

Genetics, Biology 304
Outline of Topics/Terminology – Exam 1

The following is a list of topics and terms/concepts that have been covered during lecture and that you will be responsible for on the exams. This list is intended to help your study for the exam. However, it is NOT a complete list of everything discussed; you are responsible for everything discussed in lectures, including subjects not on this list.

Some history (<i>discussed, but not on exam</i>)	Incomplete dominance
Hippocratic school of medicine	Codominance
Theory of epigenesis	Perfect additivity
Theory of preformation	Pleiotropy
Homunculus	Phenylketonuria (PKU)
Blending inheritance	Ploidy
Inheritance of acquired characters	Diploid
epigenetics	Haploid gametes
pangensis	Tetraploid
Gregor Mendel	Polyploidy
Why did Mendel choose the garden pea, <i>Pisum sativum</i>	Penetrance
Monohybrid cross	Incomplete penetrance
Hybrid	Expressivity
Parents (P ₁)	Epistasis
Offspring (F ₁) = filial generation 1	Complementary gene action
Offspring (F ₂) = filial generation 2	Duplicate gene action
Reciprocal crosses	Sex-linked genes
Dominant trait	Autosomes
Recessive trait	Sex chromosomes
Unit factors = hereditary determinants	Homogametic
Genes vs. alleles	Heterogametic
Genotype vs. phenotype	Haplo-diploid
Homozygous vs. heterozygous	X-linkage or X-linked inheritance
Mendel's First Law = The Principle of Segregation	Pedigrees
Punnett Square	Sex-linked for recessive alleles
Test cross	Sex-linked trait for dominant alleles
Backcross	Y-linked
Dihybrid Cross	Sex-limited traits
Principle of Independent Assortment	Sex-influenced
Probability	Lethal alleles
Product rule (Multiplicative rule)	Deleterious alleles
Sum rule (Additive rule)	Conditional alleles
Pedigrees	Somatic cells vs. germ cells
Pedigree conventions	Chromosome theory of heredity
Patterns for dominant vs. recessive traits	Thomas Hunt Morgan
Carriers	Cell cycle
Multiple alleles	Interphase
Wildtype	G ₁ = first gap phase
Complementation testing	G ₀ arrest
Dominance	S phase = synthetic phase
Complete dominance	Sister chromatids
	Centromere
	G ₂ phase = second gap phase

G₂ arrest
 Mitosis
 Prophase
 Centrioles
 Microtubules
 Tubulin
 Cytoskeleton
 Asters
 Mitotic spindle
 Kinetochore
 Metaphase
 Prometaphase
 Metaphase plate
 Anaphase
 Disjunction
 Telophase
 Cytokinesis
 Cell furrow
 Contractile ring
 Cell plate
 Plant vs animal cells
 Meiosis → haploid gametes
 Reduction division = meiosis I
 Prophase I
 Homologous chromosomes
 Synapsis
 Bivalent
 Tetrad
 Crossing over
 Chiasmata
 Synaptonemal complex
 Lateral elements
 Central element
 Leptonema = leptotene stage
 Zygonema = zygotene stage
 Pachynema = pachytene stage
 Diplonema = diplotene stage
 Diakinesis
 Metaphase I
 How metaphase I differs from mitotic metaphase
 Anaphase I
 Telophase I
 Interkinesis
 Equational division = Meiosis II
 Prophase II
 Metaphase II
 Anaphase II
 Telophase II
 Alternation of generations
 Gametophyte

Sporophyte
 Gametogenesis
 Spermatogenesis
 Oogenesis
 Polar bodies
 Sporogenesis
 Microspores → pollen
 Megaspores → 3 degenerate and 1 becomes the female gametophyte
 Female gametophyte → mitosis → 8 haploid cells
 Endosperm
 Double fertilization
 Heterokaryon (Heterokaryotic cell) - a cell that contains multiple, genetically different nuclei (e.g., many fungi)
 Asexual vs sexual reproduction
 Binary fission
 Vegetative reproduction
 Non-meiotic spore formation
 Parthenogenesis
 How does meiosis explain Mendel's Laws
 Locus (loci)
 Linkage
 Linkage map = chromosome map
 Linkage group
 Recombination
 Recombinants
 How do genes recombine?
 Recombination frequency
 Why is the maximum R = 50%?
 Map unit
 centiMorgan (cM)
 Why is the maximum R = 50%?
 Chromatid interference
 Coefficient of coincidence
 Three-point test cross = tri-hybrid test cross
 Are these genes linked?
 How do we identify which two types of chromosomes the original parents had?
 What is the correct sequence of genes?
 What is the genetic distance between each pair of genes?
 Karyotype
 Centromere
 Chromosome arms
 Chromatid
 Telomere
 Proximal vs. distal
 Metacentric chromosomes
 Submetacentric chromosomes

Acrocentric chromosomes
Telocentric chromosomes
Dicentric chromosomes
Acentric chromosome
Monoploid chromosome number
Species that are polyploid → have larger cells
Many polyploid organisms are sterile
Univalent
Trivalent
Allopolyploids
Autopolyploids
Polyploidization
Endomitosis
Polytene chromosomes