

Cytogenetics

1. What is a change in the number of entire chromosome sets called?
 - a. Aneuploidy
 - b. Euploidy
 - c. Monosomy
 - d. Trisomy
 - e. Deficiency

2. What is an individual with only one set (n) of chromosomes called?
 - a. Triploid
 - b. Monosomic
 - c. Trisomic
 - d. Haploid
 - e. Polyploid

3. Bread wheat is an allohexaploid. What is its most likely origin?
 - a. Tripling the original diploid number by use of colchicine
 - b. Crossing with other hexaploid species
 - c. Hybridization of 3 diploid species accompanied by chromosome doubling of each hybrid species
 - d. By inducing mutations with x-rays or chemical mutagens

4. Define aneuploidy
 - a. A reduction in the number of chromosome sets
 - b. Loss or addition of a chromosome
 - c. An increase in the number of chromosome sets
 - d. An increase in chromosome sets when two species are crossed

5. Choose an example of a human monosomic.
 - a. Turner syndrome
 - b. Klinefelter syndrome
 - c. Down syndrome
 - d. Translocation Down's syndrome

6. What is the karyotype of a female individual exhibiting Down syndrome?
 - a. 44 autosomes, + XX
 - b. 43 autosomes, + XX
 - c. 45 autosomes, + XX

- d. 46 autosomes, + XX
 - e. 44 autosomes, + XY
7. In a certain stock of *Drosophila*, some individuals exhibited normal red eyes while others showed eyes with red and white patches (variegated). On cytological examination of the flies with variegated eyes, it was found that the chromosome segment carrying the eye color gene was attached near a heterochromatic region on another chromosome through translocation. What genetic phenomenon was producing this mutant phenotype?
- a. Pseudodominance
 - b. Position effect
 - c. Genetic non-disjunction
 - d. Pleiotrophy
8. One chromosome of an individual has the genes ABCDEF and the homologous chromosome has the genes AEDCBF. What is this condition called?
- a. Deletion heterozygote
 - b. Duplication homozygote
 - c. Deletion homozygote
 - d. Inversion heterozygote
9. What is the difference between autopolyploidy and allopolyploidy?
- a. Two species are involved in autopolyploidy and only one species in allopolyploidy.
 - b. Only one species is involved in both; the method of inducing polyploidy differs.
 - c. Two species are involved in allopolyploidy and only one species in autopolyploidy.
 - d. Two species are involved with both; colchicine is used with autopolyploidy and naturally occurring polyploidy is found with allopolyploidy.
10. A diploid individual has genes ABCFED in a chromosome and the homologous chromosome has genes ABCFED. The normal order of the genes is ABCDEF. What is this condition called?
- a. Duplication homozygote
 - b. Inversion heterozygote
 - c. Deficiency heterozygote
 - d. Translocation homozygote
 - e. Inversion homozygote
11. There is a reciprocal translocation homozygote. What occurs during synapsis?
- a. There is normal pairing

- b. A cross-shaped configuration forms
 - c. The chromosomes do not pair
 - d. A deficiency loop forms
 - e. A duplication loop appears
12. The European raspberry (*Rubus idaeus*) has 14 chromosomes. The dewberry (*Rubus caesius*) is a tetraploid with 28 chromosomes. Hybrids between these two species are sterile F₁ individuals. Some unreduced (homologous chromosomes do not separate at Anaphase I of meiosis) gametes of the F₁ are functional in backcrosses. Determine the chromosome number for individuals derived from the F₁ backcrossed to *R. idaeus*.
- a. 21
 - b. 28
 - c. 35
 - d. 42
13. Eight regions of a diptera (fly) chromosome are easily recognized cytologically and are labeled A through H. Four different races within this species have the chromosomal orders listed as: (1) ABCDEFGH, (2) ADCBEFGH, (3) ABCHGFED, (4) AHGFEBDC. What process appears to be involved in the evolution of this genus?
- a. Duplication
 - b. Mutation
 - c. Inversion
 - d. Translocation
14. A dominant allele *W* produces yellow flowers in a certain plant species and the recessive allele *w* produces white flowers. Plants trisomic for the chromosome bearing the color gene will produce N and $N + 1$ functional female gametes where N = the number of chromosomes. What is the phenotypic ratio expected from the following cross?

Seed parent		Pollen parent
WWw	x	Ww

- a. 3 yellow: 1 white
 - b. 5 yellow: 1 white
 - c. 11 yellow: 1 white
 - d. 15 yellow: 1 white
15. Which of the following is an example of a deletion?
- a. Seedless watermelon
 - b. Down's syndrome in humans
 - c. Bread wheat

d. Cat-cry syndrome in humans