Bio test 3 Cheat Sheet

by taliam44 via cheatography.com/125944/cs/25047/

Fill in phases of cell cycle

G^0	most cells that will no longer divide
G^1 phase	restriction point
S phase	chromosomes duplicate
prophase	mitotic spindle begin to form
prophase	chromosomes become visible
pro metaphase	kinetochore-microtubule interactions move chromosomes to midline
metaphase	chromosomes line up at central plate
anaphase	sister chromosome separate and chromosomes move apart
telophase	nuclear membranes form around separated chromosomes
cytokinesis	cell plate forms or cleavage furrow pinches cells apart

Probabilities of Genotype (example)

Cross	Offspring	Probability
AAbb X *AaBb*	*AAbb*	1/4
AaBB X *AaBb*	*aaBB*	1/8
AABbcc X *aabbCC*	*AaBbCc*	1/2
AaBbCc X *AaBbcc*	*aabbcc*	1/32

Blood Groups of Man who could not be the father

Child	Mother	Man
AB	A	no groups exonerated
O	B	A or O
A	AB	A or O
O	O	AB only
B	A	B or O

Steps of transcription

Initiation	Transcription factors bind to promoter and facilitate the binding of RNA polymerase II, forming a transcription initiation complex; RNA polymerase II separates DNA strands and RNA synthesis begins at the start point.
Elongation	RNA polymerase II moves along the DNA strand, connecting RNA nucleotides that have paired to the DNA template to the 3' end of the growing RNA strand
Termination	After polymerase transcribes past a polyadenylation signal sequence, the pre-mRNA is cut a released.

Phases of cell cycle

Interphase	90% of cell cycle; growth and DNA replication
G1 phase	Chromosome consists of a long thin chromatin fiber made of DNA and associated proteins; growth and metabolic activities occur.
S phase	Synthesis of DNA. Chromosome is duplicated; two exact copies (sister chromatids) are produced and held together tightly at their centromeres and by cohesions along with their length; growth and metabolic activities continue.
G2 phase	Growth and metabolism continue
Mitotic phase	Cell division occurs
Prophase	The sister chromatids, held together by sister chromatid cohesion, become coiled and tightly condensed.
Prometaphase	Kinetochore fibers from opposite ends of the mitotic spindle attach to the kinetochores of the sister chromatids; the chromosomes move towards midline.
Metaphase	The centromere of the chromosome is aligned at the metaphase plate along with the centromeres of the other chromosomes.
Anaphase	Cohesins are cleaved and the sister chromatids separate (now considered individual chromosomes) and move to opposite poles of the cell.
Telophase	Chromatin fiber of the chromosome uncoils and is surrounded by reforming nuclear membrane.

Processes of transcription and translation

	Transcription	Translation
Template	DNA	RNA
Location	nucleus (cytoplasm in prokaryotes)	cytoplasm; ribosomes can be free or attached to ER
Molecules involved	RNA nucleotides, DNA template strand, RNA polymerase, transcription factors	amino acids, tRNA, mRNA, ribosomes, ATP, GTP, enzymes, initiation, elongation, and release factors.

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Processes of transcription and translation (cont)

Enzymes involved	RNA polymerase, spliceosomes	aminoacytl-tRNA synthetase, ribosomal enzymes (ribozymes)
Control-start and stop	transcription factors locate promoter region with TATA box and start point, polyadenylation signal sequence to stop	initiation factors, initiation sequence (AUG), stop codons, release factor
Product	primary transcript (pre-mRNA)	polypeptide
Product processing	RNA processing: 5' cap and poly-A tail, splicing of pre-mRNA, introns removed by spliceosomes.	spontaneous folding, disulfide bridges, signal peptide removed, cleaving, quaternary structure, modification with sugars, etc.

Eukaryotes*

Key events of meiosis

Interphase	Chromosome duplication; sister chromatids attached at centromere and by sister chromatids cohesion along their lengths.
Prophase I	Chromosomes condense. Synapsis of homologous pairs (held by synaptonemal complex); crossing over (exchange of corresponding DNA segments) is evident at chiasmata.
Metaphase I	Homologous pairs line up independently at metaphase plate (orientation of maternal and paternal homologs is random).
Anaphase I	Homologous pairs of chromosomes separate and homologs move toward opposite poles; sister chromosomes remain attached at centromere.
Metaphase II	Haploid set of chromosomes, each consisting of 2 sister chromatids, aligns at metaphase plate; sister chromatids not identical due to crossing over.
Anaphase II	Sister chromatids separate and move to opposite poles as individual chromosomes.

Levels of metaphase chromosome packing

1. Nucleosomes (10-nm fiber of nucleosomes and linker DNA)
2. 30-nm fiber
3. Looped domains (300-nm fiber)
4. coiling and folding of looped domains into highly condenses metaphase chromosome.

DNA sequence info

Types of DNA	Description	%
Exons or rRNA/t-RNA coding	Protein and RNA coding sequences	1.5
Introns	noncoding sequences with genes	20
Regulatory sequences	enhancers, promoters, and other such sequences	5
Transposable elements and related sequences	multiple copies of mostly movable sequences	44
Alu elements	family of short sequences related to transposable elements	10
L1 sequences	retrotransposons found in introns of most genes	17
Unique noncoding DNA	gene fragments and psuedogenes	15
Large-segment duplications	multiple copies of large sequences	5-6
Simple sequence DNA	DNA centromeres and telomeres, also STRs	3

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