Reduction Division

Sexual Reproduction = Genetic Diversity = GOOD
Pierre and Joseph

Reduction Division

Sexual Reproduction	= Genetic Diversity = GOOD		
Pierre and Joseph	***gametes*** *(egg & sperm) each contained* ***2*** *chromosomes*; ***somatic*** *(nonreproductive) contained* ***4*** *chromosomes (most cells)*		
Fertilization (Van Beneden)	= syngamy = fusion of gametes		
Reduction Division	producing cells with half the number of chromosomes = meiosis		
Sexual Life Cycle	meiosis + fertilization = sexual reproductiondiploid cells	diploid cells=2 sets of chromosomes	haploid cells= one set of chromosomes (23 through eggs & 23 through sperm[1])
Somatic Tissues	post fertilization= zygote divides by mitosis	plant cells=haploid cells divide by mitosis	

Reduction Division (cont)

Germ Line Tissues	In animals= cells set aside to undergo meiosis & produce gametes	gamete - prroducing
Synapsis [2]	aligning of homologous chromosomes(homologues)	
Homologous Recombination [2]	Crossing over= small segment excahnages	

[1] This does not mean 1/2 mom, 1/2 dad

[2] Special features of Meiosis (PEQ)

Unique Features of Meiosis (PEQ)

Synapsis	aligning of homologous chromosomes(homologues)		
Homologous Recombination	genetic exchange between homologous chromosomes	Crossing over= small segment excahnages	=Genetic **diversity**
Reduction Division	Chromosomes do not replicate beteween the 2 nuclear divisions		

Prophase 1

Leptotene	Chromosomes condensed tightly
Zygotene	synaptomal complex
Pachytene	
Diplotene	
Diakinesis	

Inheritance

pedigree	maps the flow of traits;s doinance and recessiveness	
sexlinked traits (sex linkage)	trait determined by a gene on the x-chromosome	whatever is on the x shows since there is no combative gene or competition on y
some traits tend to stay within races	EX: sickle cell anemia= African americans	
chromosomal theory of inheritance	similar chomosomes paired with one another during meiosis	
problem with chromosomal theory	why does number of characters that assort often greaetly exceed the number of chromosomes pairs the organism posesses	

Genetic Recombination

crossing over	exchange of chromosome arms	form of recobination
Genetic Map	results of crosses that can be put together to measure distance between genes in terms of frequesncy recombination	
A map unit	centimorgan	

Genetic Recombination (cont)

3 point cross	cross involving 3 linked genes
Human genome Project	sequence the entire human genome

Early Ideas of Heredity

Classical Assumption 1: Constancy of Species	heredity occurss within species	
Classical Assumption 2: Direct Transmission of Traits	traits are transmitted directly	
Koelreuter	carried out hybridization of plant species	
Classical Assumptions Fail	traits can be 'masked' and reappear in one generation (contradicts theory of direct transmission)	traits-segregation of alternative forms of character
TA Knight and Peas	did not quantify or count their results	

Early geneticists demonstrated that some forms of an inherited character (1) can disappear in one generation only to appear unchanged in future generations; (2) segregate among the offspring of a cross; and (3) are more likely to be represented than their alternatives.

Mendel and the Pea

Why Peas?	large variety of pea	large # of true breeding varieties	sexual organs enclosed within flower
LUCKY	Pea plants only have 2 genes for each trait		
Mendel	Father of Genetics		
F1 generation (1st filial)			
F2 generation (2nd filial)	hidden in F1 may have reappeared in F2		
Punnet Squares	predicts offspring possibilities	capital letters-dominant	lowercase letters-recessive
Mendel-Model of heredity	No blending effect		
Law of Segregation(Mendel's 1st Law of Heredity)			
Mendel's second law of heredity: Independent assortment	dihybrids=individuals eheterozygous for both genes	genes located on different chromosomes assort independently during meiosis	gened ilocated on different chromosmes assort independently
continuous variation	greater # of genes that influence character	the more continuous the expected distribution of versions of trait character	

Mendel and the Pea (cont)

pleiotropic effects	individual allele will have more than one effect on the phenotype	on gene effects many traits in marked contrast to polygemy(many genes effect one trait)
Lack of complete dominance (codominance)	ability to see heterozygous zygote	EX: red dominant over white but when together as heterozygous the recessive trait is not allowing it to be fully red (red+white=pink)

Blood Groups and Rh Factors (PEQ)

ABO blood groups	Landsteiner blood groups		
Type A	add only galactosamine	Either I^AI^A homozygotes or I^Ai heterozygotes	
Type B	add only galactose	Either I^BI^B homozygous or I^BI^b heterozygous	
Type AB	add both sugars (galactosamine and galactose)	I^AI^B heterozygous	Universal **recipient**
Type O	add neither sugar	are ii homozygous	Universal **donor**

Blood Groups and Rh Factors (PEQ) (cont)

incorrect transfusion	agglutinate=cause cells to clump		
Rh Blood group antigens	named after rhesus monkies	Rh-positive = Rh cell surface marker	Rh-negative = lack the Rh cell surface marker
Rh negative	detect Rh surface antigens as	Rh negative mother births Rh positive child= build antibodies which secon time around could kill baby (erythroblastosis fetalis)	

Epistasis

Epistasis	one gene can interfere with the expression of another gene		
Eample Lab REtrievers	Gene: EE or Ee = dark pigmmentation ee=no pigmentation	second gene: E_B_ = black fur E_bb= brown fur	eebb = brown bigment on brown nose of yellow lab eeB_ = black pigment on the nose of yellow labs

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