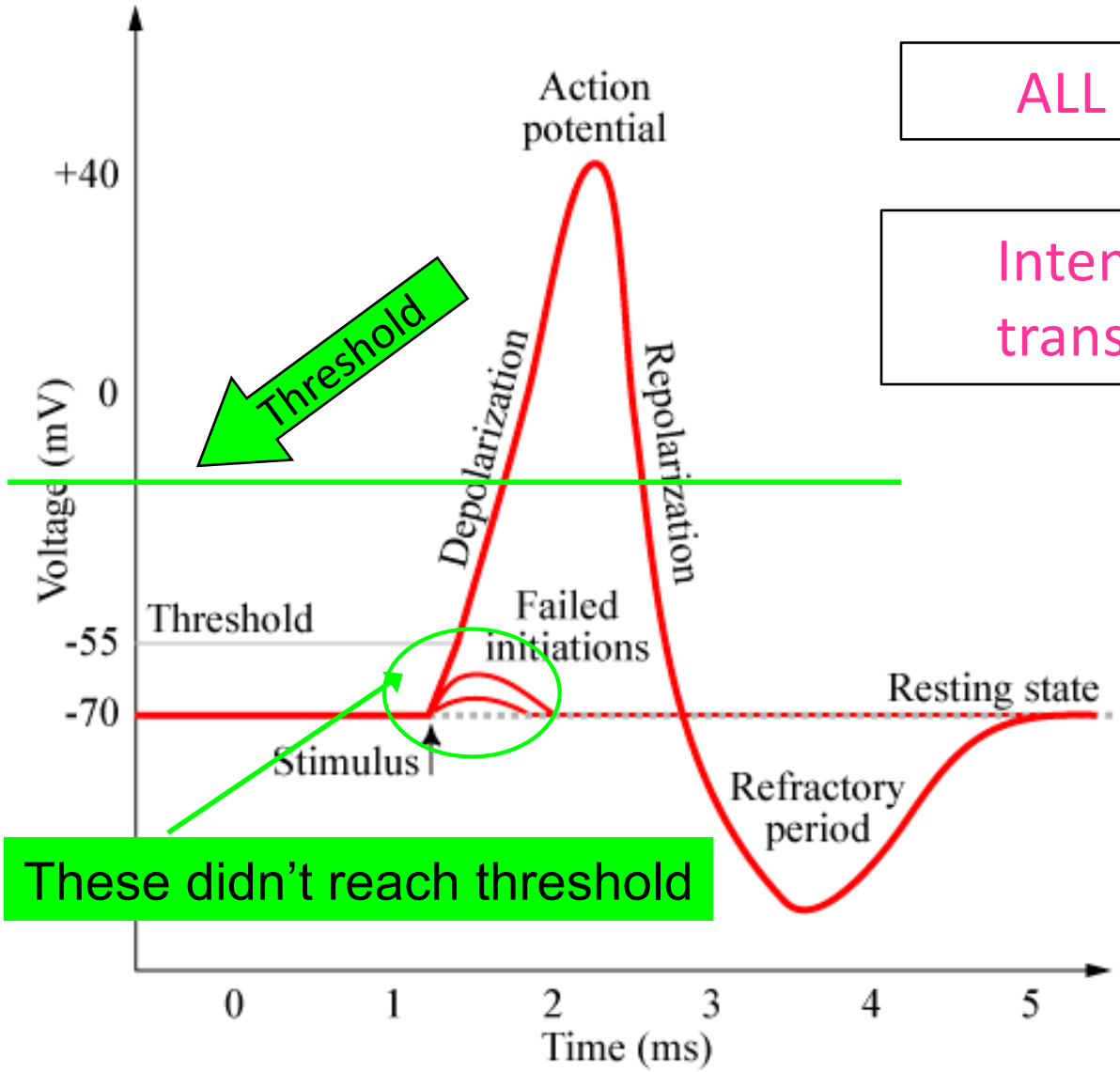
Na^+-sodium

SALTY BANANA



K^+-potassium

2. CON't explain how an action potential is formed by electrochemical gradients and how it is transmitted along a neuron.

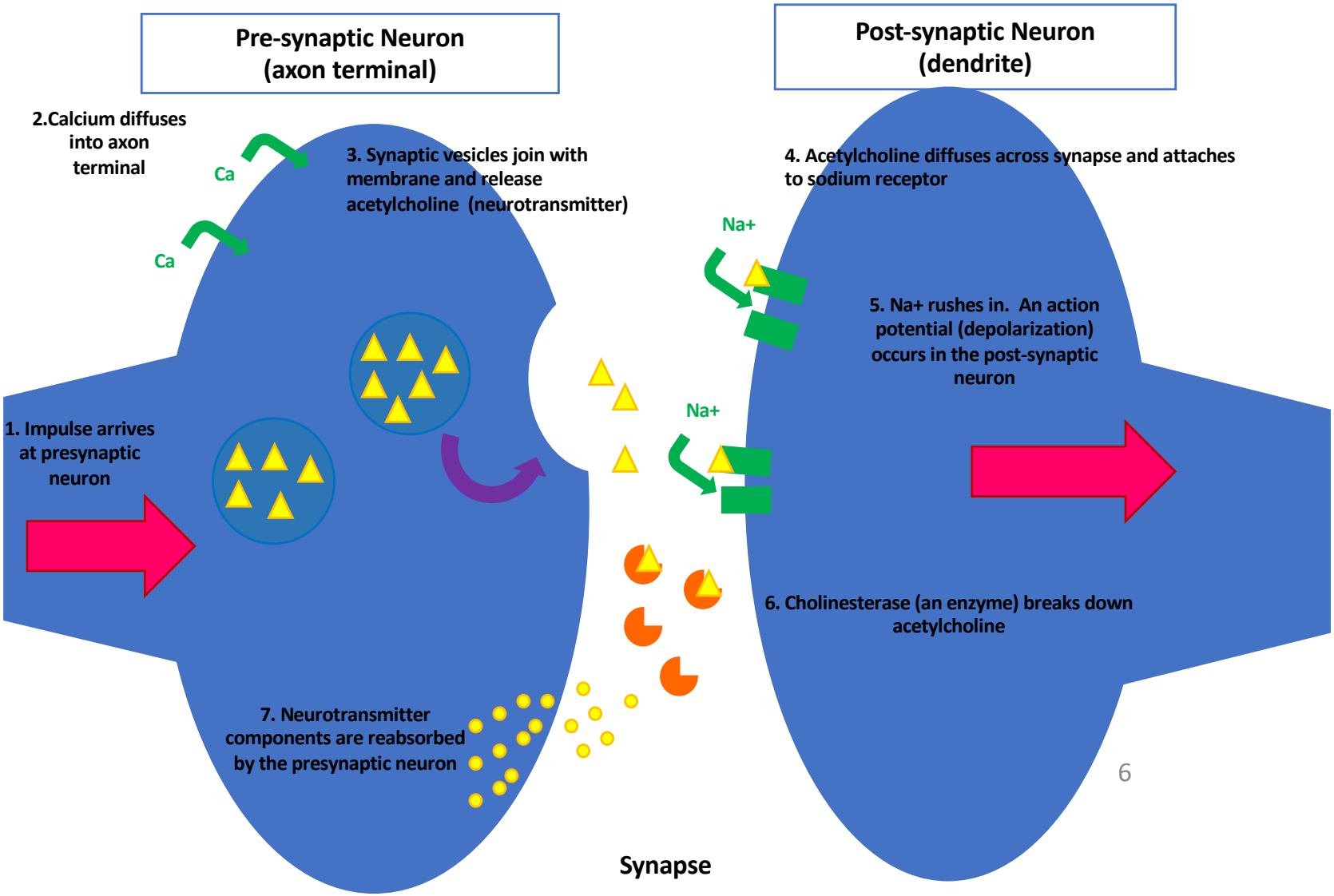


ALL or NONE response

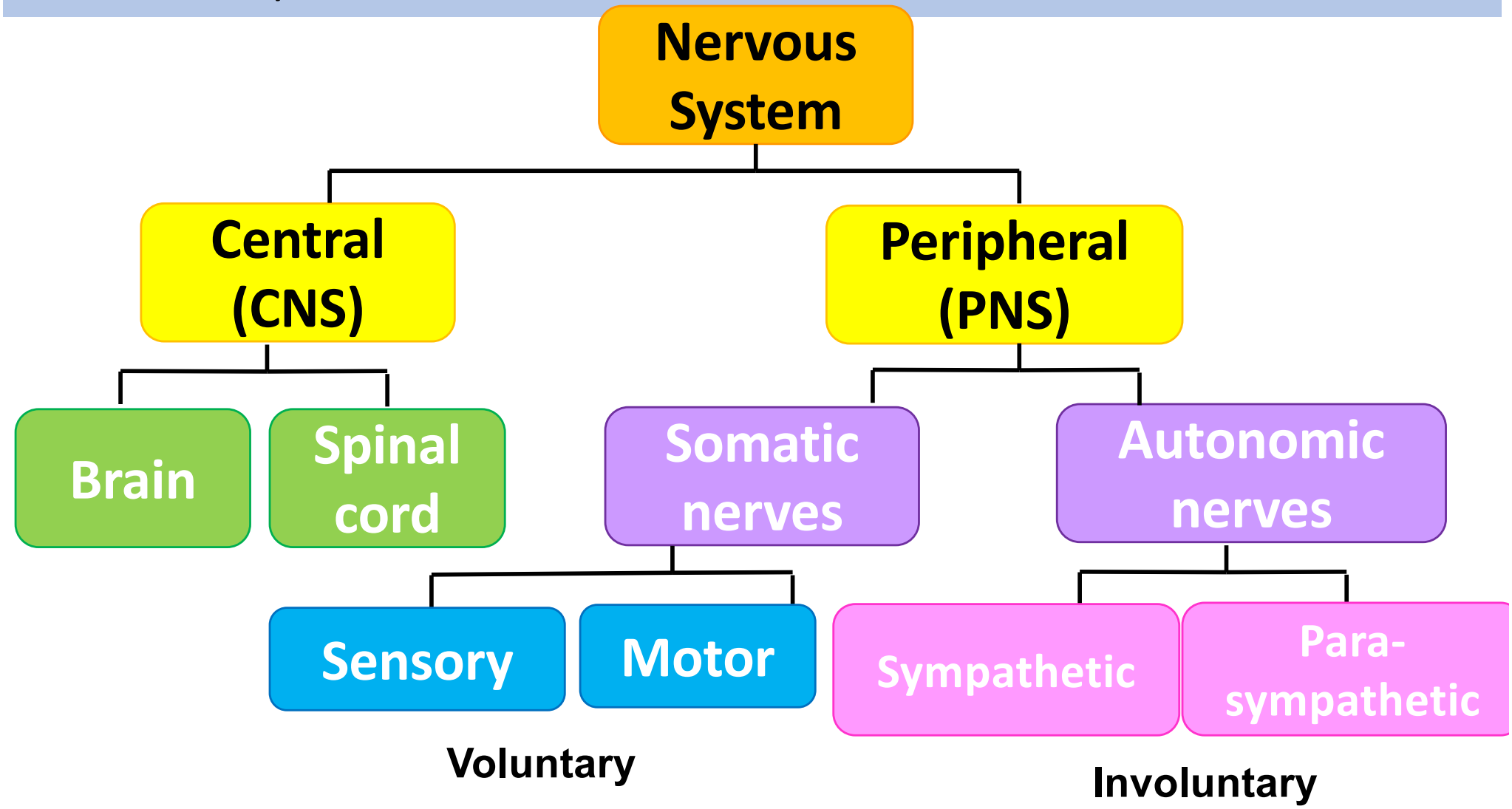
Intensity and speed of nerve transmission remain the same

These didn't reach threshold

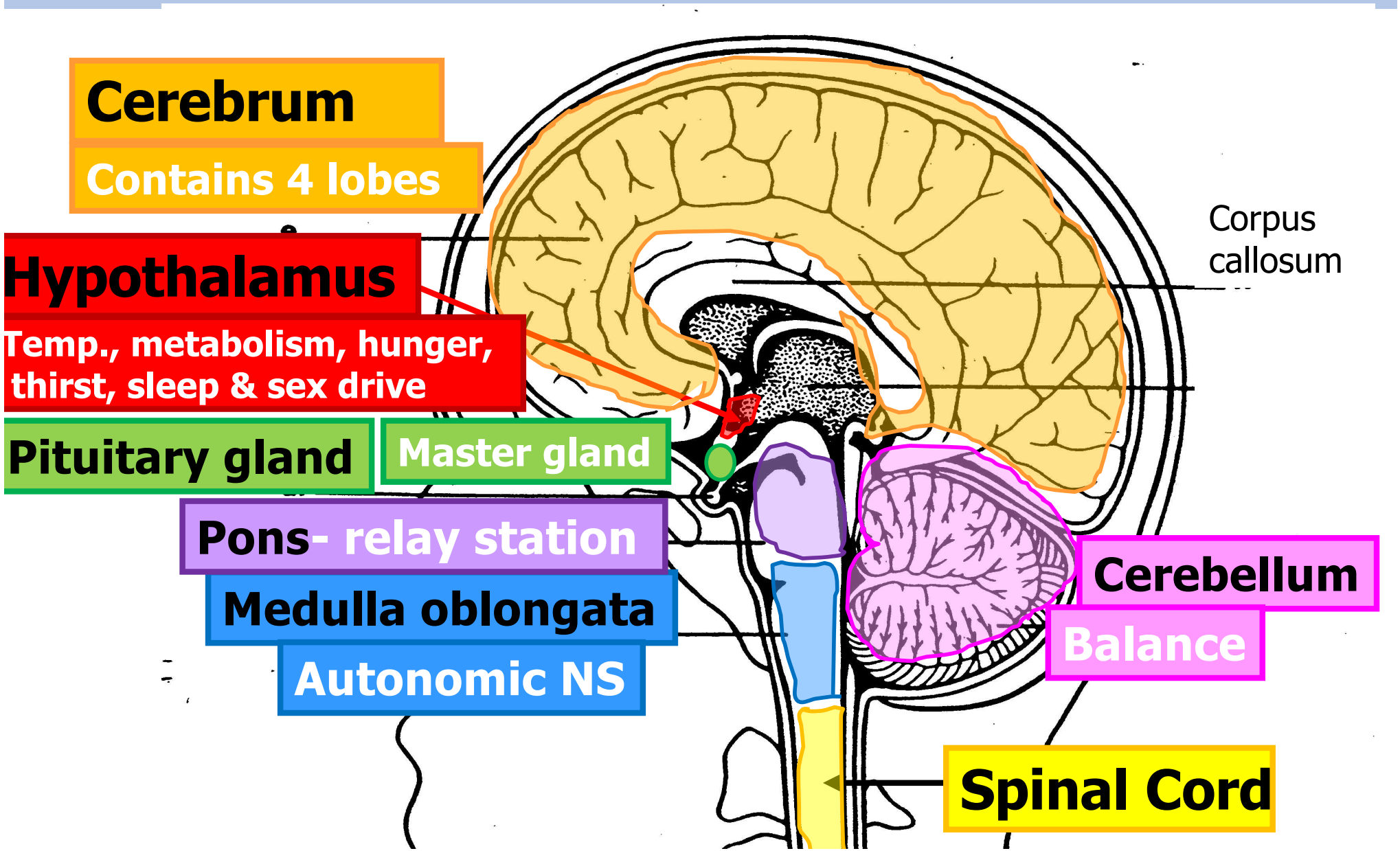
3. explain how a nerve impulse can cross a synapse using neurotransmitters such as norepinephrine, acetylcholine, and enzymes such as cholinesterase.



4. differentiate between the somatic and autonomic nervous systems.



5. describe the function of the 4 lobes of the cerebrum, the pons, the cerebellum, the medulla oblongata, the hypothalamus, and the spinal cord.



5. describe the function of the 4 lobes of the cerebrum, the pons, the cerebellum, the medulla oblongata, the hypothalamus, and the spinal cord.

Frontal Lobe

- **Motor control**
- **Controls voluntary movements**
- Link to **memory, reasoning, critical thinking, language use and personality**

Parietal Lobe

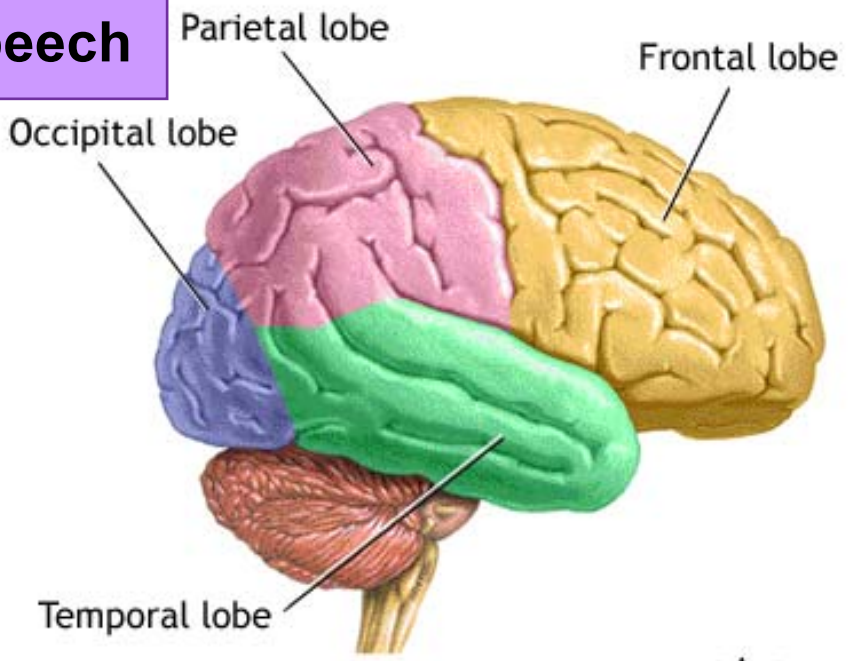
- **Sensory areas** associated with **touch, pressure, pain**, **temperature** and **taste**
- Also linked to **emotions** and interpreting **speech**

Occipital Lobe

- Sensory areas associated with **vision**

Temporal Lobe

- Sensory areas associated with **hearing** and **smelling**

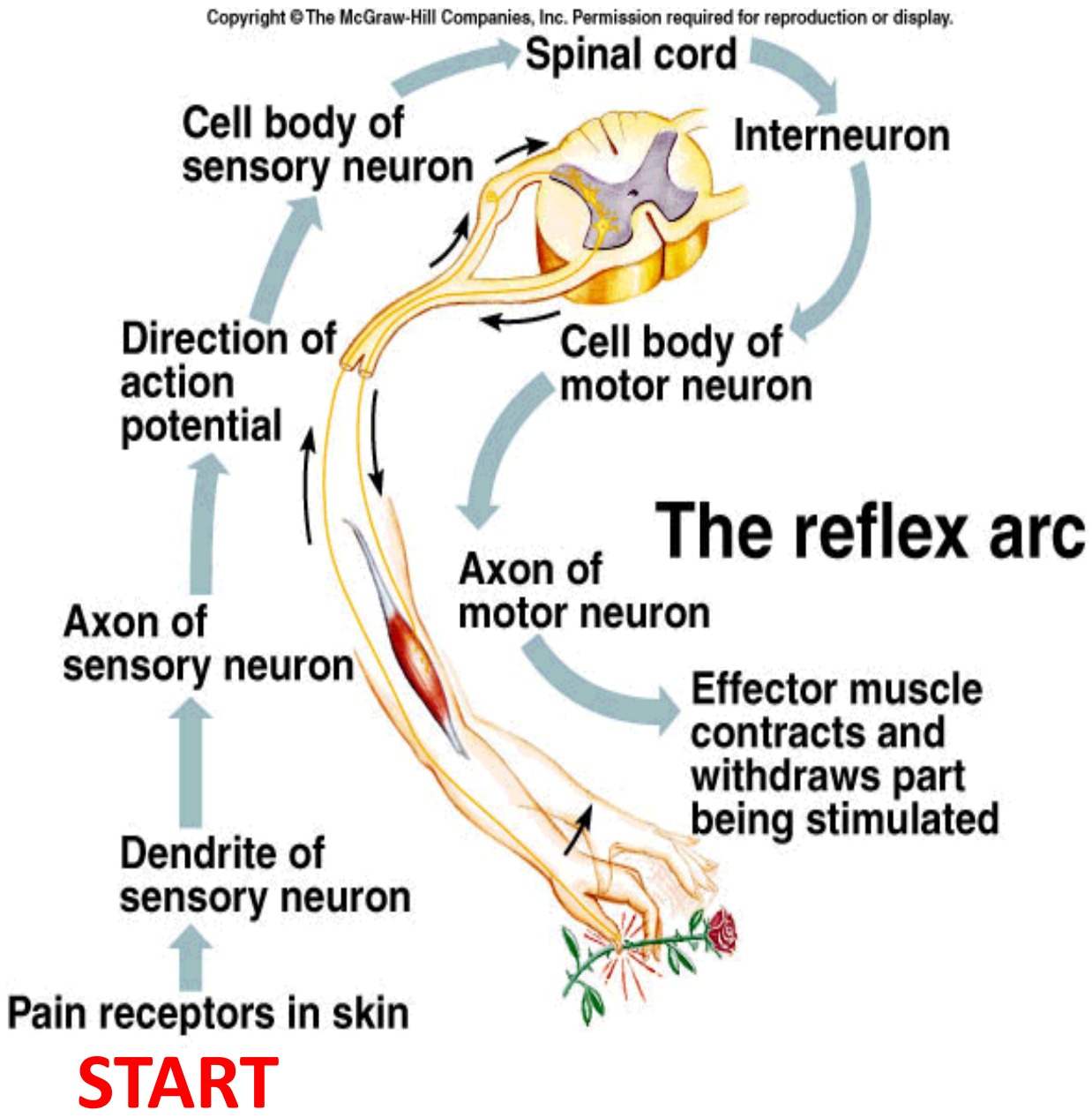


6. list several functions of both the parasympathetic and sympathetic nervous systems.

Parasympathetic	Sympathetic
Heart rate	Heart rate
Peristalsis	Peristalsis
↑Glucose to glycogen	↑Glycogen to glucose
pupils	pupils
Contracts bladder	inhibits bladder contraction
Blood flow to skin	Blood flow to skin
Blood flow to muscles	Blood flow to muscles

These 2 systems balance each other out!

7. explain how a reflex works, including the sensory receptor, sensory neuron, interneuron, motor neuron, and effector.



8. describe the structure and function of the human eye, including the cornea, lens, sclera, choroids, retina, rods, and cones, fovea centralis, pupil, iris, and optic nerve.

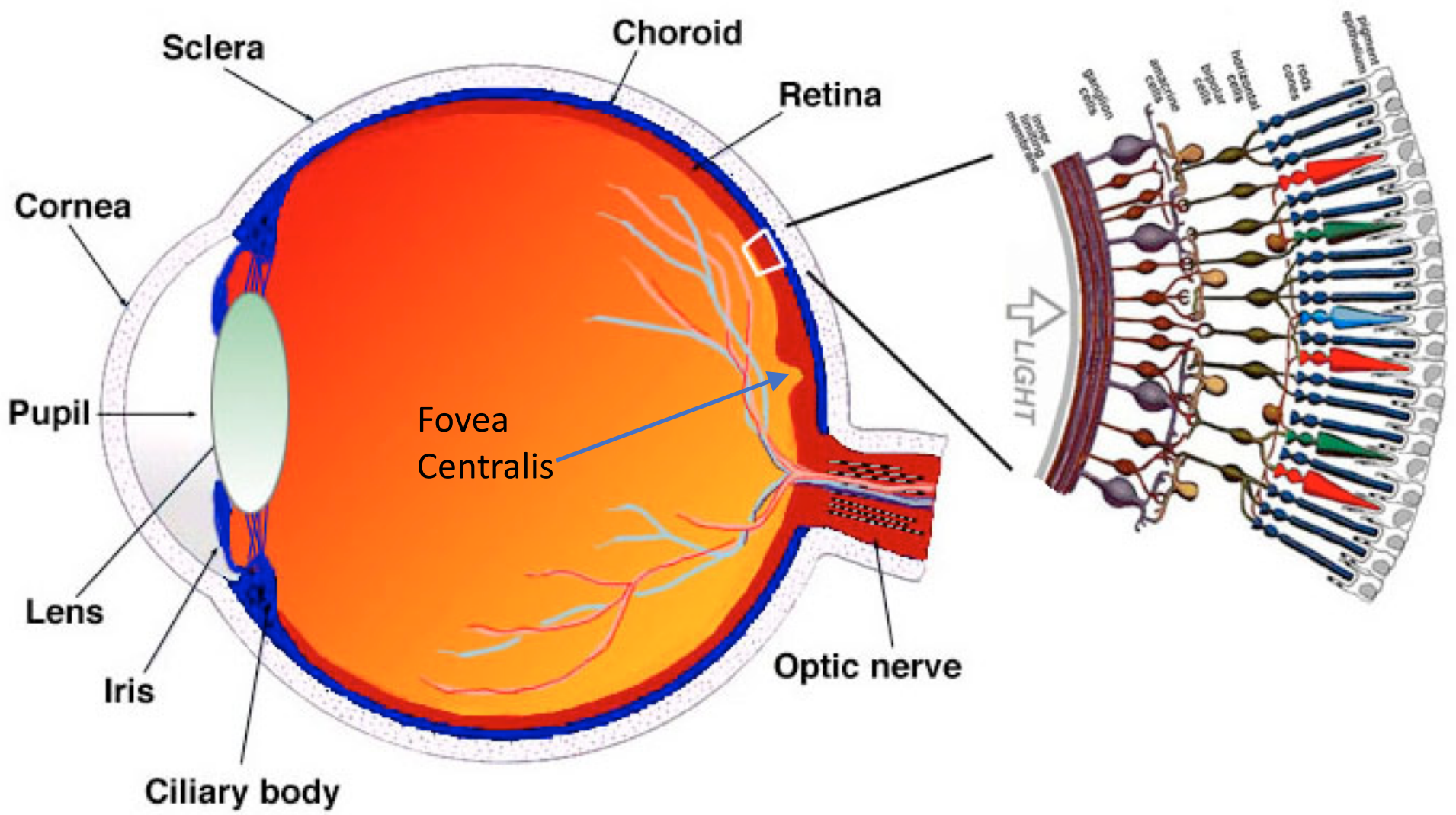
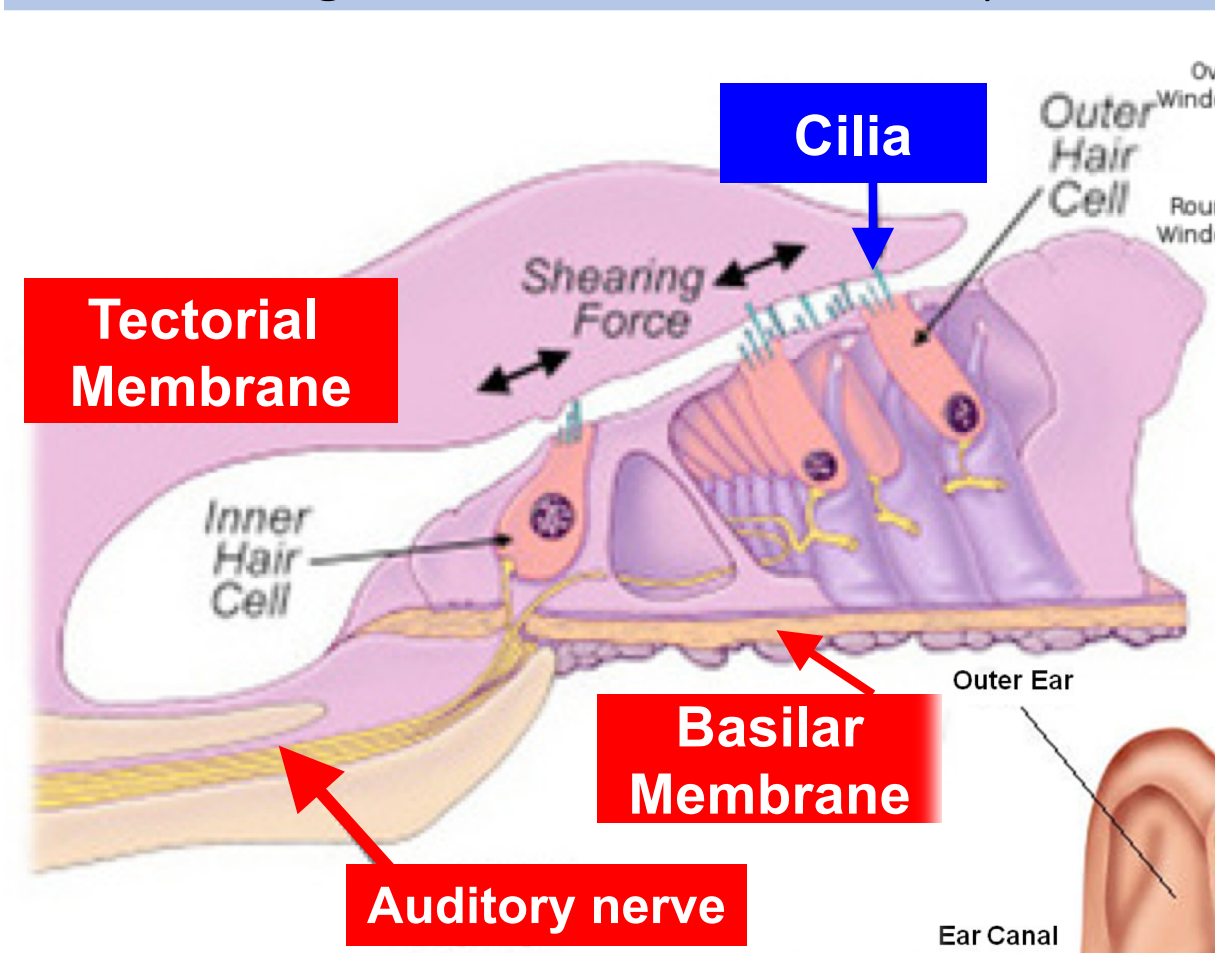
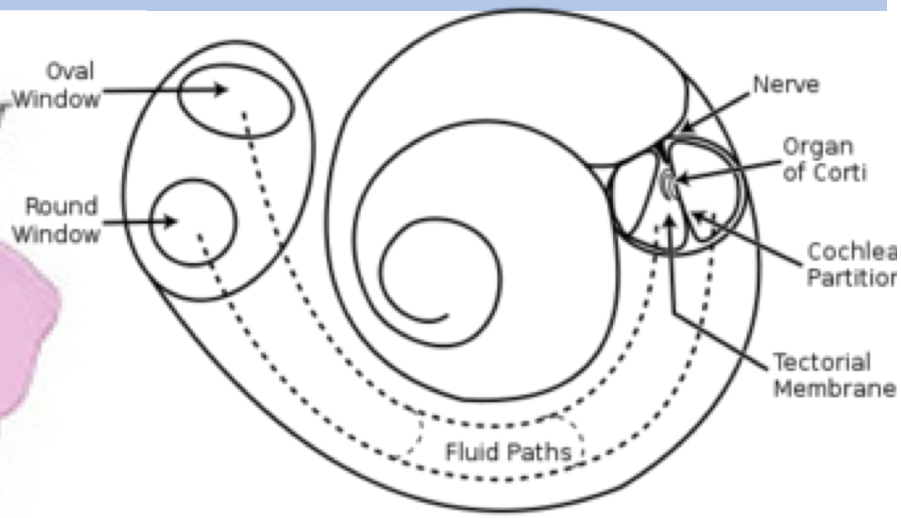
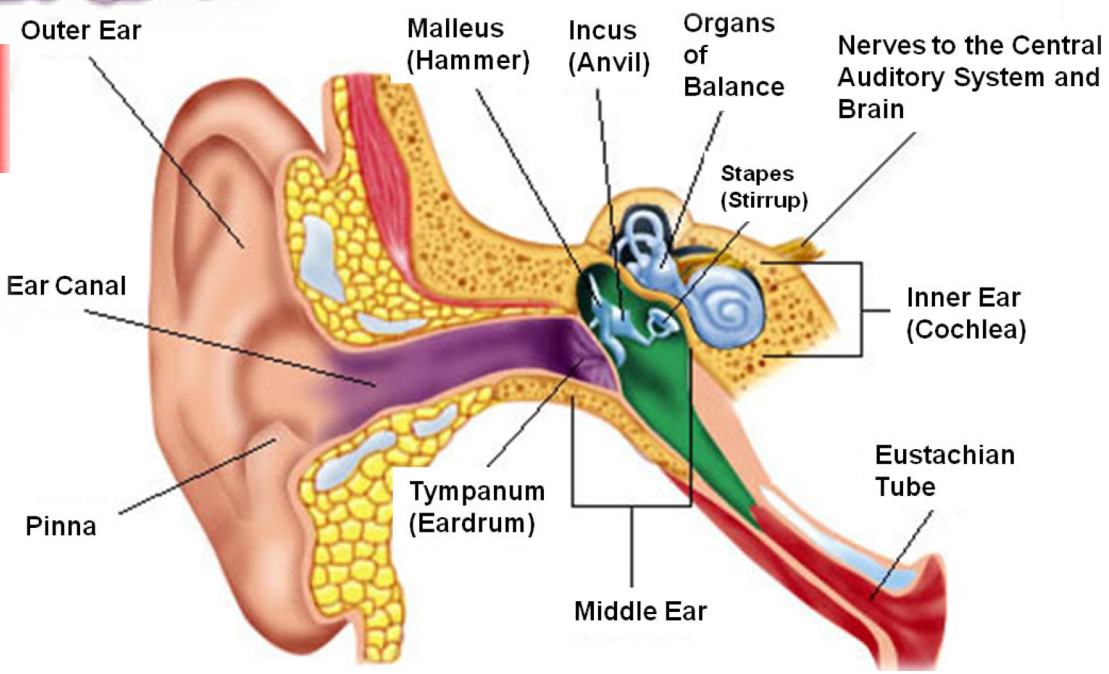


Fig. 1.1. A drawing of a section through the human eye with a schematic enlargement of the retina

9. describe the structure and function of the auditory parts of the ear including the pinna, auditory canal, tympanic membrane, ossicles, cochlea, organ of Corti, and auditory nerve.



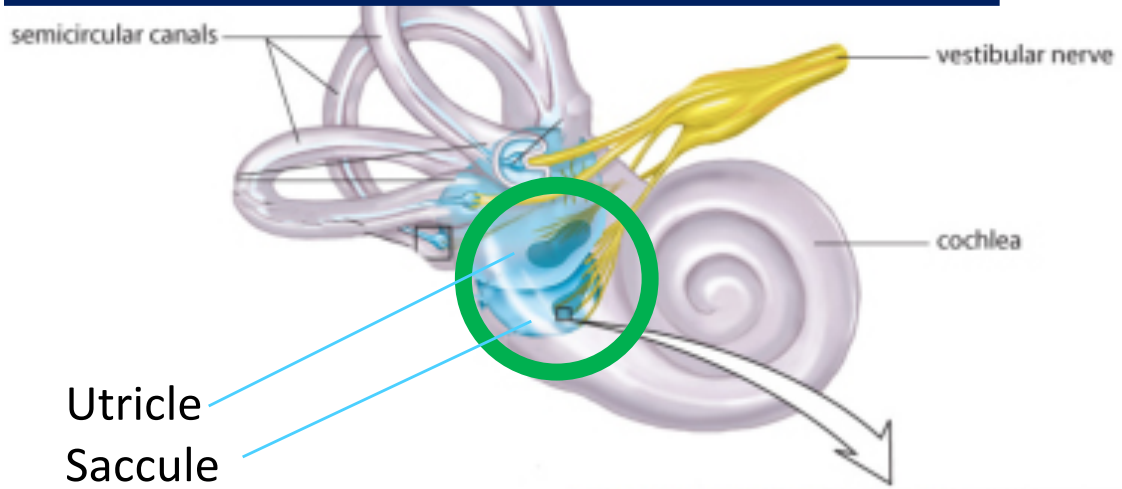




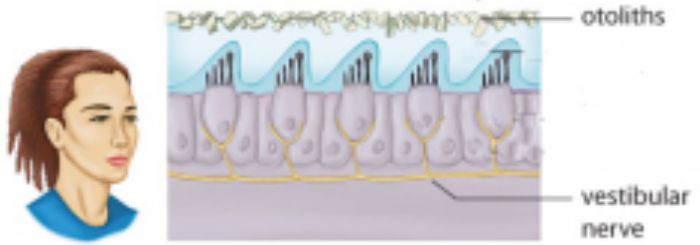
Basilar Membrane Movement Video

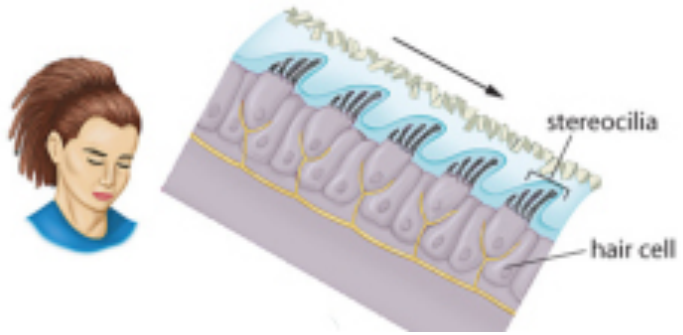
10. describe the structure and function of the balance related parts of the ear including the semicircular canals, utricle, saccule

Static or gravitational equilibrium

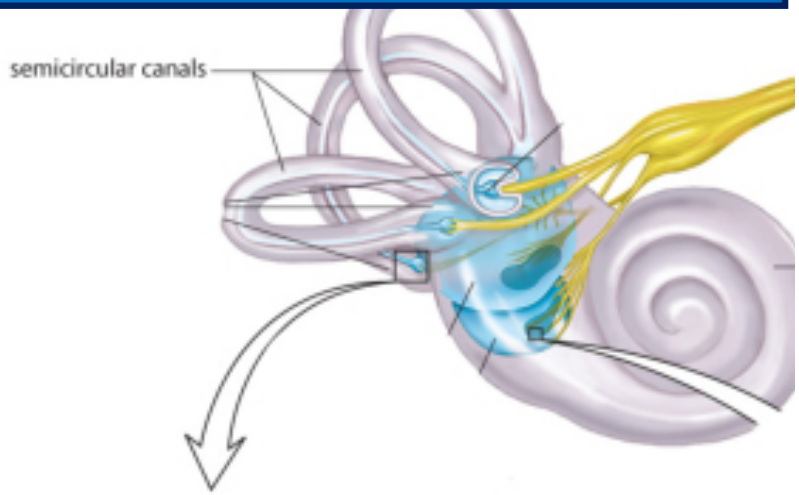


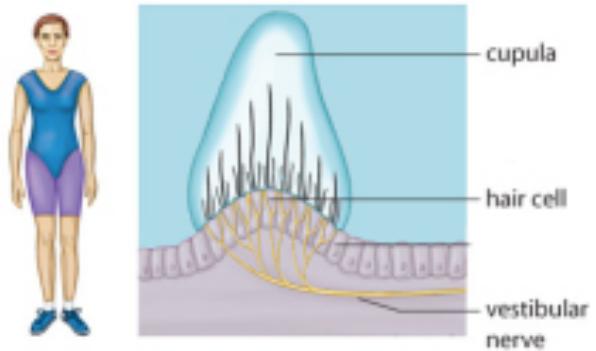
Utricle
Saccule
=
Vestibule

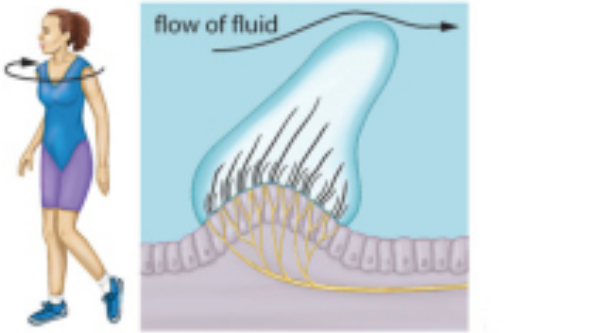




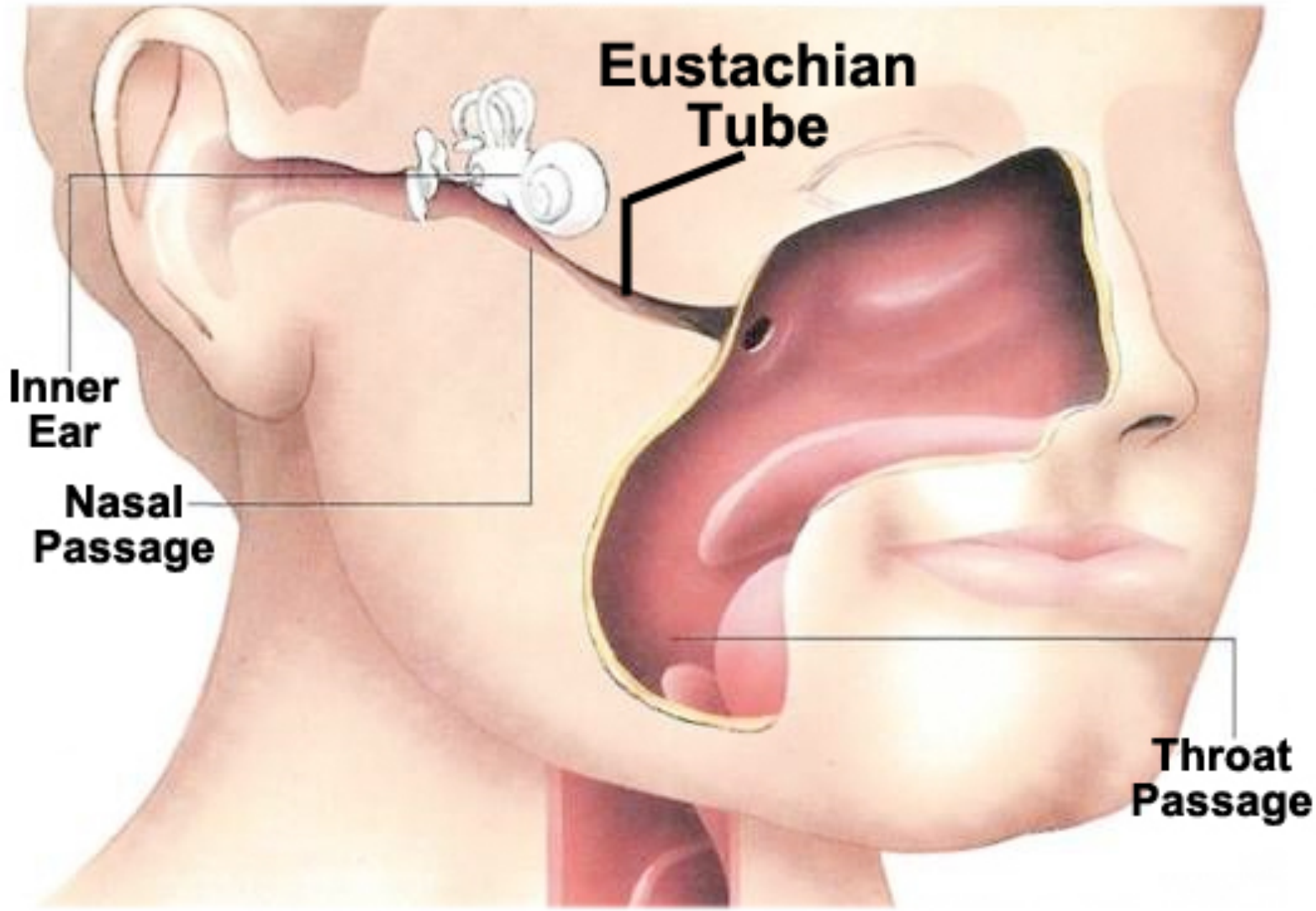
Dynamic or Rotational Equilibrium



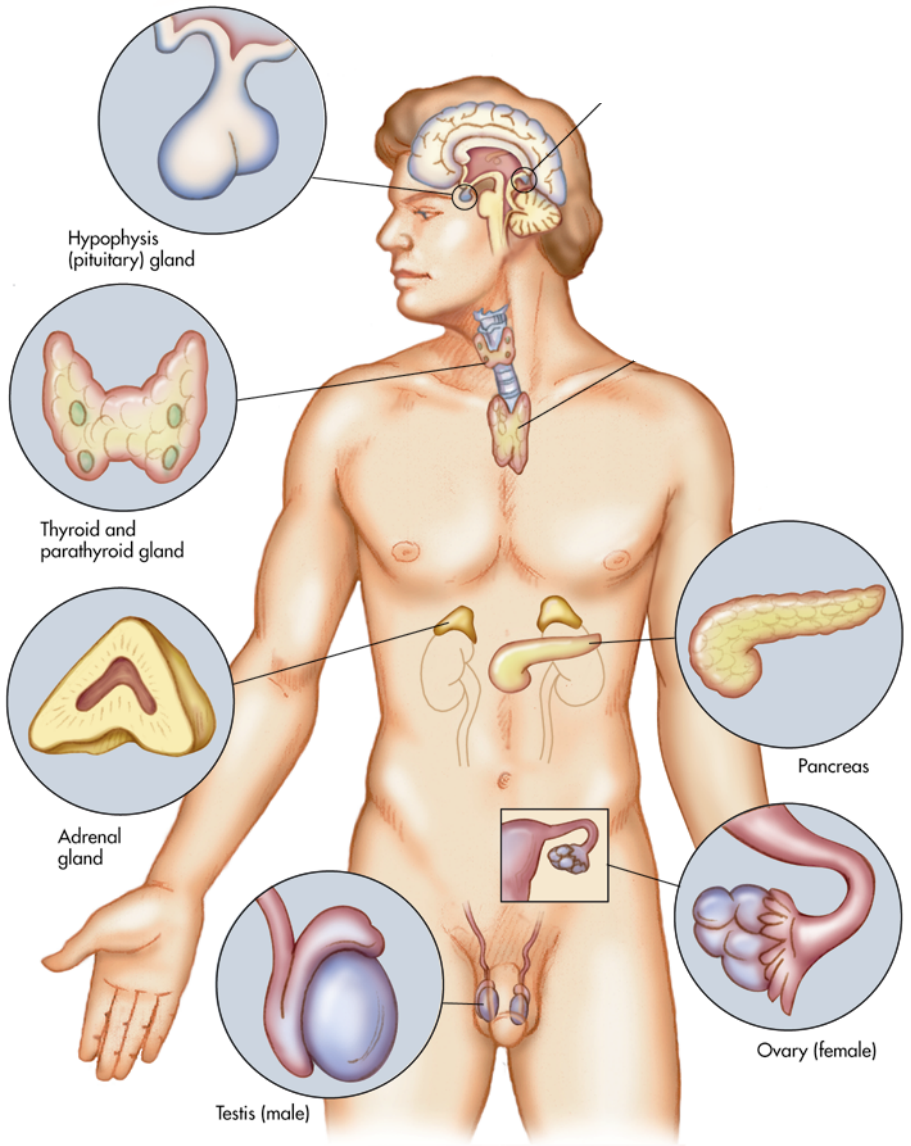




11. describe the function of the Eustachian tube



13. identify the location of the principal human endocrine glands including the hypothalamus/pituitary complex, thyroid, parathyroid, adrenal glands, and islet cells of the pancreas.



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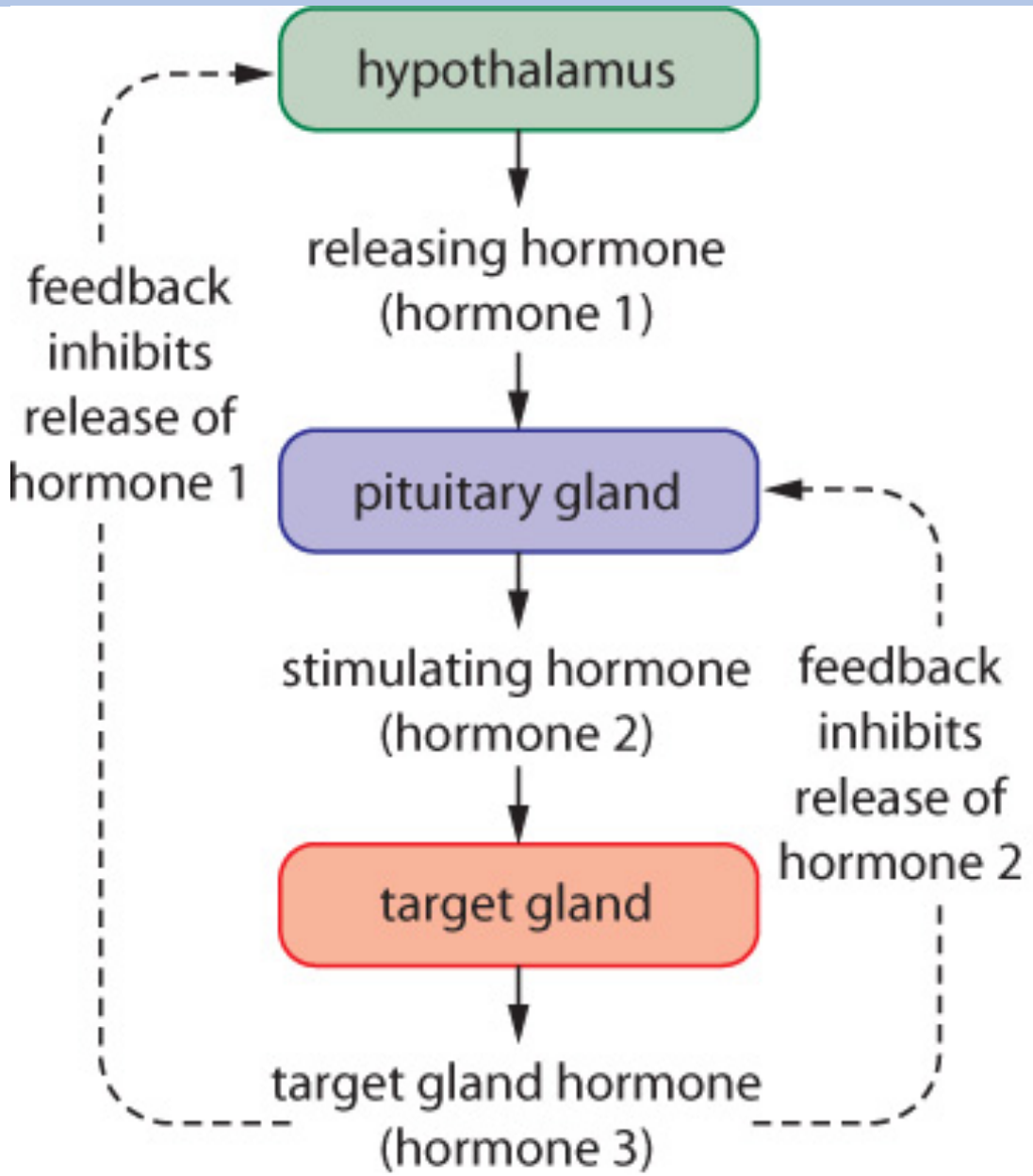
Calcitonin & Parathyroid Hormone (PTH)	Calcitonin(from thyroid) – remove Ca+ from blood & into bone Parathyroid – the reverse…
Adrenocorticotropic Hormone (ACTH) & Cortisol	ACTH – stimulates long term stress hormones Cortisol –long term stress hormone - conv. Amino acids to glucose
Glucagon & Insulin	Insulin – lowers blood glucose Glucagon –raises blood glucose
Human Growth Hormone (hGH)	Hgh- Almost all body cells to grow
Antidiuretic Hormone (ADH)	Water retention
Epinephrine / Adrenaline	Short term stress hormones from adrenal medulla glands
Aldosterone	Sodium retention and water
Follicle Stimulating Hormone (FSH)	Stimulates ovary to mature a follicle
Leutinizing Hormone (LH)	Stiulates release of egg from ovary & And progesterone and estrogen. prod.
Prolactin & Oxytocin	Prolactin- maintains milk production Oxytocin-contractions and initiates milk prod.

14. describe how each of the hormones above could be or are controlled through negative feedback



15. describe the role that thyroxine plays in metabolism.

Thyroxin **increases** **metabolism**
(how fast we **burn calories)**
-stimulated by TSH from thyroid

16. describe the role that glucagon and cortisol play in blood sugar regulation.

Glucagon _____ blood glucose

Cortisol _____blood glucose

17. describe the role hGH has in growth.

Increases growth of most cells and as a result metabolism is increased, and as a result blood glucose goes down so as a result it needs to be raised, so as a result more glucagon will be used

18. describe the role ADH has in water regulation and the role aldosterone has in sodium ion and water regulation.

ADH _____ water retention in kidney –response to dehydration

Aldosterone _____ **retention of Na+** in kidney and as a result water is also retained

19. explain how both ADH and Aldosterone can alter the body's blood pressure.

BOTH _____ BLOOD PRESSURE
by retaining water

20. explain the relationship between the nervous system and the endocrine system and how they can sometimes act together (ie. the hypothalamus/pituitary complex; the adrenal gland is stimulated by both the endocrine system and sympathetic nervous system)

a. Hypothalamus is **part of nervous system**

b. Hypothalamus controls: **posterior** pituitary through neurons
anterior through releasing hormones(RH)

c. (eg) if you get frightened the **nervous system** triggers the adrenal medulla**(endocrine)** to release adrenaline

21. describe the physiological consequences of hormone imbalances including:

Diabetes mellitus – **TYPE 1** (no insulin prod) and **TYPE2** (insulin production but not able to be used well)

Diabetes insipidus – too little ADH = not holding water so urinate too often

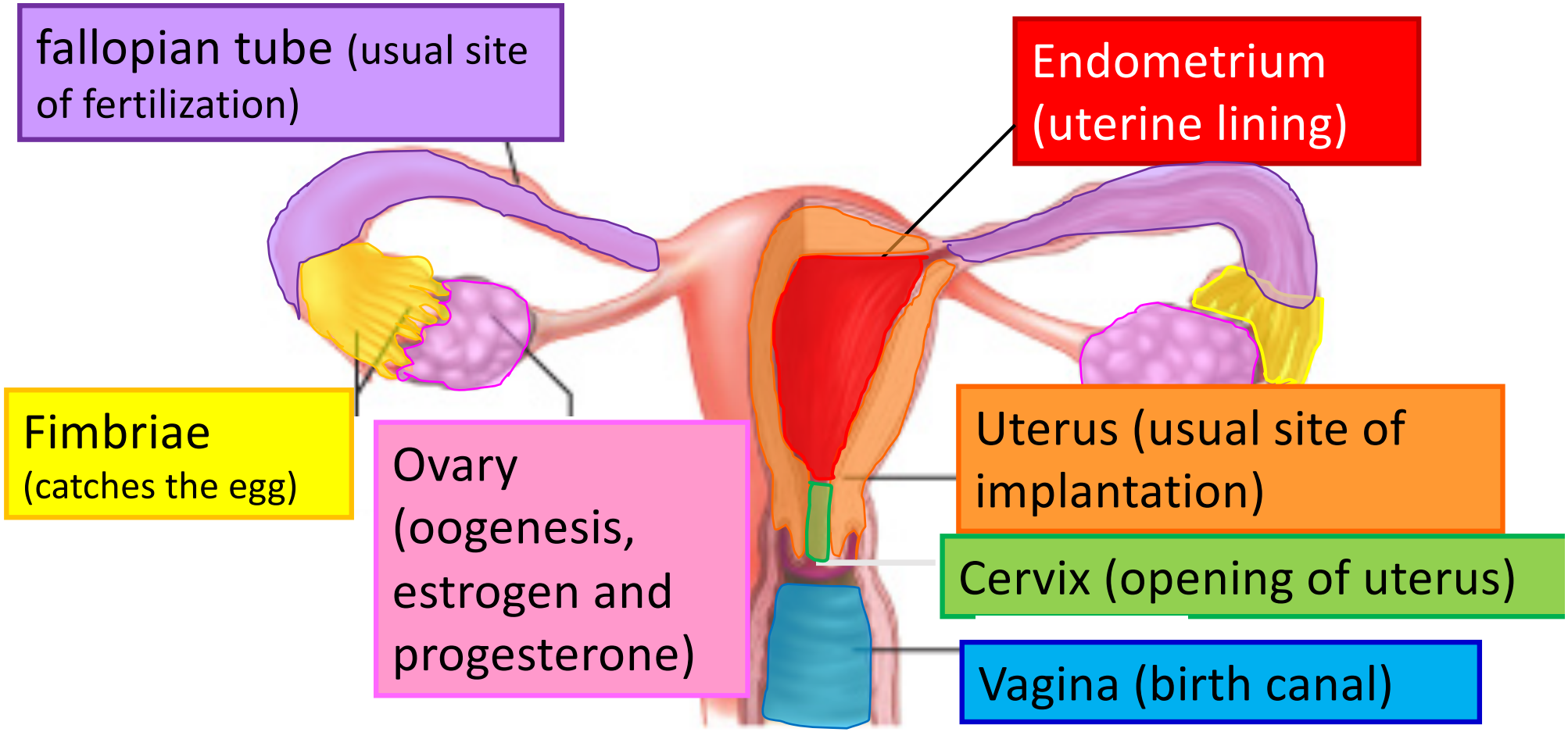
Gigantism / Acromegaly – too much hGH (Acromegaly too much when adult)
Dwarfism – too little hGH

Goitre and NEGATIVE FEEDBACK LOOP- not enough IODINE creates lack or no thyroxine being produced which makes pituitary release more and more TSH and overstimulate thyroid…it still cant do its job – overstimulation causes goiter to form

22. identify the structures in the human female reproductive system and describe their function:

Ovaries_____Fallopian Tubes___Uterus

Endometrium____Cervix_____Vagina



23. identify the structure in the male reproductive system and describe their functions:

Testes – contain seminiferous tubules
Seminiferous tubules – produce sperm
Interstitial Cells – in between seminiferous tubules produce testosterone
Sertoli Cells – help sperm grow in seminiferous tubules
Epididymides – store and mature sperm
Ductus/vas deferens - tube from testes – out

STUDENT **P**RICE **C**ARD
Seminal Vesicles- fructose and prostaglandins
Prostate Gland -alkaline buffer to protect from acid enviro of vagina
Cowper's Glands –mucus and alkaline buffer to protect from acid urine and increase motility (motion)
Ejaculatory Duct – path sperm takes through glands
Urethra – path of semen and urine
Penis – provides path for semen and urine

24. differentiate between sperm and eggs in terms of their supporting structures such as

seminiferous tubules – sperm prod. – tiny tubes in testes

interstitial cells, - testosterone…influences sertoli

sertoli cells, - nourish growing sperm

follicle, - matures egg and influenced by FSH

corpus luteum.- produces P and E to keep endometrium

25. describe how the Y chromosome causes testosterone to be produced leading to male organ formation, whereas it's absence results in female organ development.

SRY gene on Y chromosome determines sex of individual by increasing testosterone production

26. explain how STI's like Chlamydia, gonorrhea, human papilloma virus, etc. can interfere with fertility and reproduction.

27. describe the role of GnRH, FSH, eH, estrogen, progesterone and testosterone in the regulation of primary and secondary sex characteristics in females and in males.

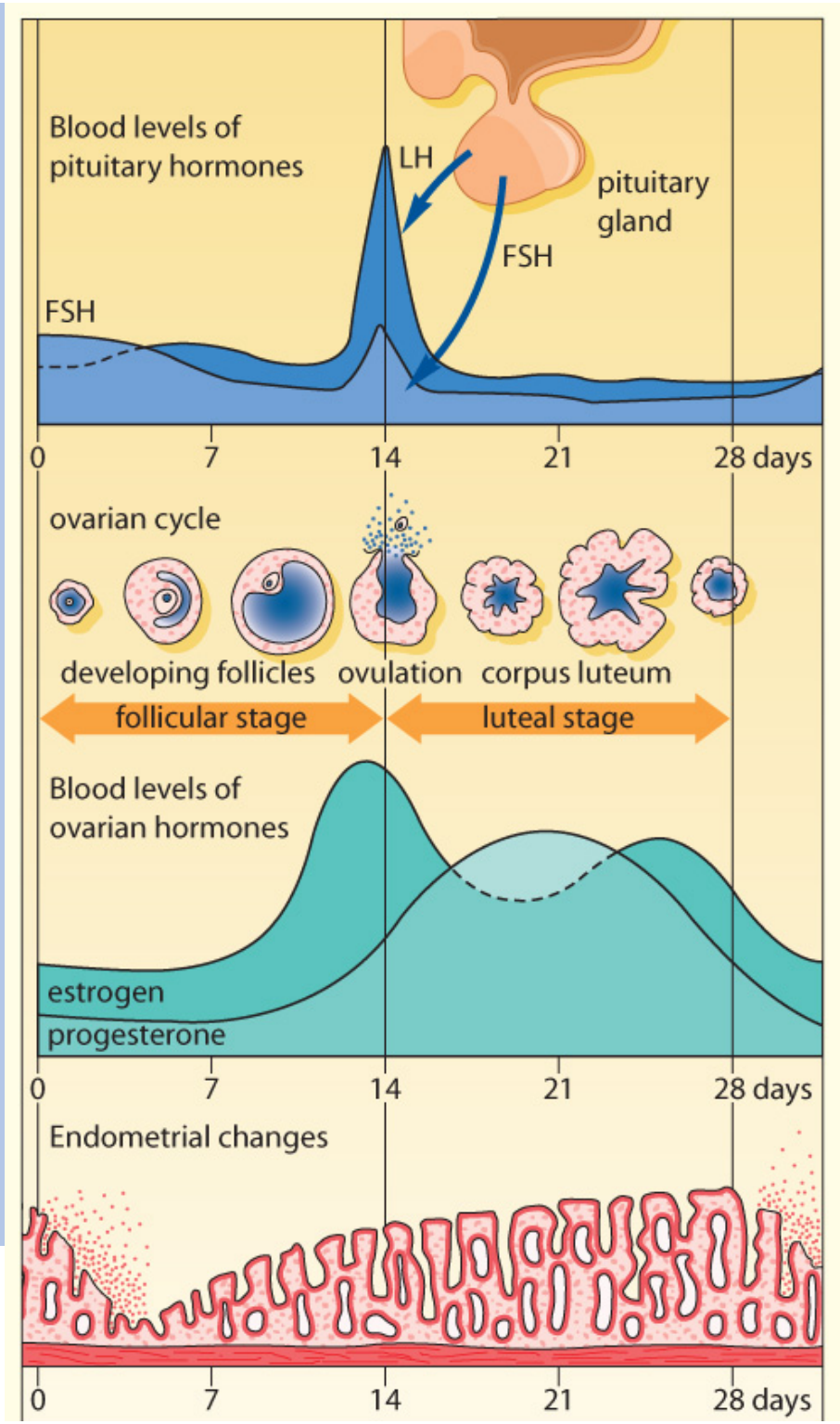
- **Testosterone**- stimulates: **spermatogenesis**
- **Primary characteristics (reproductive organ development)**
- **Secondary characteristics (deepening of voice, facial and pubic hair, muscle growth)**

Follicle-stimulating hormone (FSH) stimulates production of sperm cells in seminiferous tubules
Luteinizing Hormone (LH) stimulates production of testosterone in interstitial cells

WOMEN

- At puberty, the hypothalamus releases gonadotropin releasing hormone (GnRH)
- **GnRH** activates the **anterior pituitary** to release **FSH** and **LH**
- FSH secretions are carried by the blood to the **ovary** where follicle development is stimulated.
- After egg is released the follicle turns into corpus luteum which then releases prohgesterone and estrogen

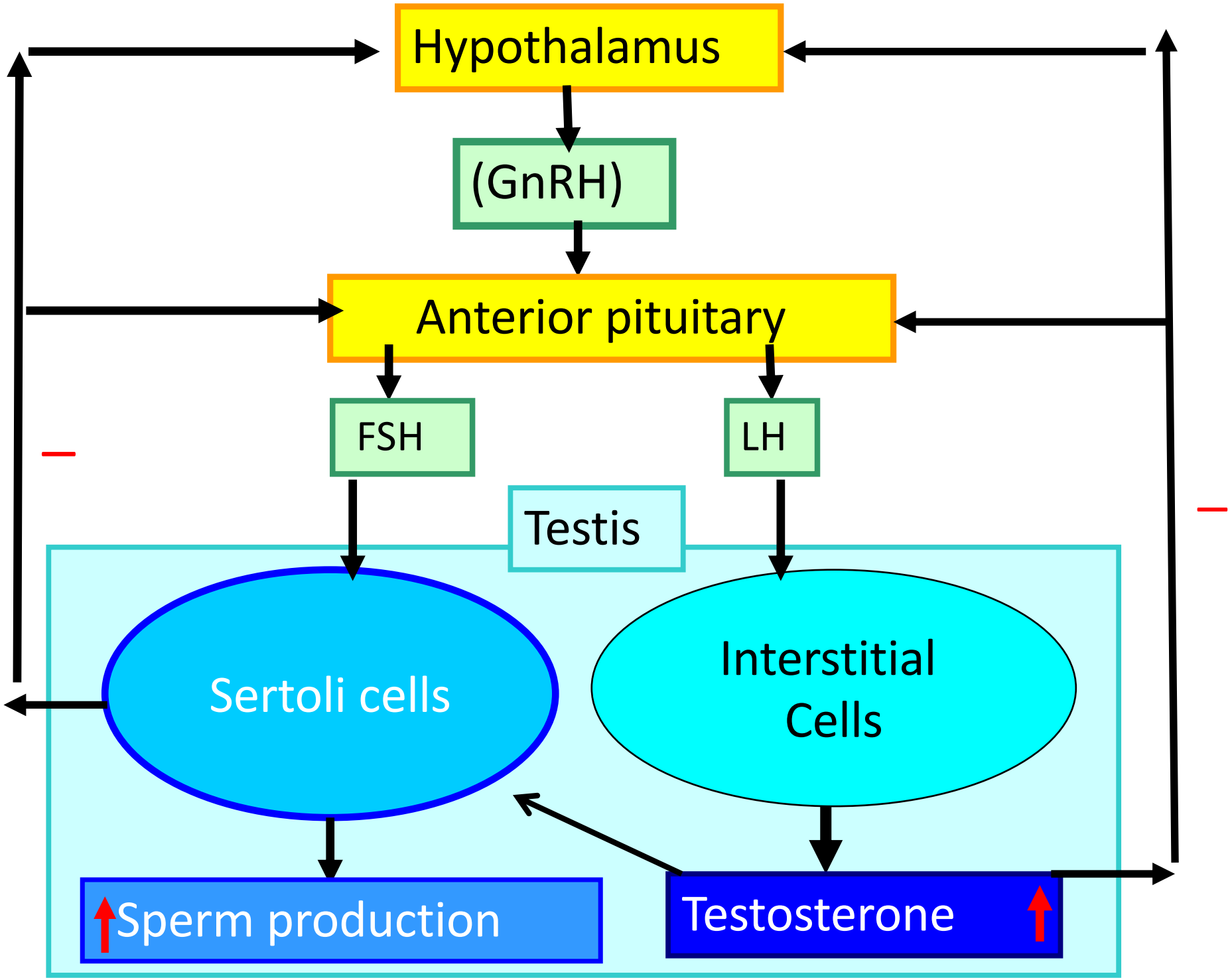
28-29. identify the principal reproductive hormones involved in the female menstrual cycle and explain how FSH, LH, estrogen, and progesterone work together to maintain the menstrual cycle.



30. Identify and describe the function of the following in males…
    -testosterone,
    -LH, and
    -FSH in human males.

Follicle-stimulating hormone (FSH) stimulates production of sperm cells in seminiferous tubules

Luteinizing Hormone (LH) stimulates production of testosterone in interstitial cells which then in turn also affects Sertoli cells


Hypothalamus
(GnRH)
Anterior pituitary
FSH
LH
Testis
Sertoli cells
Interstitial Cells
Sperm production
Testosterone

31. trace the process from conception to birth including:

Fertilization, zygote, gastrulation, blastulation & neurulation

Implantation

Extra-embryonic membrane formation

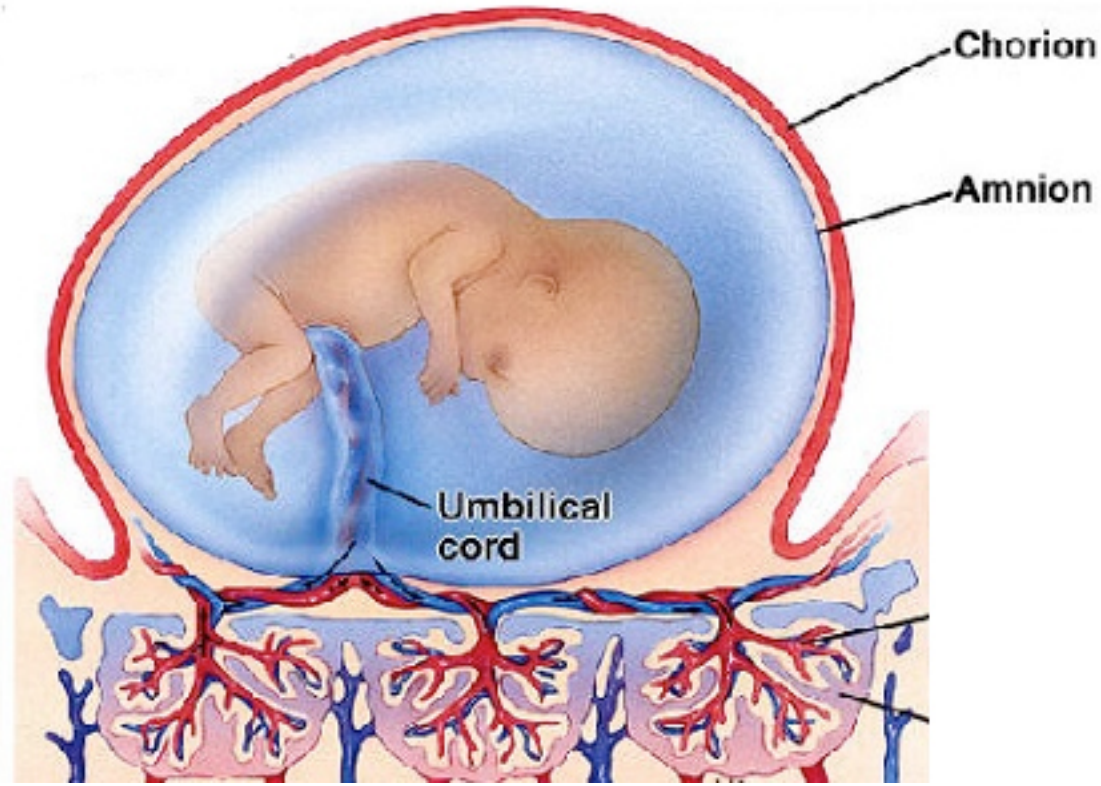
Placenta

Amnion

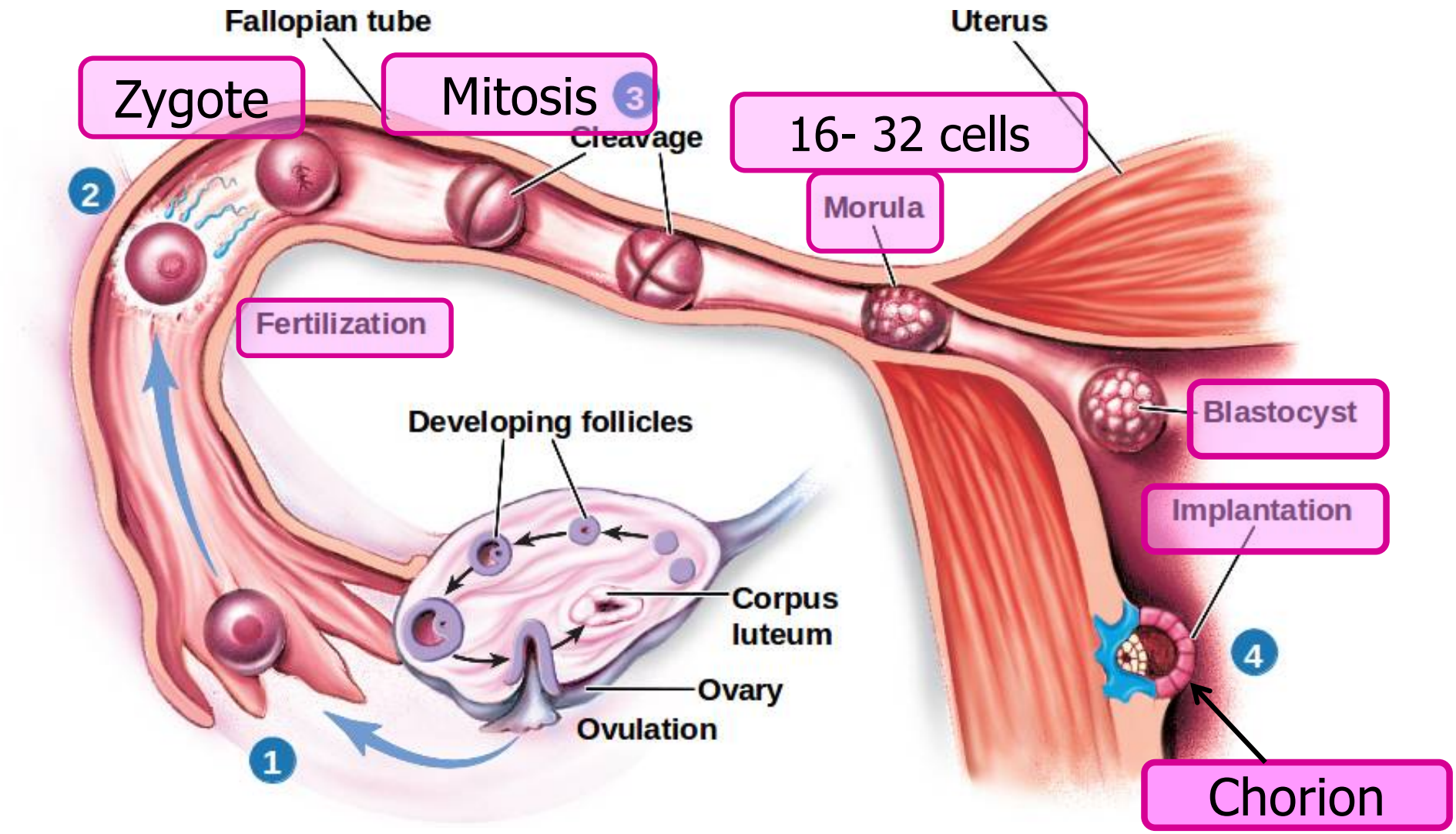
Chorion

Allantois

Parturition

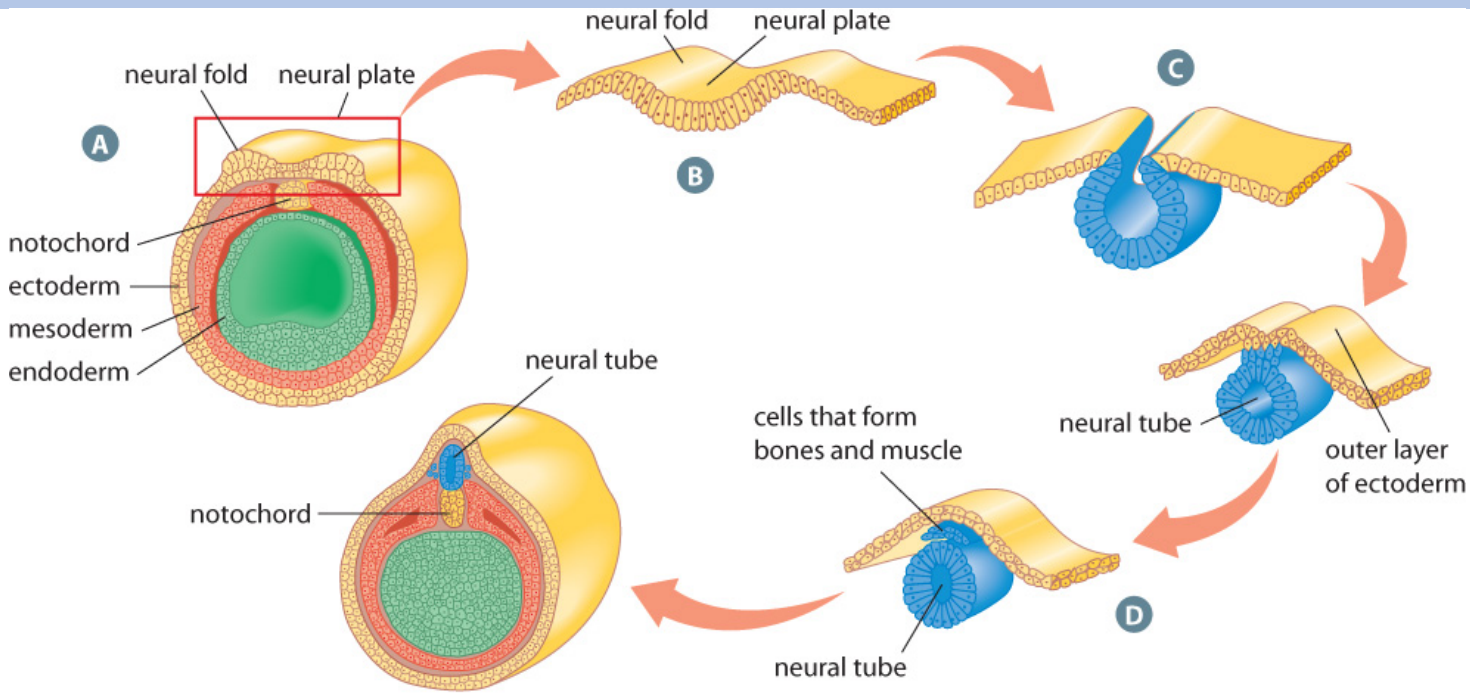


From Ovulation to Implantation

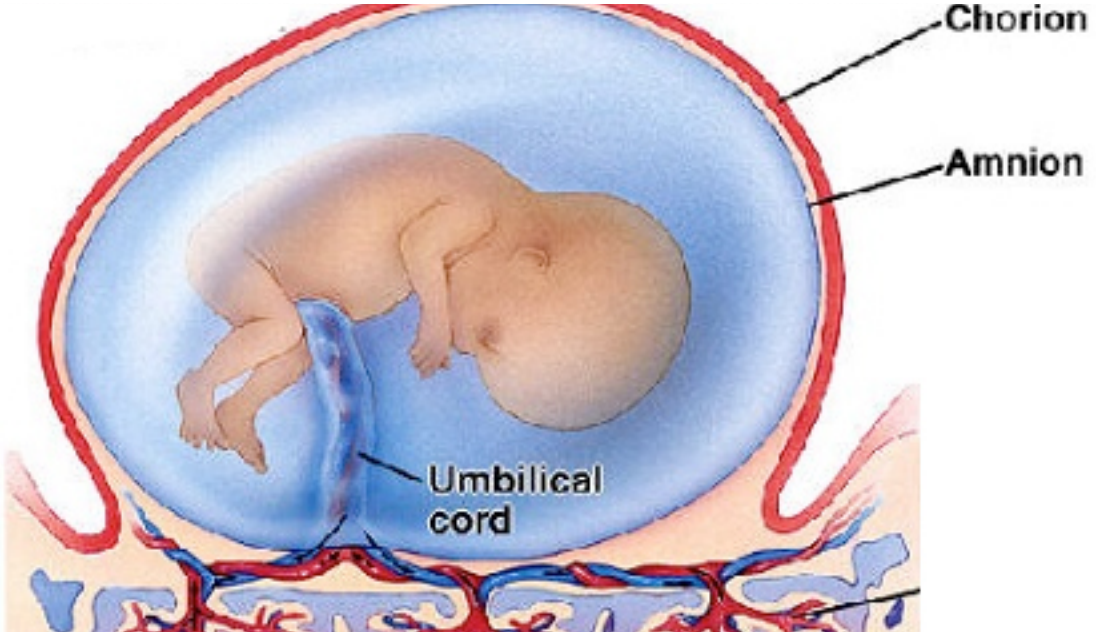


31. trace the process from conception to birth including:

Neurulation



Amnion
Chorion



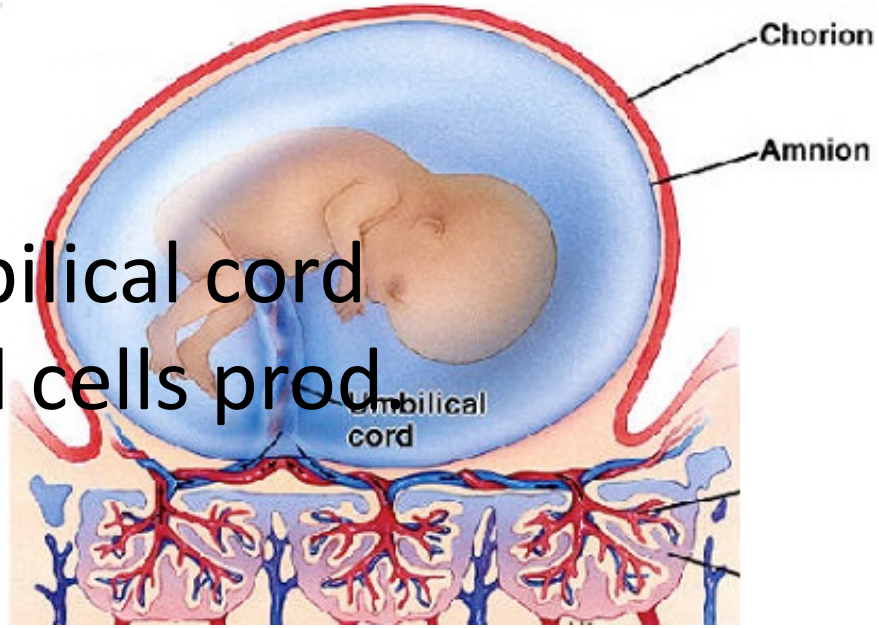
31. trace the process from conception to birth including:

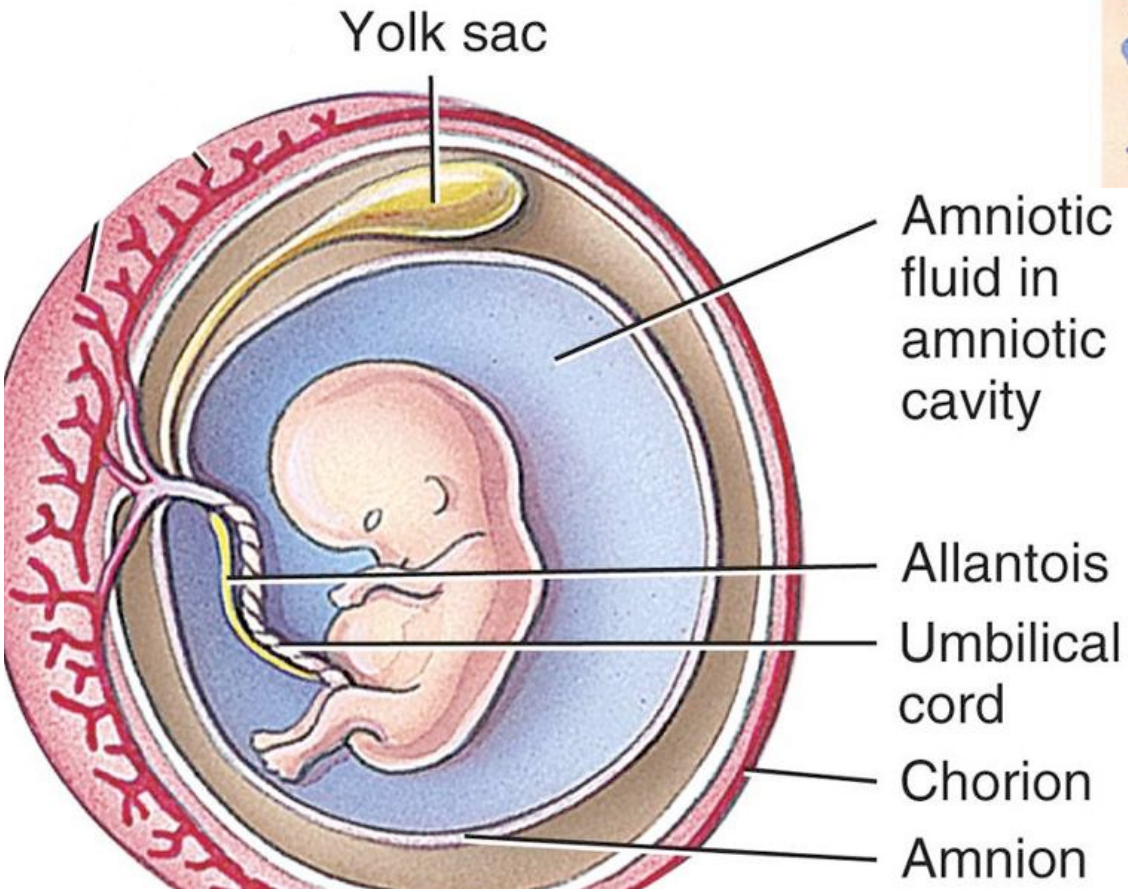
Chorion-outer layer

Amnion-inner layer

Allantois- foundation for umbilical cord

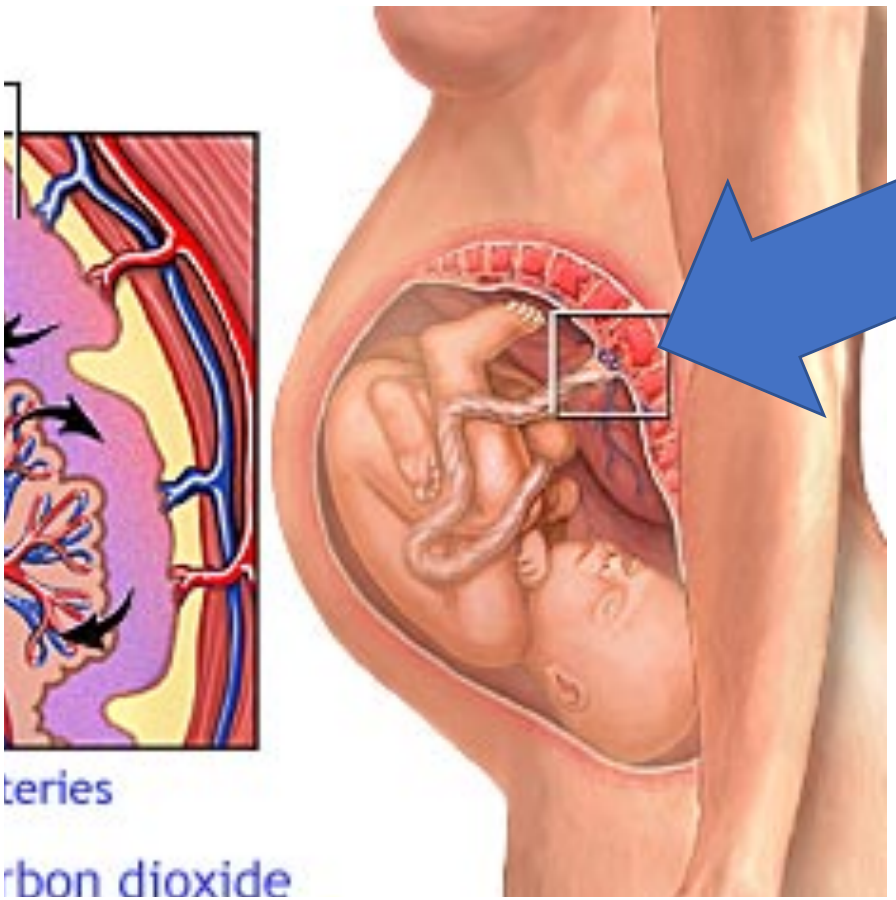
Yolk Sac- small but into blood cells prod.

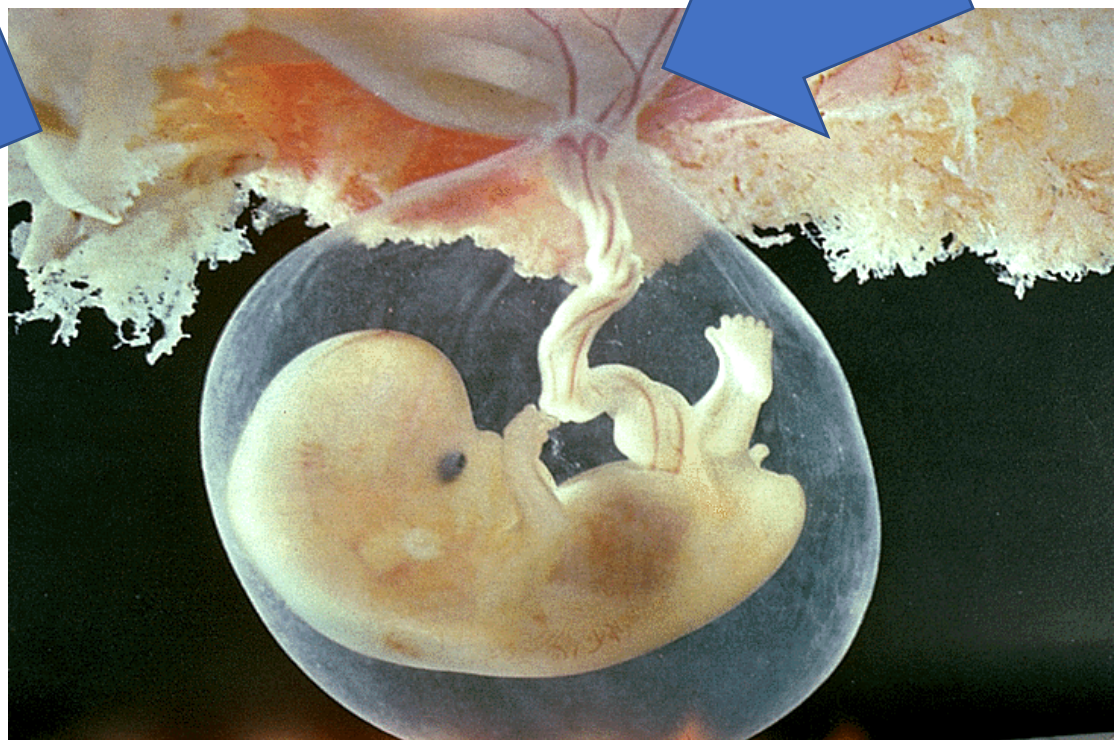




31. trace the process from conception to birth including:

Placenta- connection to mother to exchange nutrients and wastes – NO BLOOD EXCHANGE.





32. describe the roles of the following in human development

Progesterone, -

LH, - stimulates corpus luteum to be prod.

hCG, - human corionic gonadotrophin – keeps corpus L. producing for first 3 months

-produced by embryo

prostaglandins-localized hormone – helps start contractions

oxytocin –

33. describe the general mechanisms of lactation in human females after childbirth and the role of oxytocin and prolactin.

Oxytocin – a babys cry initiates oxytocin release which then "releases" milk (makes available for baby to suckle) when baby needs to feed

Prolactin –

34. describe the main physiological events in human prenatal development of the following as it relates to each trimester…

neural tube / nervous. - 1-2 weeks system development

heart formation- 3 weeks

limb formation- 5 -6 weeks

sex differentiation- 6 – 7 week

35. identify the major tissues and organs that arise from the

Ectoderm (nervous system, skin)

Mesoderm (skeleton, muscles, reproductive system)

Endoderm (digestive and respiratory systems, endocrine glands)

36. describe the influence environmental factors such as maternal lifestyle, alcohol, drugs, and infections can have on embryonic and fetal development – i.e. teratogens

Most critical developmental period is _____.

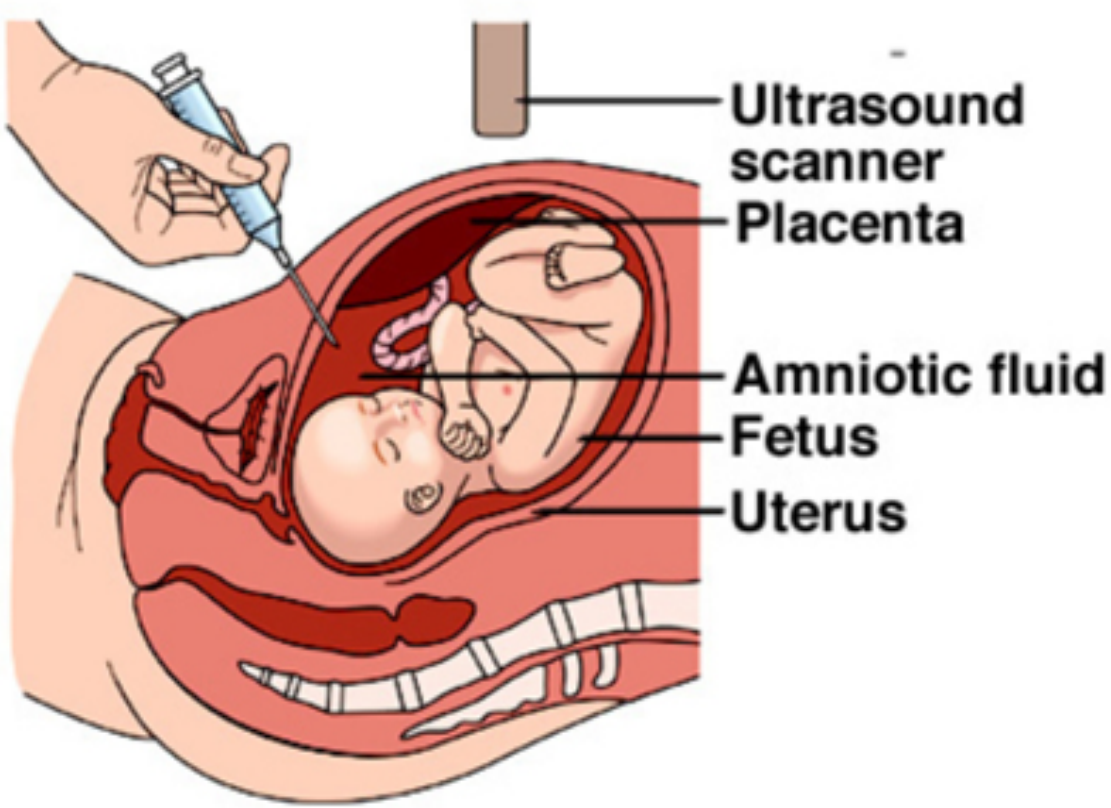
37. describe medical technologies such as in-vitro fertilization, vasectomy, and fertility drugs.

Prenatal Screening Technologies

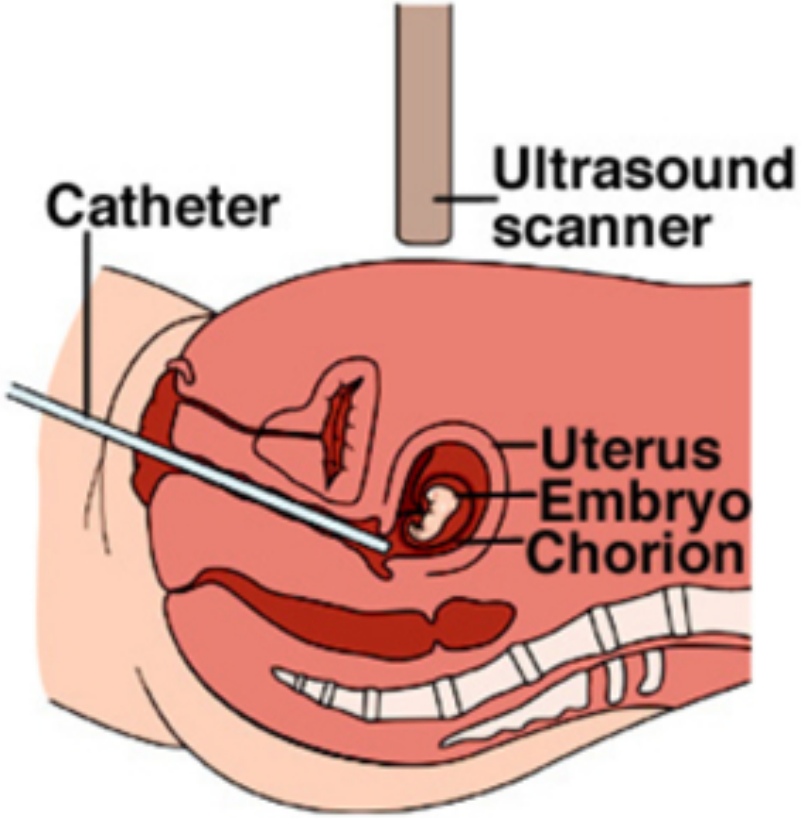
1. **Chorionic Villi Sampling**: needle removes fetal cells from chorion/placenta → genetic testing
   - detects Downs' Syndrome, Cystic Fibrosis etc.
   - can be performed after 9th week

2. **Amniocentesis**: needle withdraws amniotic fluid sample containing fetal cells → genetic/karyotyping(chromosome abnormalities)/hormone tests
   - can be performed after 14th week

Amniocentesis & Chorionic Villus Sampling



(a) Amniocentesis



(b) Chorionic villus sampling

Cells selected from
AMNIOTIC FLUID
14th week

Cells selected from
CHORION/PLACENTA
9th week

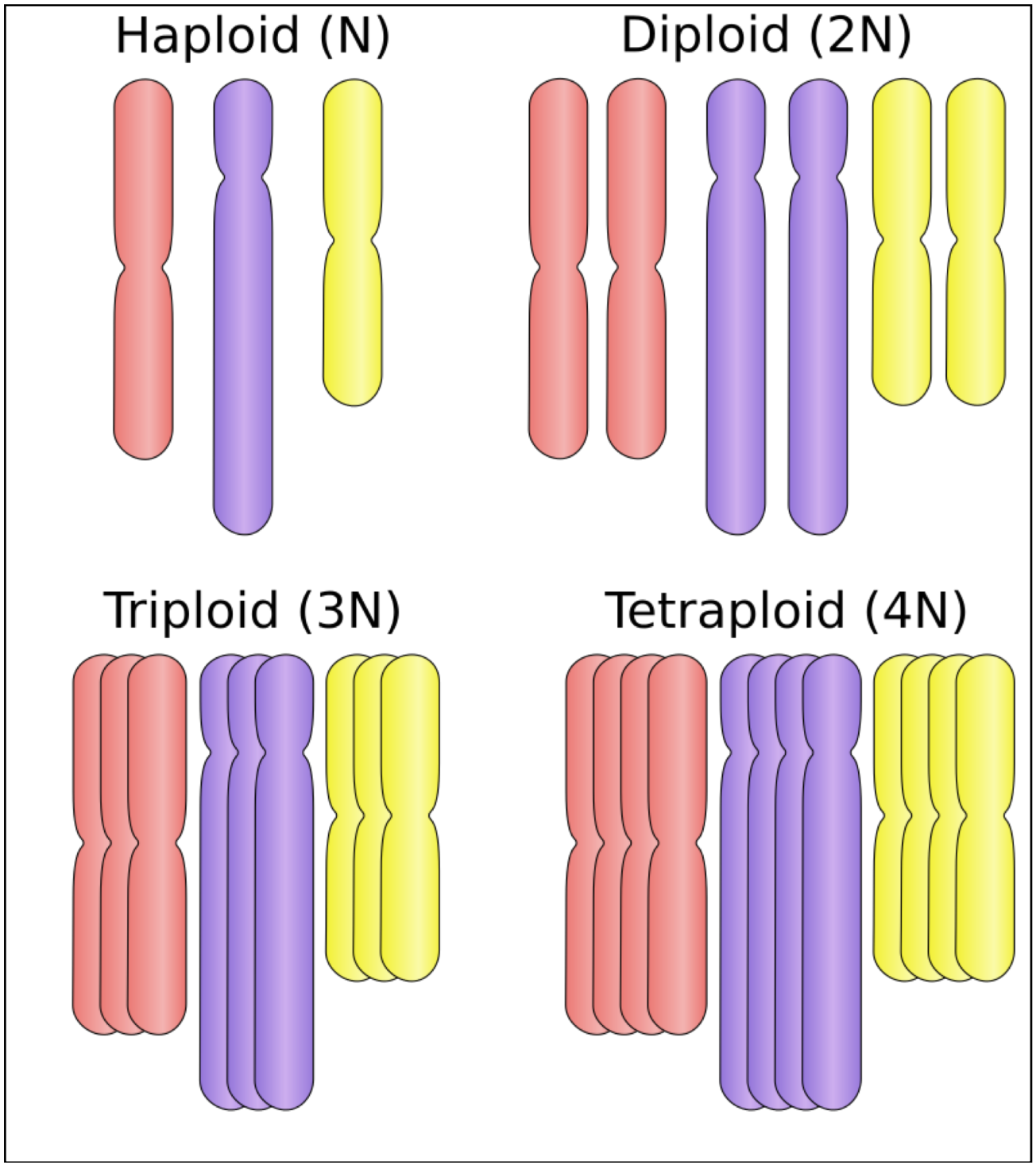
38. explain the meaning of haploidy, diploidy, and polyploidy

n = number of “unique” chromosomes

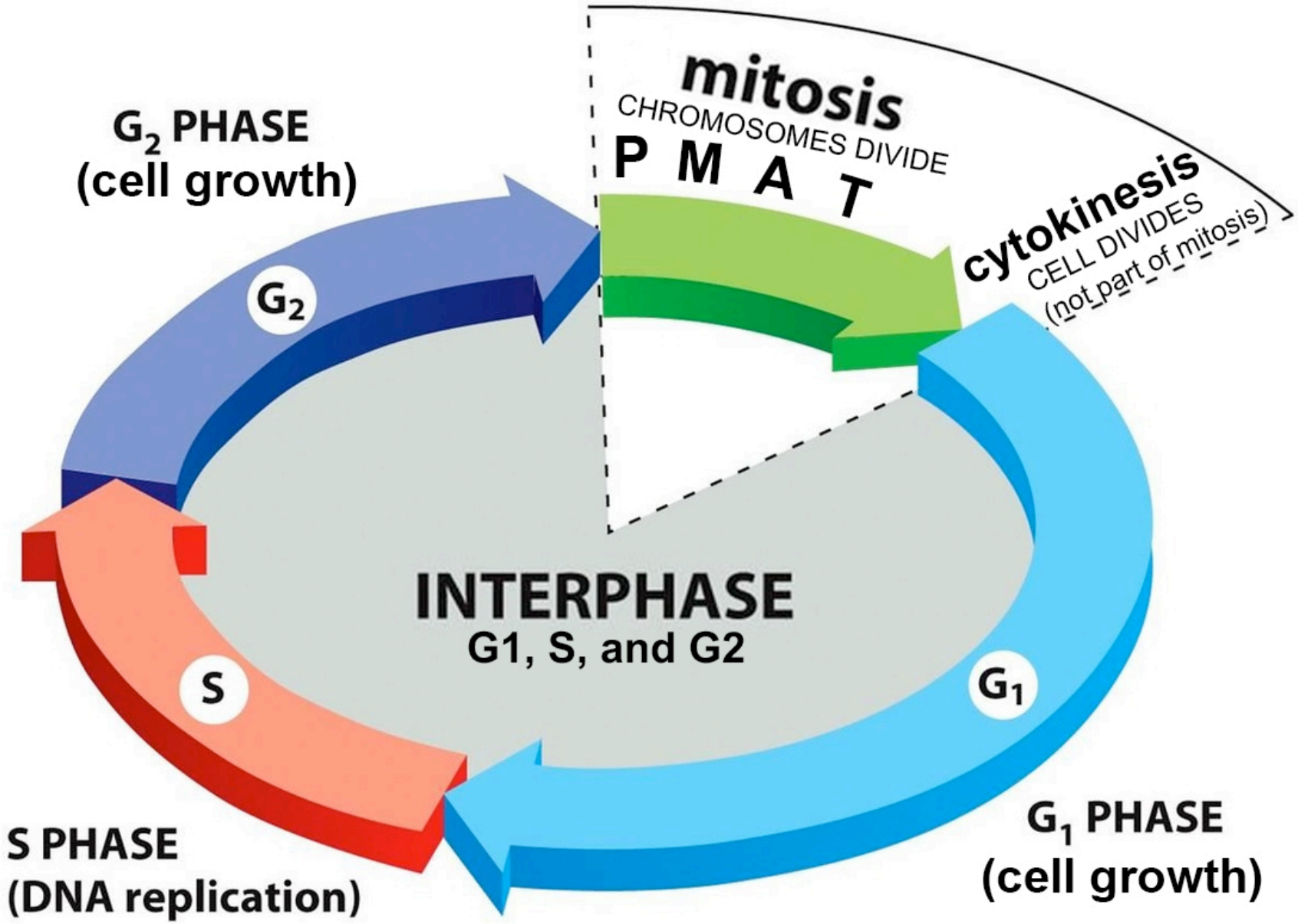
Haploid(n), # chrom. in gametes

Diploid(2n) # chrom. in somatic cell

polyploidy(3n, 4n..) multiple sets of “homologous”chromosomes


Haploid (N)
Diploid (2N)
Triploid (3N)
Tetraploid (4N)

39. explain the steps of the cell cycle including interphase, prophase, metaphase, anaphase, telophase and cytokinesis



40. differentiate and compare the processes of mitosis and meiosis in terms of their purpose, as well as the major steps involved in each.

I Propose Men Are Toads

I	Prepare	Middle	Apart	Tear in two
n	r	e	n	e
t	o	t	a	l
e	p	a	p	o
r	h	p	h	p
p	a	h	a	h
h	s	a	s	a
a	e	s	e	s
s		e		e
e				

41. describe the difference between metaphase of mitosis and metaphase of meiosis I & II.

Metaphase means MIDDLE…

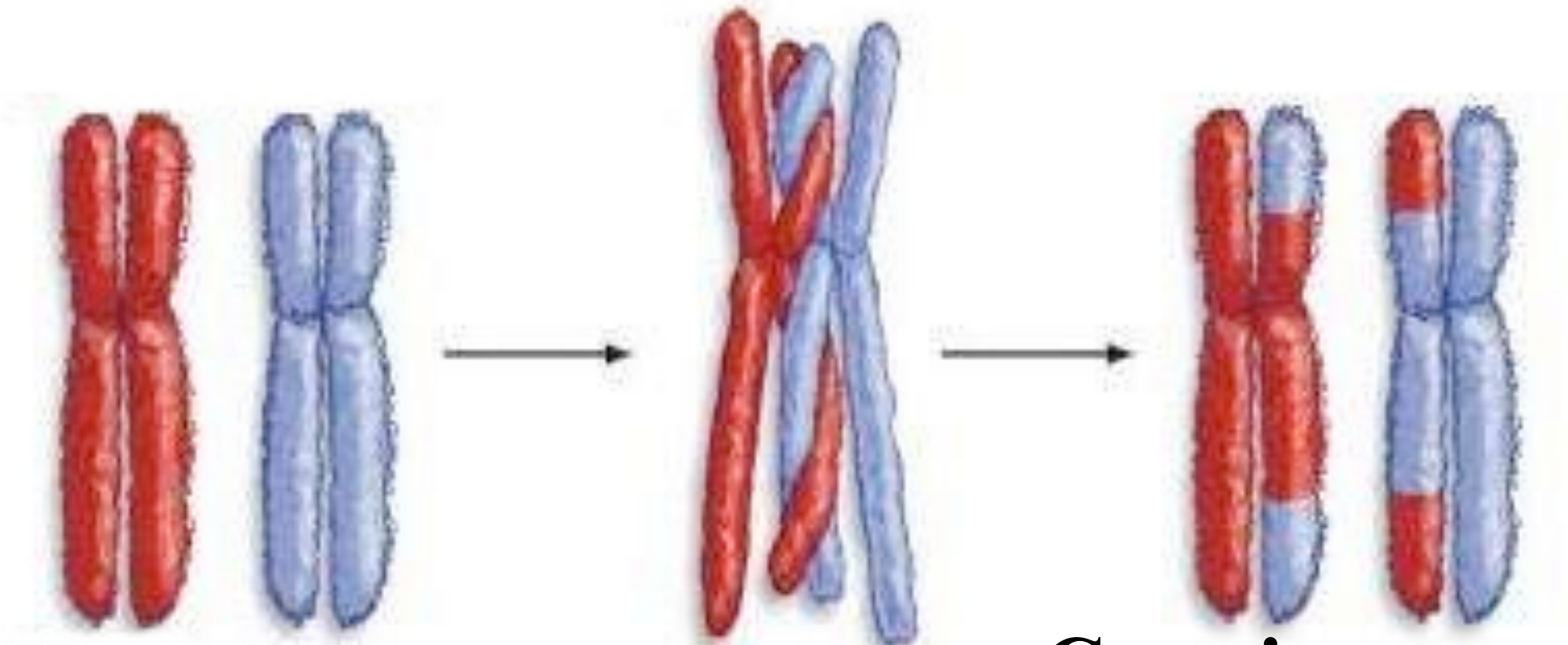
Mitosis

Meiosis I

Meiosis II

42. describe the process of crossing over and evaluate its significance to organisms inheritance.

Recombination results in totally different genetic combinations than parents



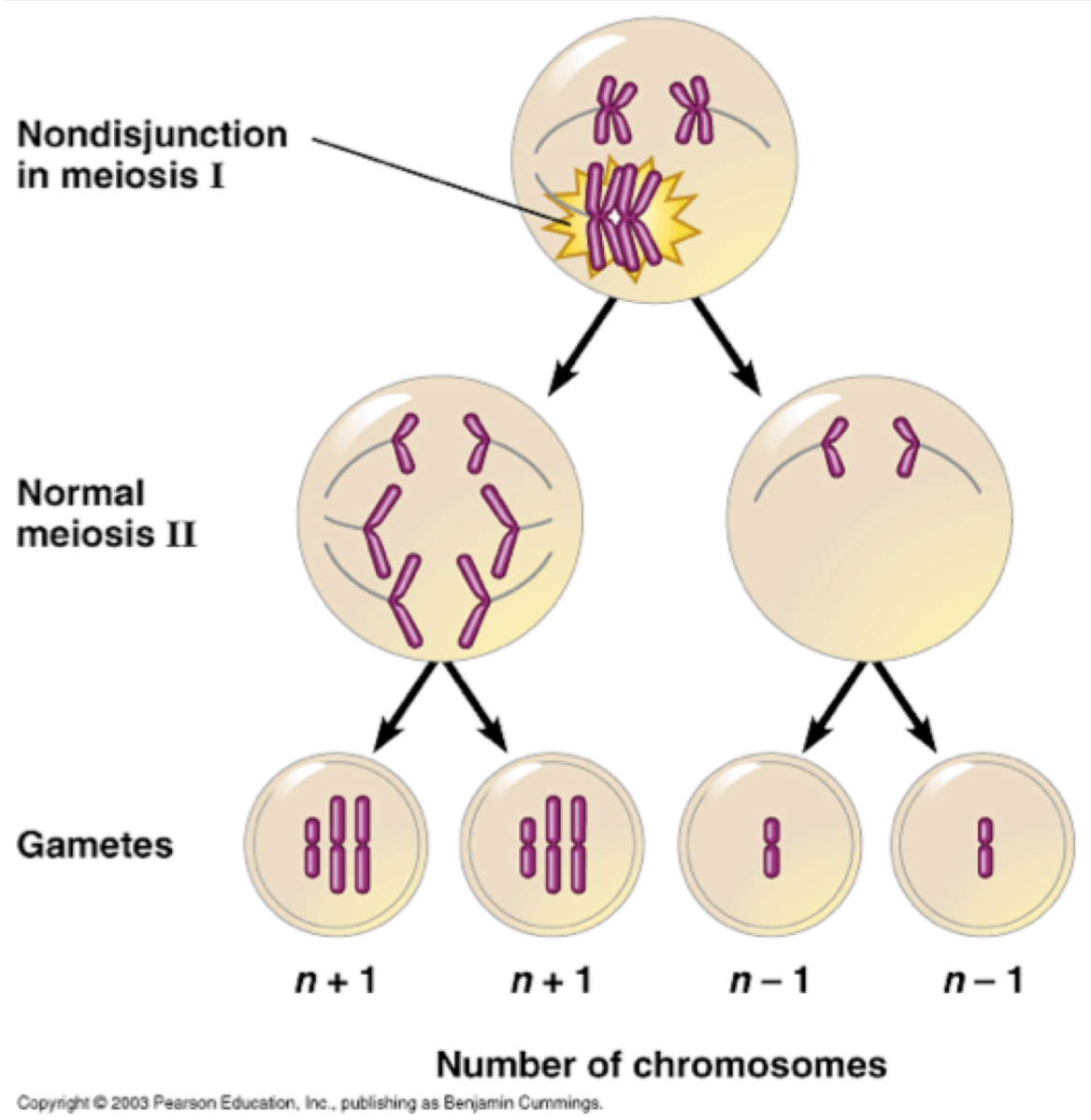
Homologous chromosomes

Tetrad

Crossing over occurred

43. describe the process of nondisjunction and identify how disorders such as Turner & Down Syndrome that occur as a result.

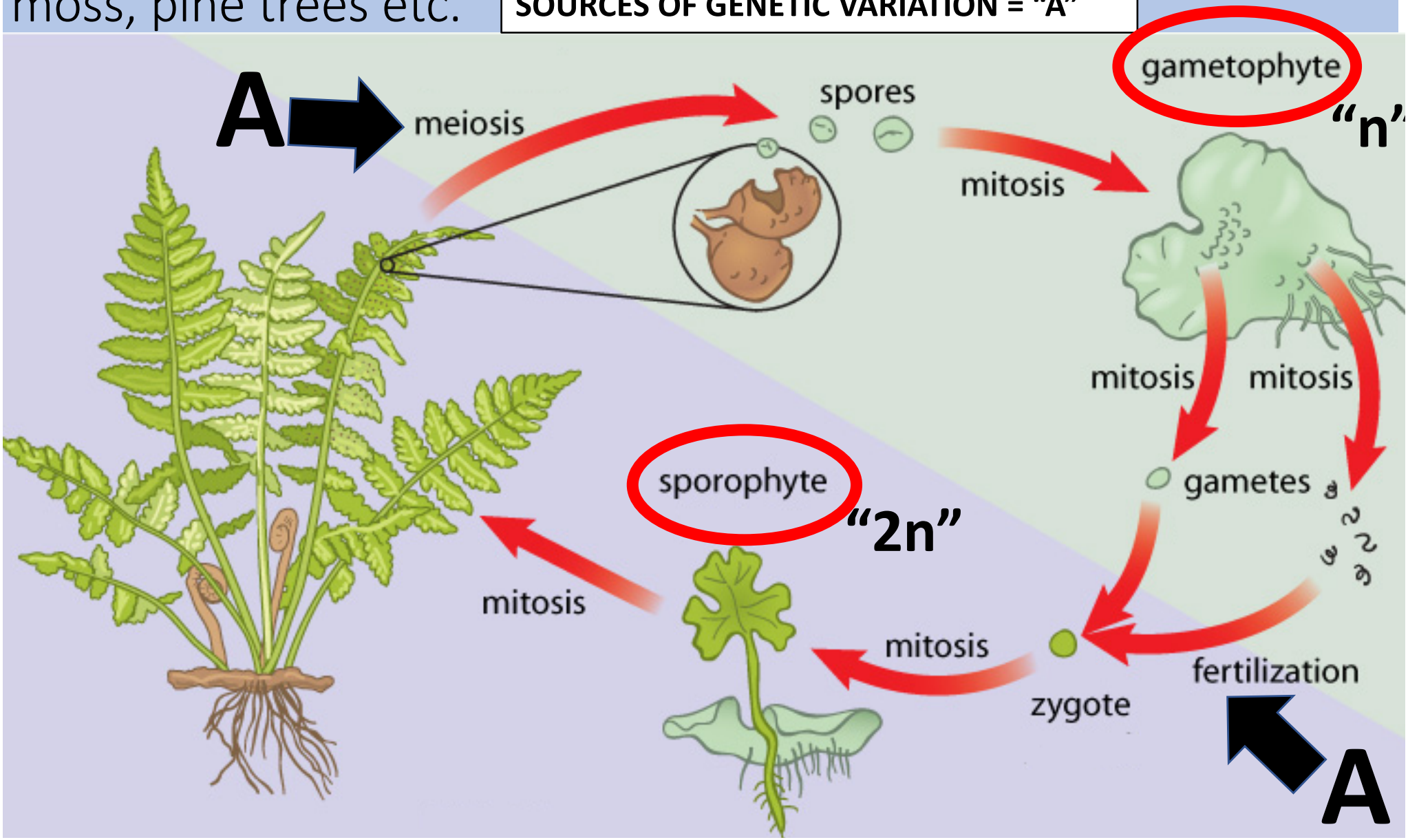
Anaphase I or II



44. explain how both fraternal and identical offspring are formed in a single birthing event.

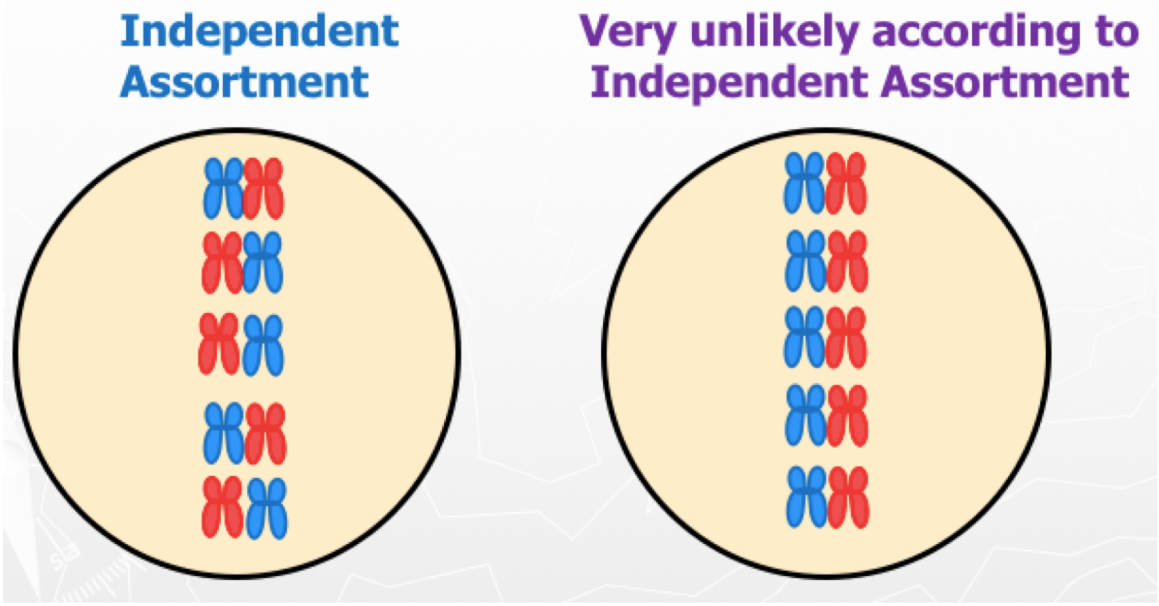
45. identify and describe some of the diversity of reproductive strategies by comparing the alternation of generations in organisms such as Daphnia, sea anemones, moss, pine trees etc.

SOURCES OF GENETIC VARIATION = "A"

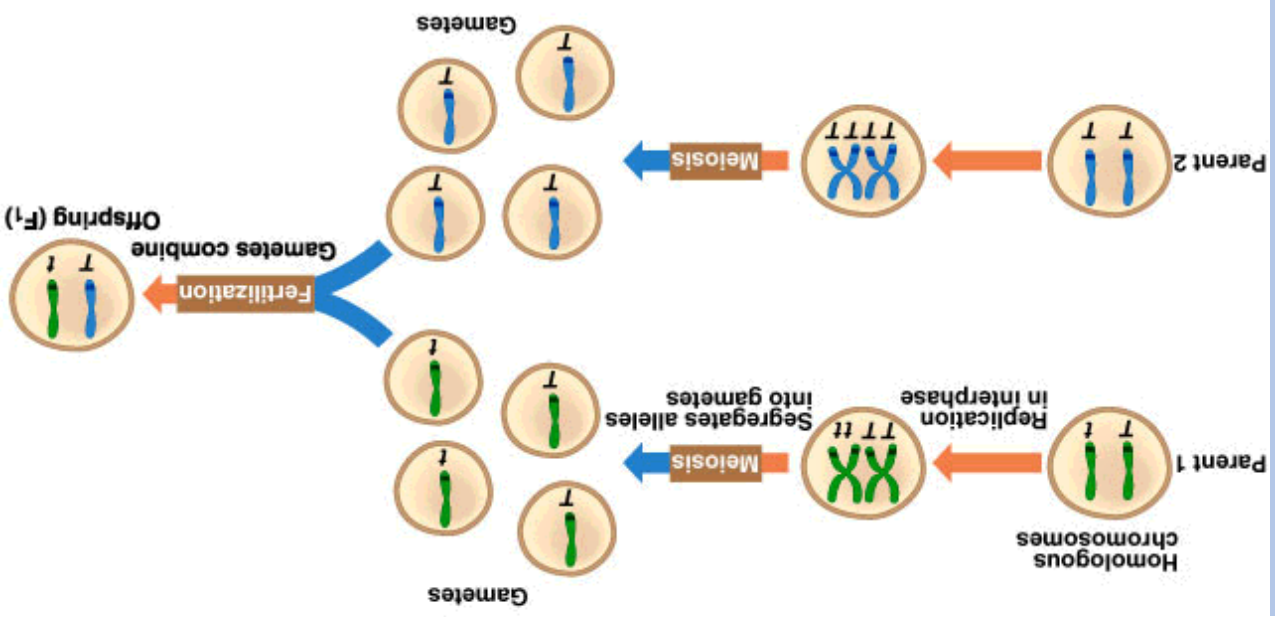


46. describe the evidence Mendel obtained for dominance, segregation, and the independent assortment of genes on different chromosomes.

Law of Independent Assortment: Different pairs of alleles align independently of each other.

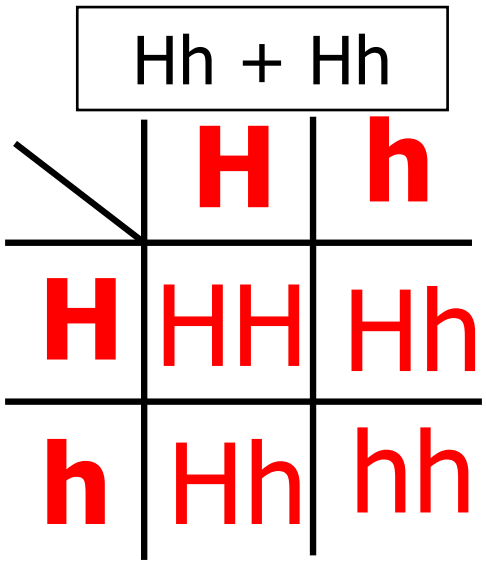


Law of Segregation: All individuals have two copies of each gene. Pairs of genes segregate (separate)



47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Dominant vs recessive



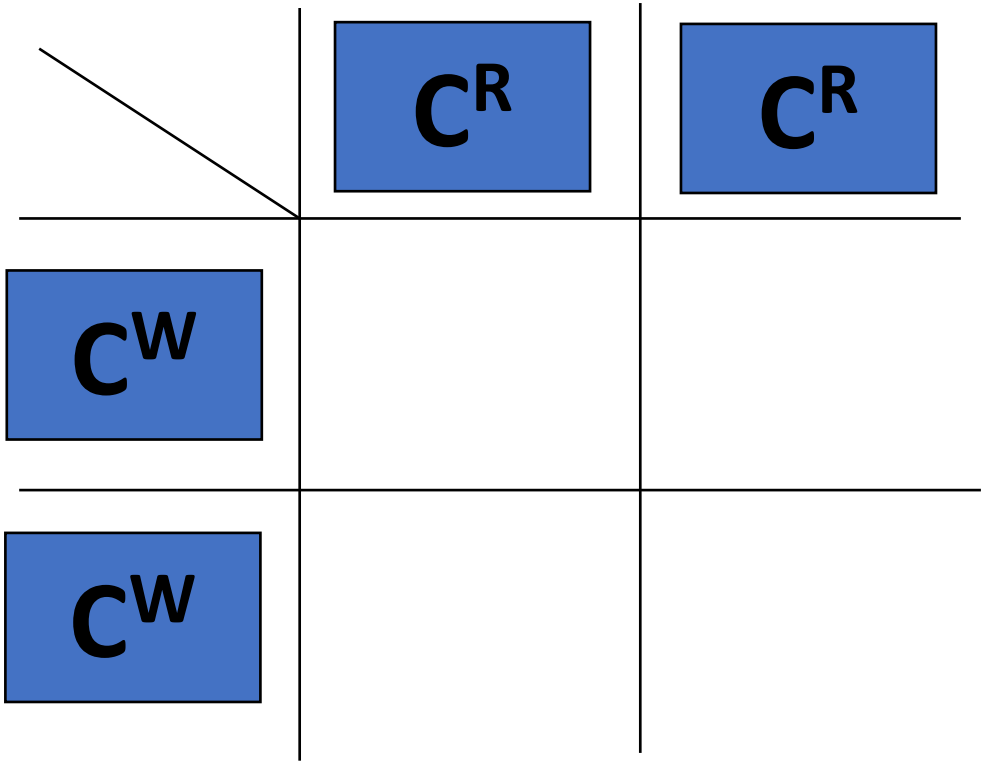
Phenotype Ratio: **3:1 tall : short**

Genotypic Ratio: **1:2:1 HH:Hh:hh**

47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Incomplete dominance

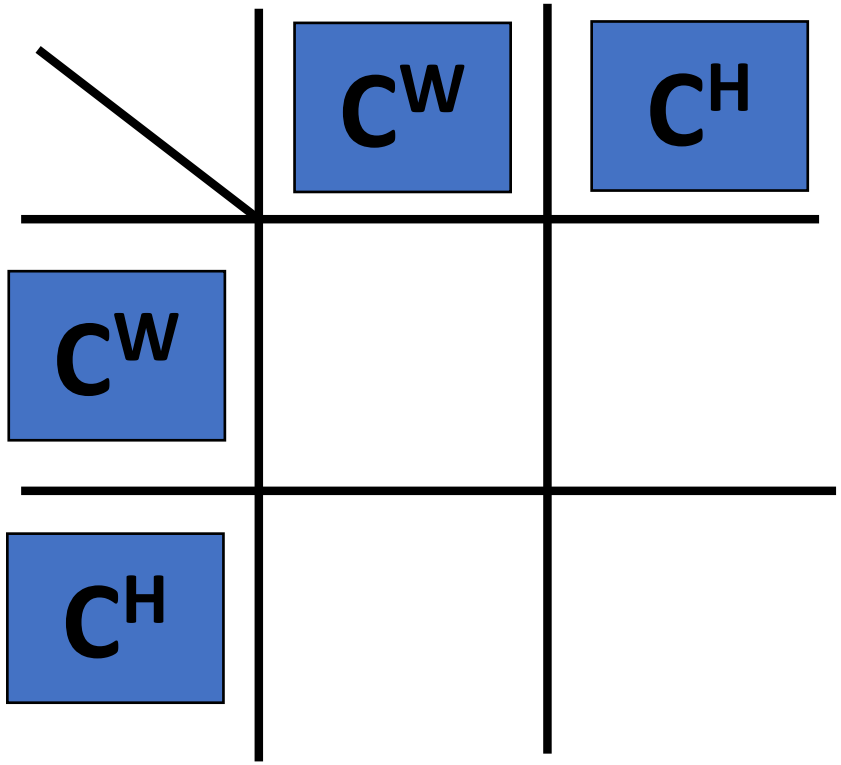
WHITE + RED = PINK. C^WC^W + C^RC^R = C^WC^R



47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Co-dominance

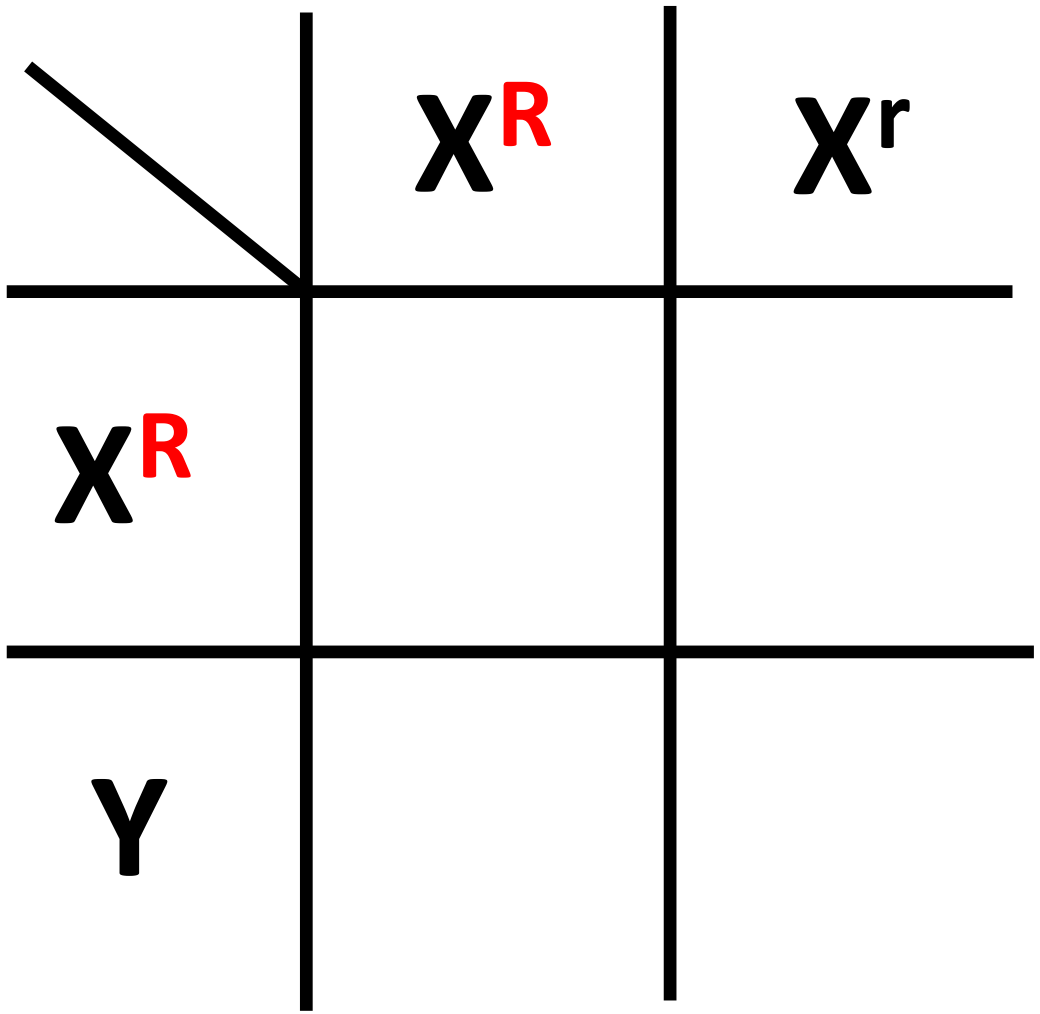
WHITE + RED = ROAN (mixed) C^WC^W + C^HC^H = C^WC^H



47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Sex Linked traits- ONLY ON THE X chromo.

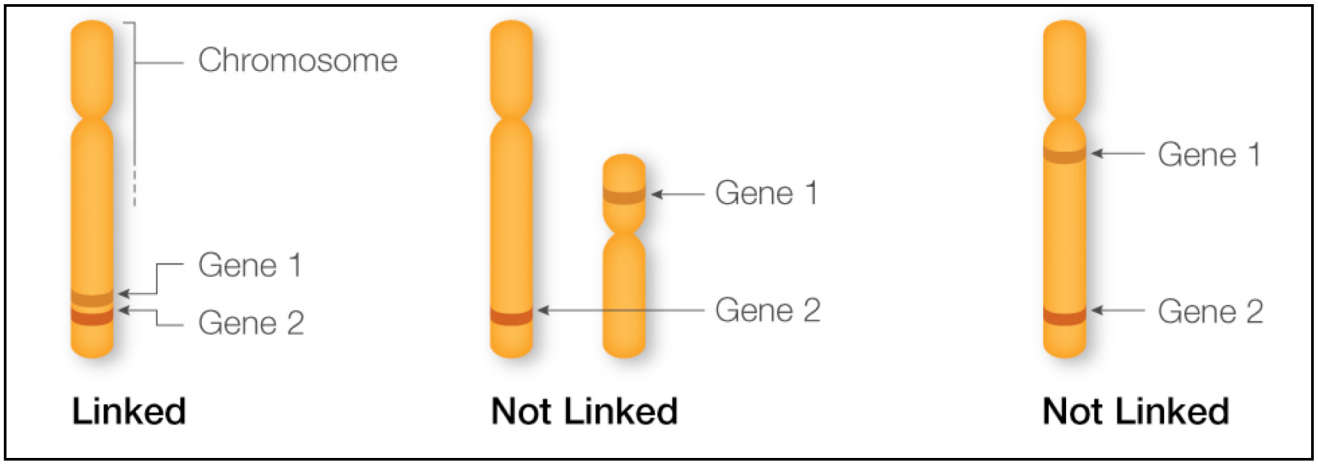
R = red eyes r = normal



47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Linked traits

- **Linked Genes are genes that are found on the same chromosome are LINKED**
- **Linked genes are inherited TOGETHER.**
- **Genes will NOT separate during meiosis…**



47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Linked traits

Crossing Over Percentage = # of recombinations / Total # of Offspring x 100

The genes for body colour and wing shape are found on the same chromosome in fruit flies

Two Genes Found on the Same Chromosome in *Drosophila*

S	body colour (S = normal / s = sable)
W	wing shape (W = normal / w = miniature)

In a cross between a heterozygous normal fly and a sable-bodied, miniature-winged fly the results were:

99 normal flies
99 with a sable body and miniature wings
11 with a normal body and miniature wings
11 with a sable body and normal wings

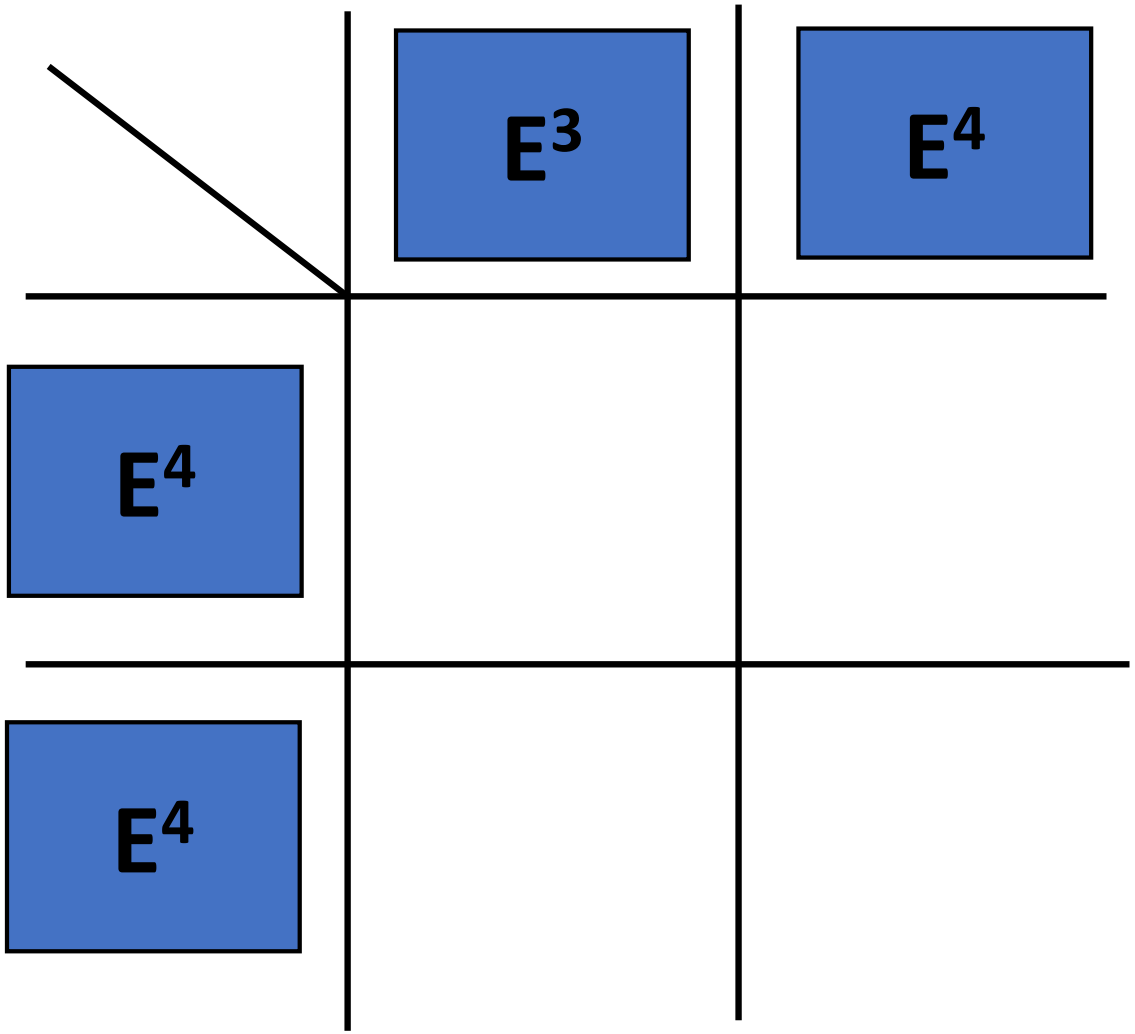
How many map units separate the genes for body colour and wing shape?

Add recombinants and divide by TOTAL of ALL

$$\frac{11 + 11}{220} \times 100 = 10\%$$

47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Multiple alleles



Phenotypes

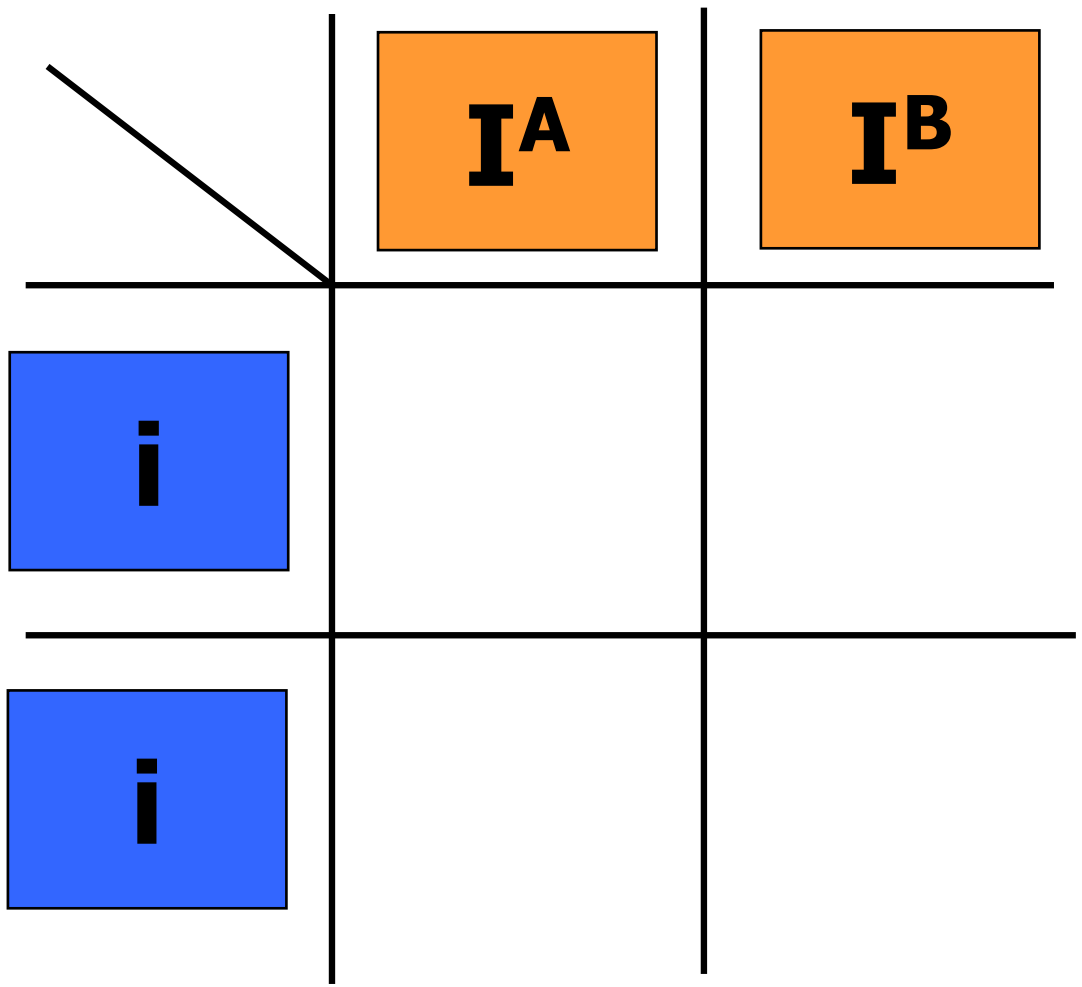
- Wild Type
- Apricot
- Honey
- White

Genotypes

E^1E^1, E^1E^2, E^1E^3, E^1E^4
E^2E^2, E^2E^3, E^2E^4
E^3E^3, E^3E^4
E^4E^4

47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Multiple alleles

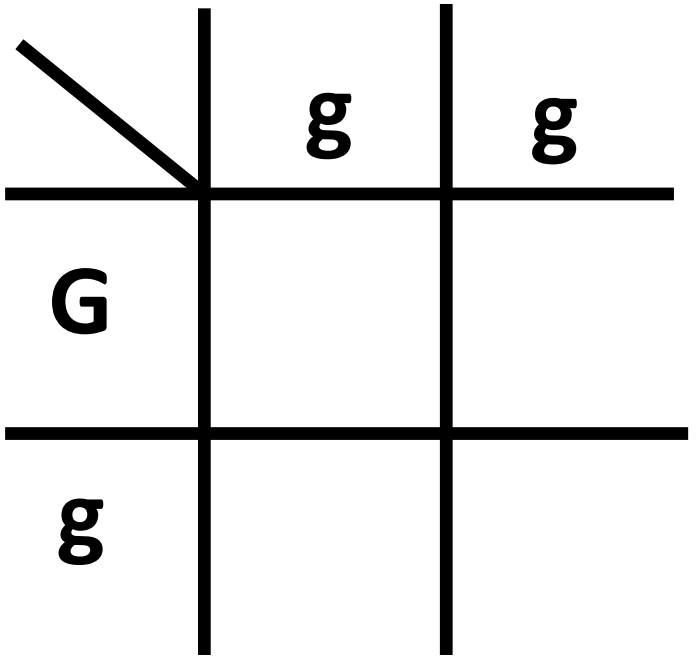


47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

Product Rule (Probability of two events occurring simultaneously) = **Probability of event 1** x **Probability of event 2**

Probability of a boy with green hair from mom who is a carrier and dad who has green hair. Green hair is recessive..

Prob of having a boy =
Prob of green hair=



47. calculate & compare ratios and probabilities of genotypes and phenotypes for genetic crosses with the following inheritance patterns:

DIHYBRID CROSS

Lets cross TtYy X TTYY

49. understand that traits can be controlled by one pair of genes (Rh factor), or they may be controlled by many genes (ex. skin colour, height)

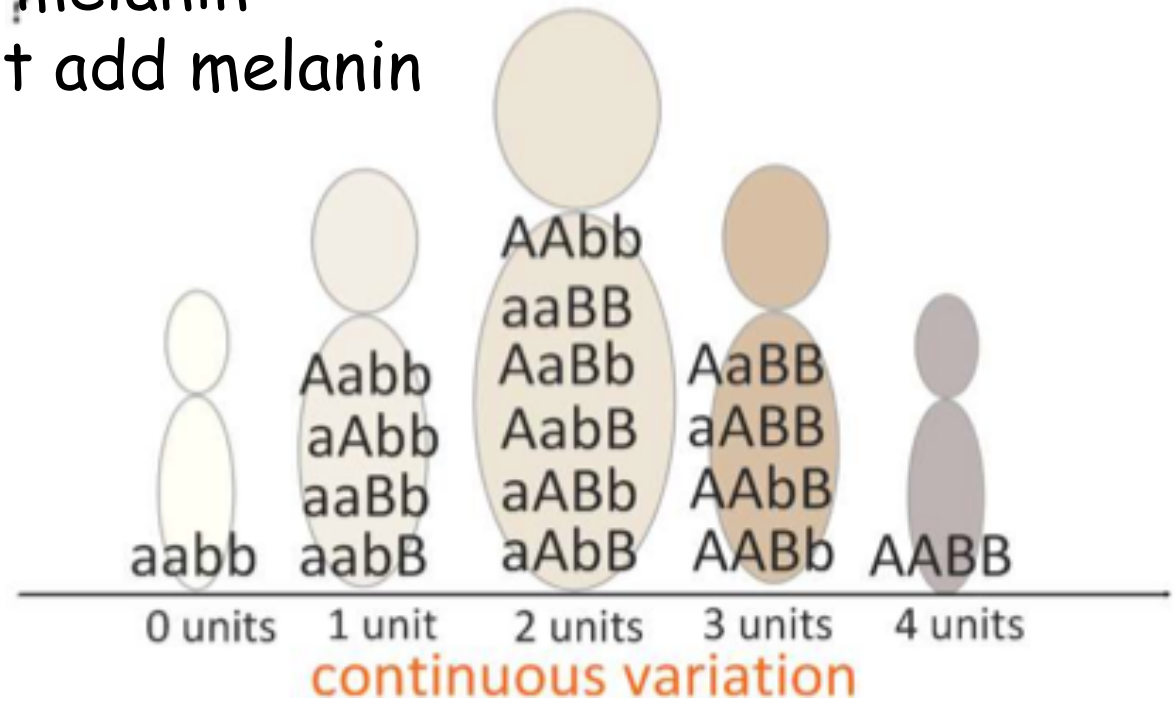
Example (2 genes with 2 alleles each)

Gene A: A = add melanin
a = don't add melanin

Gene B: B = add melanin
b = don't add melanin

For every DOMINANT allele present, one 'unit' of melanin is added to the skin

Notice the normal distribution of phenotypes produced



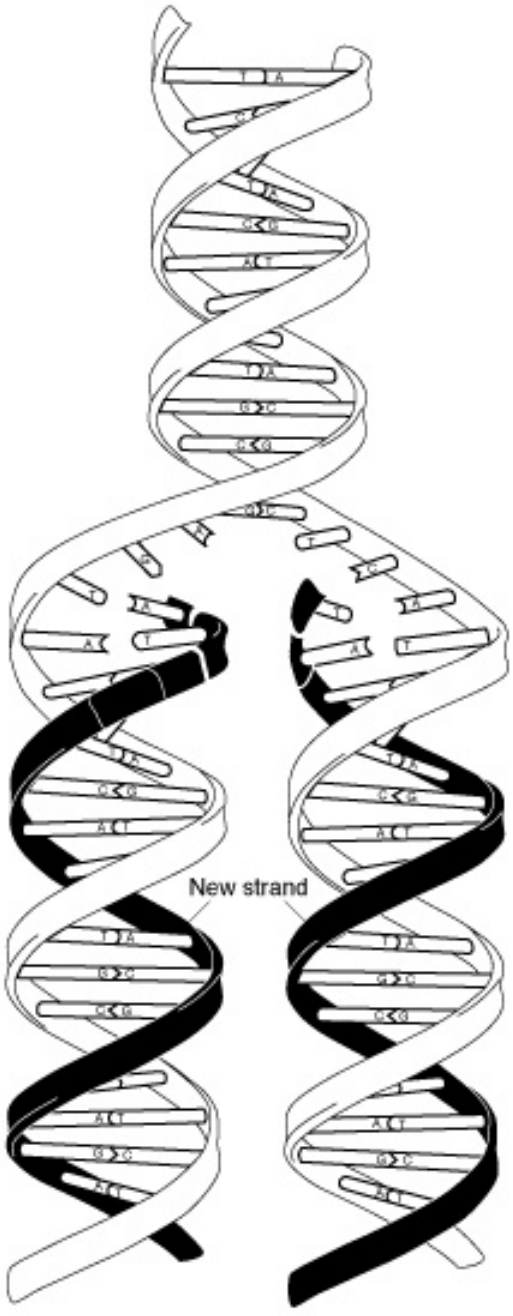
50. describe the contributions that were made by James Watson and Francis Crick to the field of genetics.

51. describe the structure of DNA, including the three components of nucleotides, the two families of nitrogen bases, and how the two strands are bonded together.

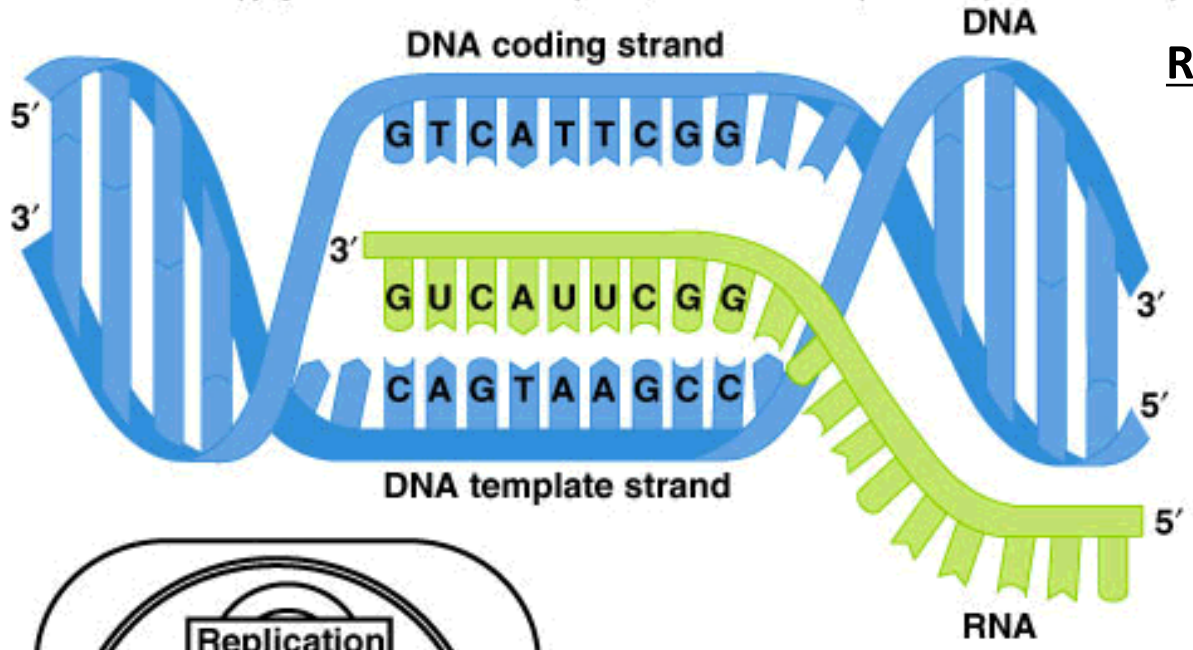
52. describe how a DNA molecule is able to replicate itself semi- conservatively using molecules such as helicase & DNA polymerase.

Helicase- _____ DNA

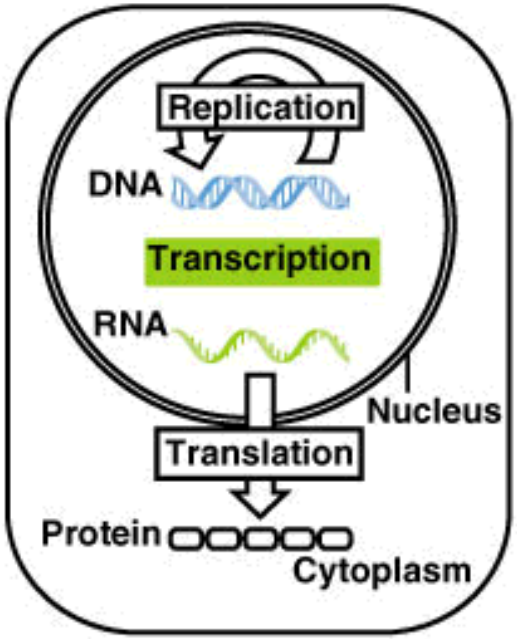
Polymerase- attaches free nucleotides



54. understand how a DNA sequence is transcribed into an mRNA sequence of bases using RNA polymerase.



RNA polymerase- puts together RNA sequence

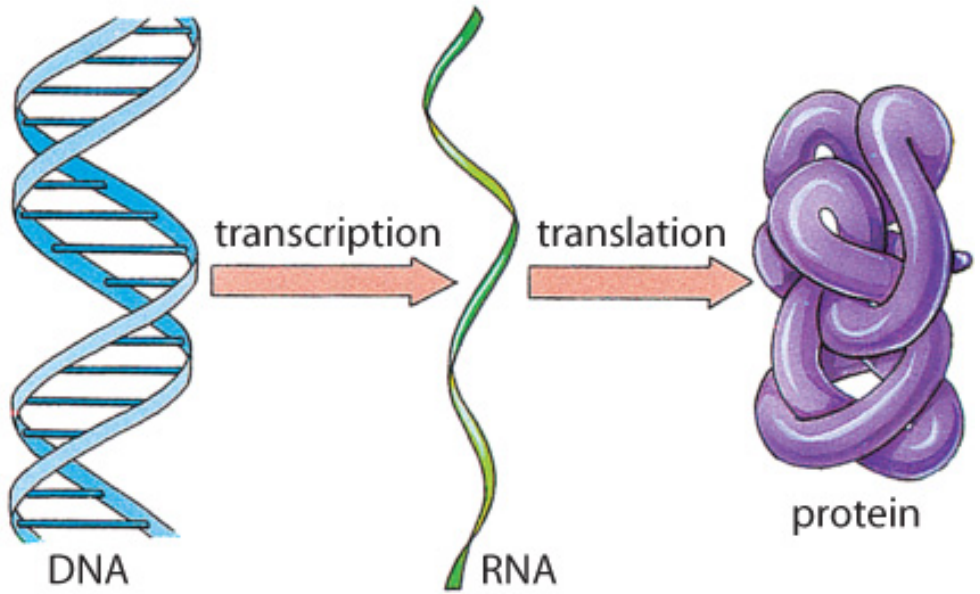


Relationship among RNA and DNA

55. understand how rRNA, tRNA, and mRNA interact to synthesize a polypeptide / protein based on the nucleotide sequence of an mRNA molecule.

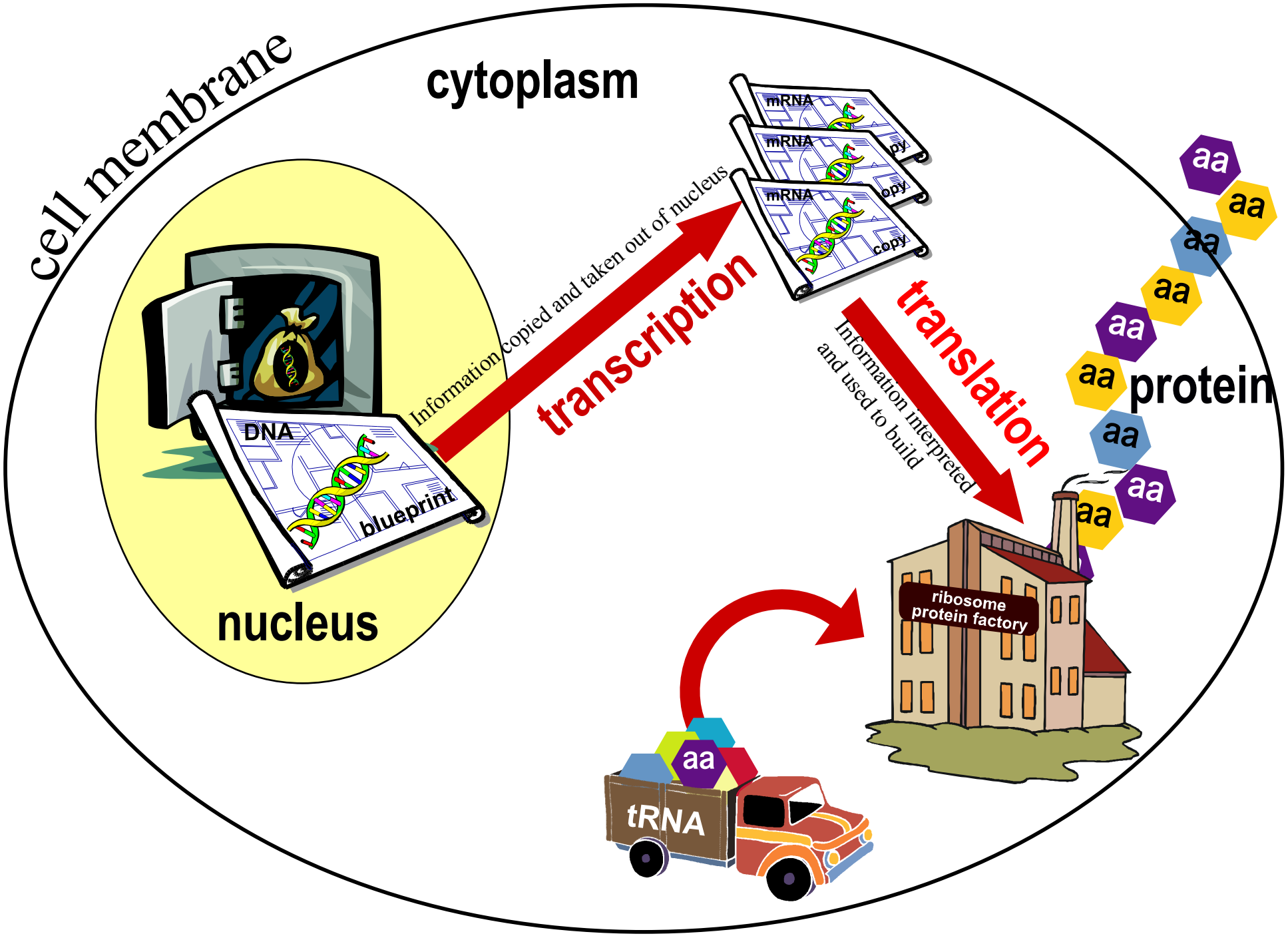
1. Transcription

2. Translation

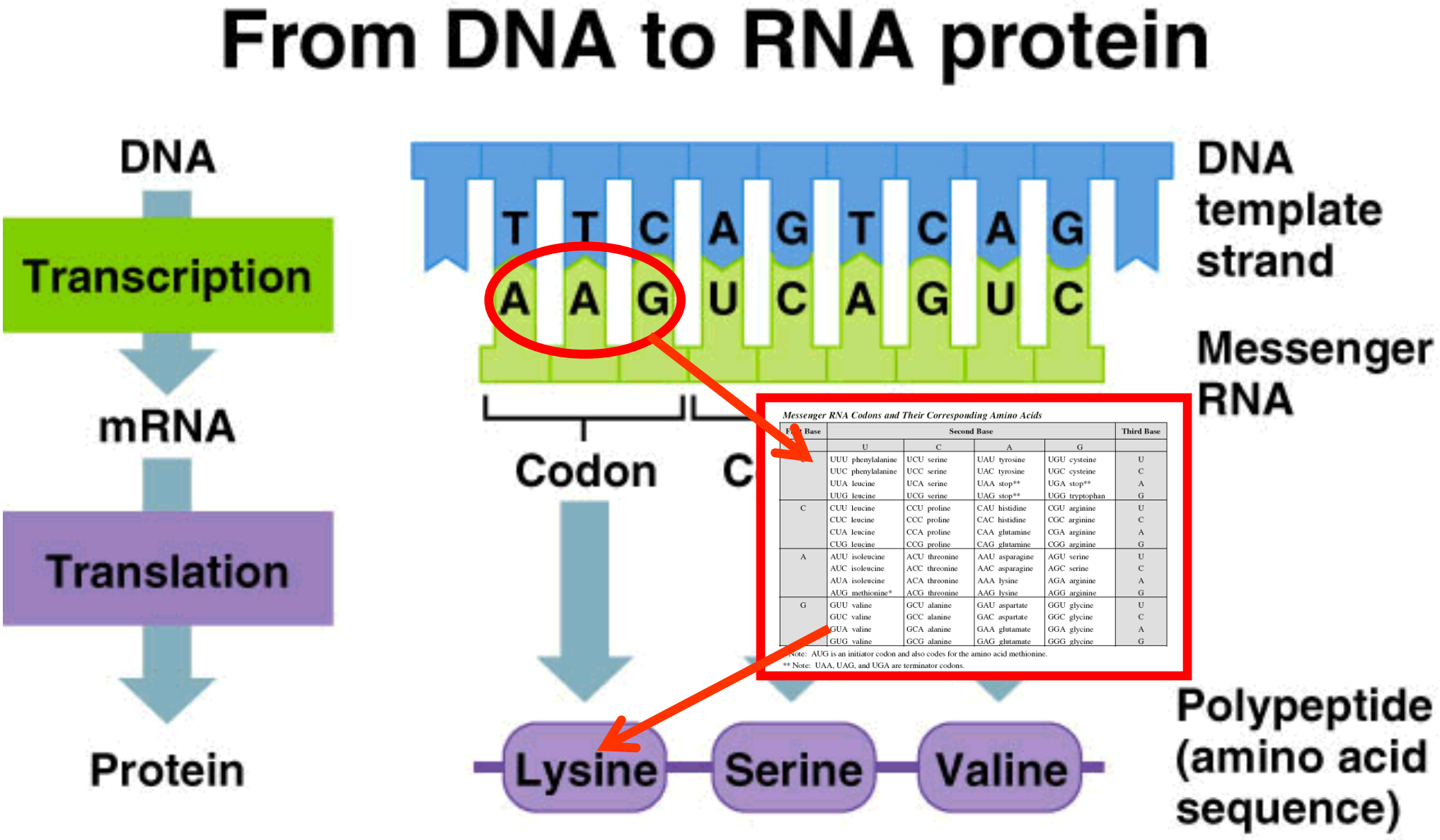


In nucleus

In cytoplasm


cell membrane
cytoplasm
DNA
blueprint
nucleus
Information copied and taken out of nucleus
transcription
mRNA
mRNA
mRNA
copy
copy
copy
translation
Information interpreted
and used to build
aa
aa
aa
aa
aa
protein
aa
aa
aa
ribosome
protein factory
aa
tRNA

56. Given a DNA sequence, I can use the mRNA codon table to identify the amino acid sequence for which it codes.



Messenger RNA Codons and Their Corresponding Amino Acids

First Base	Second Base				Third Base
	U	C	A	G	
U	UUU phenylalanine	UCU serine	UAU tyrosine	UGU cysteine	U
	UUC phenylalanine	UCC serine	UAC tyrosine	UGC cysteine	C
	UUA leucine	UCA serine	UAA stop**	UGA stop**	A
	UUG leucine	UCG serine	UAG stop**	UGG tryptophan	G
C	CUU leucine	CCU proline	CAU histidine	CGU arginine	U
	CUC leucine	CCC proline	CAC histidine	CGC arginine	C
	CUA leucine	CCA proline	CAA glutamine	CGA arginine	A
	CUG leucine	CCG proline	CAG glutamine	CGG arginine	G
A	AUU isoleucine	ACU threonine	AAU asparagine	AGU serine	U
	AUC isoleucine	ACC threonine	AAC asparagine	AGC serine	C
	AUA isoleucine	ACA threonine	AAA lysine	AGA arginine	A
	AUG methionine*	ACG threonine	AAG lysine	AGG arginine	G
G	GUU valine	GCU alanine	GAU aspartate	GGU glycine	U
	GUC valine	GCC alanine	GAC aspartate	GGC glycine	C
	GUA valine	GCA alanine	GAA glutamate	GGA glycine	A
	GUG valine	GCG alanine	GAG glutamate	GGG glycine	G

* Note: AUG is an initiator codon and also codes for the amino acid methionine.
** Note: UAA, UAG, and UGA are terminator codons.

DON'T CONFUSE WITH DNA SEQUENCE!!

Messenger RNA Codons and Their Corresponding Amino Acids

First Base	Second Base				Third Base
	U	C	A	G	
U	UUU phenylalanine	UCU serine	UAU tyrosine	UGU cysteine	U
	UUC phenylalanine	UCC serine	UAC tyrosine	UGC cysteine	C
	UUA leucine	UCA serine	UAA stop**	UGA stop**	A
	UUG leucine	UCG serine	UAG stop**	UGG tryptophan	G
C	CUU leucine	CCU proline	CAU histidine	CGU arginine	U
	CUC leucine	CCC proline	CAC histidine	CGC arginine	C
	CUA leucine	CCA proline	CAA glutamine	CGA arginine	A
	CUG leucine	CCG proline	CAG glutamine	CGG arginine	G
A	AUU isoleucine	ACU threonine	AAU asparagine	AGU serine	U
	AUC isoleucine	ACC threonine	AAC asparagine	AGC serine	C
	AUA isoleucine	ACA threonine	AAA lysine	AGA arginine	A
	AUG methionine*	ACG threonine	AAG lysine	AGG arginine	G
G	GUU valine	GCU alanine	GAU aspartate	GGU glycine	U
	GUC valine	GCC alanine	GAC aspartate	GGC glycine	C
	GUA valine	GCA alanine	GAA glutamate	GGA glycine	A
	GUG valine	GCG alanine	GAG glutamate	GGG glycine	G

* Note: AUG is an initiator codon and also codes for the amino acid methionine.

** Note: UAA, UAG, and UGA are terminator codons.

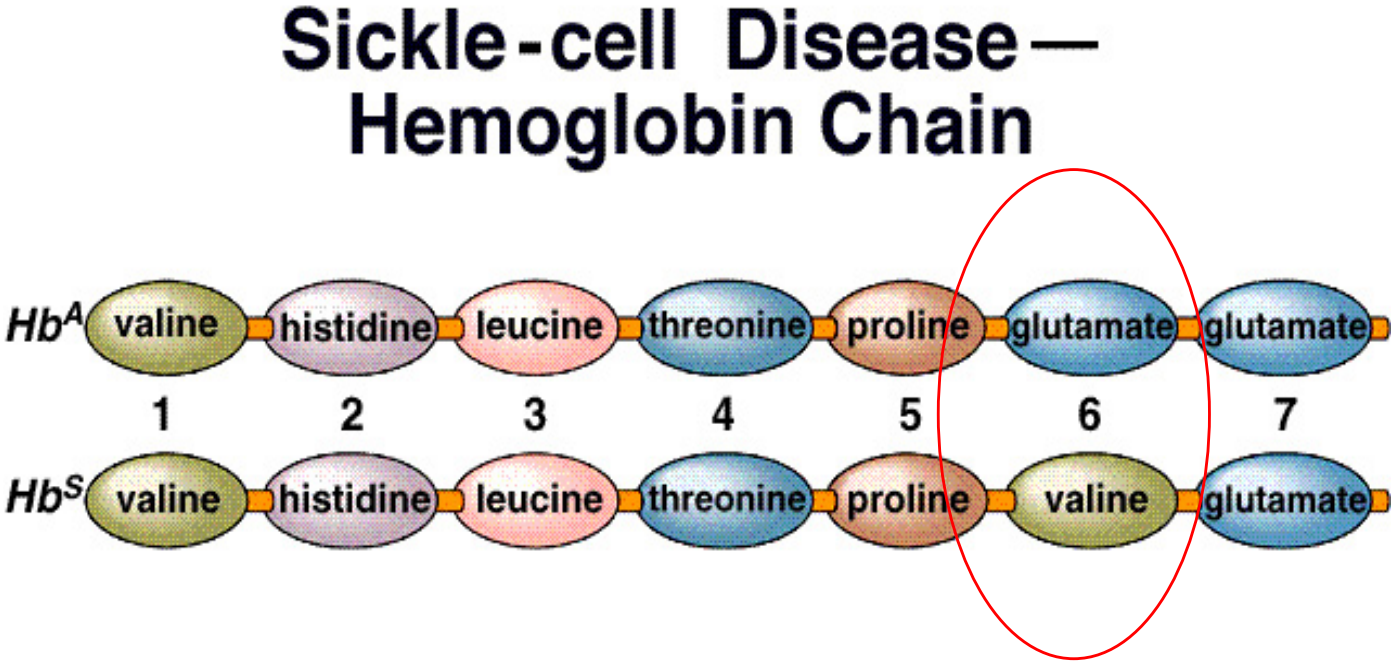
57. demonstrate how a random change (mutation) in the DNA sequence can result in abnormalities and provide a source of genetic variability (good or bad).

- Affects hemoglobin on Red Blood Cell
- Valine replaces glutamate as 6th amino acid in 1 of protein chains
- Red Blood Cell assumes a sickle shape

  -Unable to carry an adequate amount of O_2

  -clog capillaries, starving body's tissues of O_2

- HOWEVER – gives the individual resistance to malaria



58. understand and demonstrate the range of consequences of genetic mutations (severe, moderate, silent)

Samesense (silent)

Missense(moderate)- change in 1 amino acid

Nonsense(severe)

58. understand and demonstrate the range of consequences of genetic mutations (severe, moderate, silent)

FRAME SHIFT MUTATIONS – additions, subtractions or substitutions in DNA sequence

DNA - AAT CGG CTC A**T**A CGG TAA

59. explain how, in general, restriction enzymes cut DNA molecules into smaller fragments based on a specific nucleotide sequence

A restriction enzyme recognizes certain sequences and cuts them there so DNS fragments can be used.

60. understand the purpose and function of ligase.

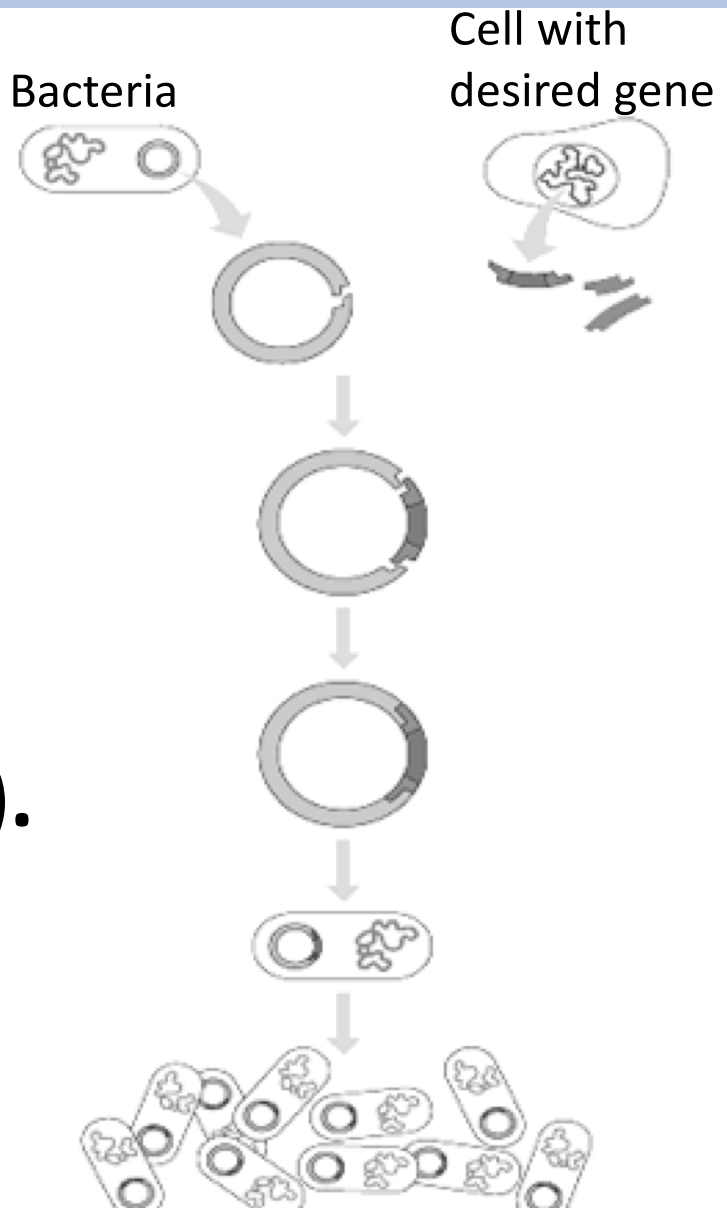
Elmers???

61. explain how restriction enzymes, ligases, and other DNA technology can be used to transform cells by inserting new DNA or genes into their genome.

1. A bacterial plasmid is opened using a restriction enzyme (scissors).

2. Isolation of the desired gene using the same Restriction Enzyme (scissors).

3. Ligase glues back together



62. explain how the sequence of nitrogen bases in DNA can give evidence for the relationships among organisms of different species.

All organisms….

63. understand that very small amounts of DNA are found in chloroplasts and mitochondria and can be used to help trace inheritance.

Mothers pass down mitochondrial DNA to offspring…males???

-it does not change from generation to generation

64. list the conditions that are required for a Hardy-Weinberg equilibrium and can explain how the gene pool changes if each condition is not met.

1. **Large population**
2. **Random mating**
3. **No gene flow – immigration or emigration**
4. **No natural selection**
5. **No mutations**
6. **No genetic drift**

65. understand the meaning of, and can describe factors that cause the gene pool to change

Natural Selection-

Genetic Drift- disappearance of genes due to chance events
(ie) death,natural disaster, human interference,

Bottleneck effect – form of genetic drift - few members survive elimination to start population

Founder effect - form of genetic drift – population started with small genetic sampling

Gene Flow – movement of genes out of a population

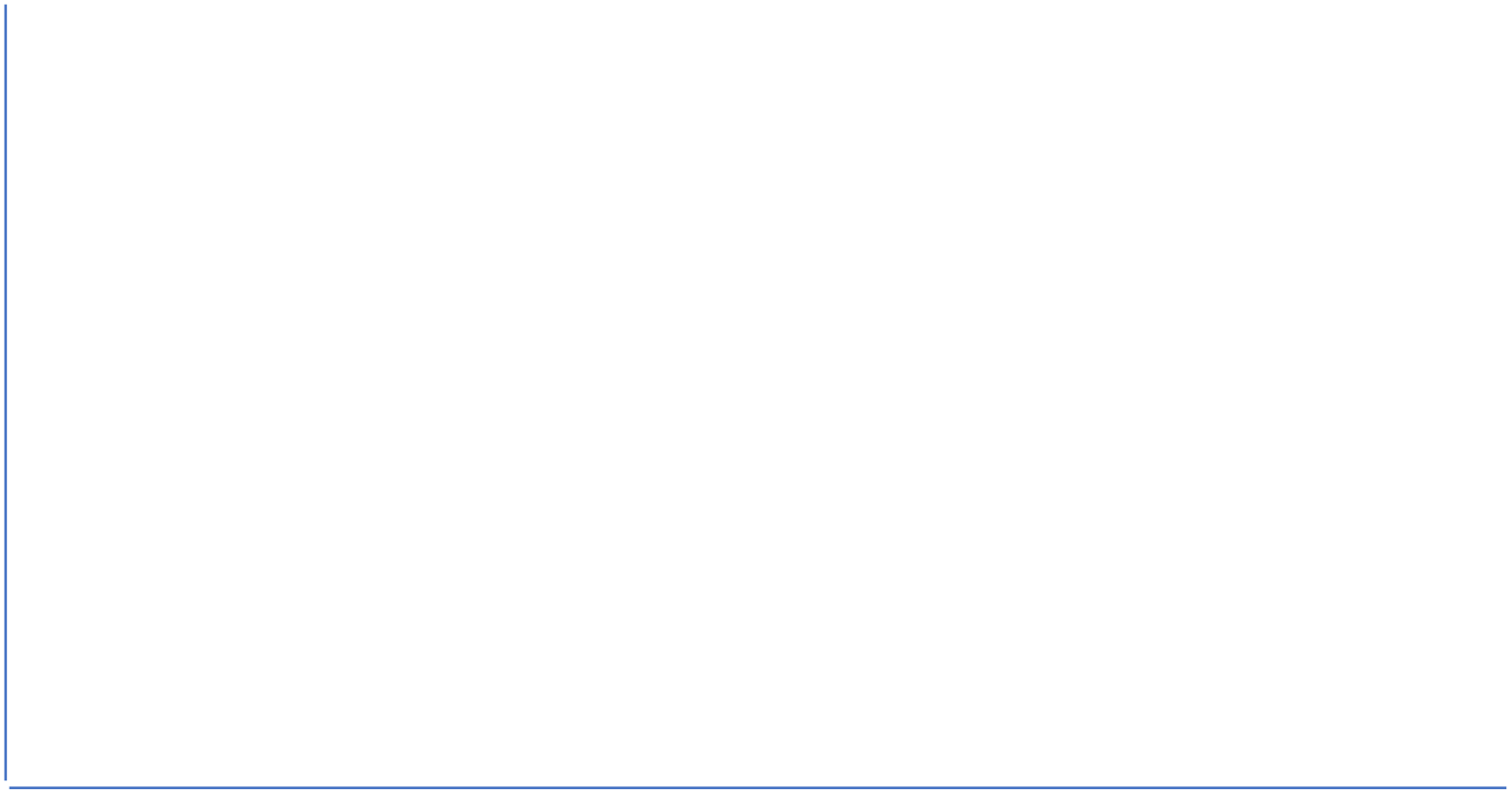
66. use the Hardy-Weinberg equation to determine allele and genotype frequencies using

$$p + q = 1 \text{ and } p^2 + 2pq + q^2 = 1$$

67. describe how interactions between predators and prey and between producers and consumers can alter populations.

Lynx:

Hare:



68. describe commensalism, mutualism, and parasitism.

69. understand the difference between interspecific and intraspecific competition and can predict how both will affect populations.

INT**ER**- competition between members of DIFF**ER**ENTSPECIES

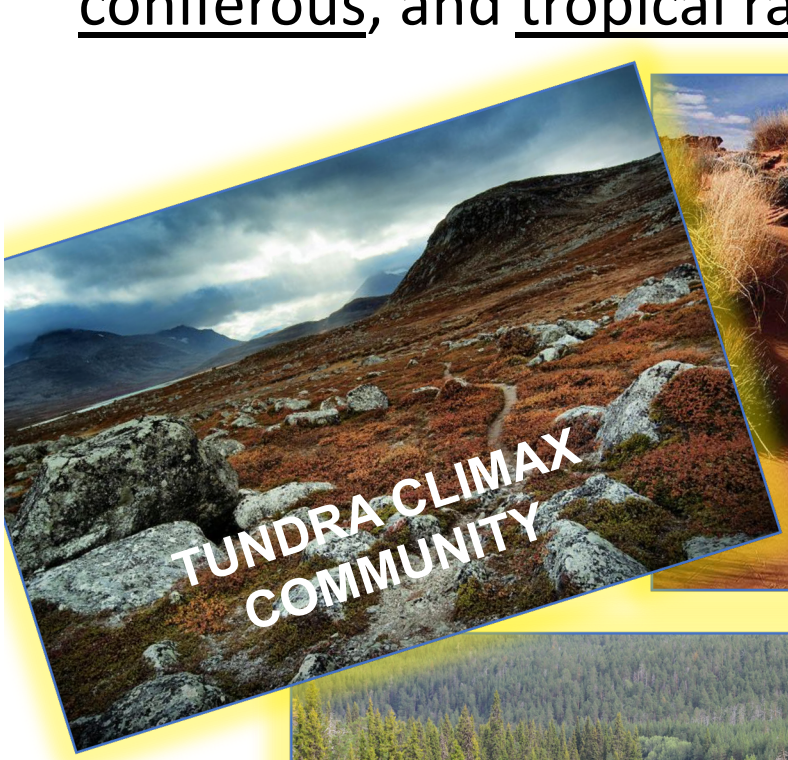
INTR**A**- competition between members of S**A**ME

71. explain how / why mixtures of populations may change over time from a climax community through different stages of succession.

Primary Succession:
Secondary Succession:
Climax Community:

Succession occurs in stages:

- **Climax Community: Stable or "final" form of the ecosystem**
- A climax community is one that has reached the **stable stage.**
- Examples are tundra , grassland, desert , and the deciduous, coniferous, and tropical rain forests .



72. know what the terms mortality, natality, immigration, and emigration mean in terms of population size /growth.

△N = factors that increase – factors that decrease

73. describe a population's size & growth using the following terms:

carrying capacity-

biotic potential-maximum population increase by size of litters, how often reproduce, how long to reach maturity

environmental resistance-

74. calculate a population's growth rate (gr), per capita growth rate (cgr) and population density (Dp).

$\triangle N =$

GR =

Remember most recent data first
When working with # of individuals.

CGR=

D=

75. explain the differences between a logistic growth pattern (S curve) and an exponential growth pattern (J curve)

76. explain the difference between an open and closed populations.

77. list some of the major differences between r-selected and K-selected organisms.

	"K" selected	"r" selected
Life span		
Reproductive age		
Reproductive rate		
Parental care		
Size		
Carrying capacity.	Near C.C.	Rapid change