**Chapter 13**

**Chromosomes**

**Multiple Choice Questions**

1. A chromosome consists of   
A. mostly protein and RNA with a small amount of DNA.  
**B.** mostly DNA and proteins with a small amount of RNA.  
C. about equal proportions of DNA, RNA, and protein.  
D. DNA only.

2.  Spindle fibers (microtubules) attach to a chromosome's \_\_\_\_\_ during mitosis.   
**A.** centromere  
B. telomere  
C. genomere  
D. euchromatin

3. A chromosome with two arms of about equal length is called   
A. telocentric.  
B. acrocentric.  
**C.** metacentric.  
D. paracentric.

4. Heterochromatic regions at the ends of chromosomes are   
A. centromeres.  
B. euchromatin.  
**C.** telomeres.  
D. DNA hubs.

5.

The satellite regions that distinguish chromosomes 13, 14, 15, 21, and 22 are

A. primarily euchromatin.  
B. proteins that stabilize the chromosomes.  
C. located near the centromere.  
**D.** repeated genes that encode ribosomal RNAs and proteins.

6. The area of genetics that links traits, including illnesses, to chromosome variations is   
A. population genetics.  
B. transmission genetics.  
**C.** cytogenetics.  
D. evolutionary genetics.

7.  **The areas** between the protein-rich parts of a chromosome and the telomeres are called-26-2013   
A. submetacentric.  
**B.**  subtelomeres.  
C.  subcentromeres.  
D.  subchromatin.

8. The DNA sequence that is repeated many times in a telomere is   
A. UUAGGG.  
B. AAUCCC.  
C. AATCCC.  
**D.** TTAGGG.

9. Chromosomes in karyotypes are arranged and ordered by   
A. telomere length.  
B. centromere position.  
**C.** length.  
D. width.

10. The centromere of human chromosome 15 creates a long arm and a very short arm. Therefore, this chromosome is   
A. telocentric.  
B. acrocentric.  
**C.** submetacentric.  
D. metacentric.

11. Which type of cell could not be used for karyotyping?   
**A.**  Red blood cell  
B.  White blood cell  
C. Fibroblast  
D.  Skin cell

12. Amniocentesis cannot be used to detect fetal   
A. gender.  
**B.** intelligence.  
C. chromosomal abnormalities.  
D. biochemicals that indicate an inborn error of metabolism.

13. Chorionic villus sampling differs from amniocentesis in that for CVS   
A. cells must first be cultured.  
B. biochemical tests can be performed on the sample.  
**C.** a karyotype is prepared directly from collected cells.  
D. cells do not directly descend from the fertilized ovum.

14.  One of the advantages of chorionic villus sampling (CVS) over amniocentesis is that CVS   
A.  samples amniotic fluid.  
B.  can never be lethal.  
C.  poses lesser risk to the fetus.  
**D.**  provides earlier results.

15.  The chromosome shorthand \_\_\_\_\_ is used to designate a normal male.   
A.  45,X  
B.  46,XX  
**C.**  46,XY  
D.  47,XXY

16. CVS cannot detect inborn errors of metabolism because   
**A.** it does not sample amniotic fluid.  
B. it is done too early in the pregnancy.  
C. it is done too late in the pregnancy.  
D. such errors are not detectable until after birth.

17. Which maternal serum marker pattern indicates increased risk of Down syndrome in a fetus?   
A. Deficient hCG and inhibin A and elevated AFP, estradiol, and pregnancy-associated plasma protein A Progesterone and testosterone  
B. Elevated hCG, inhibin A, AFP, estradiol, and pregnancy-associated plasma protein  
C. Deficient hCG, inhibin A, AFP, estradiol, and pregnancy-associated plasma protein  
**D.** Elevated hCG and inhibin A and deficient AFP, estradiol, and pregnancy-associated plasma protein A

18. To observe chromosomes, they must be   
A. actively transcribing all of their genes.  
B. actively transcribing some of their genes.  
**C.** condensed.  
D. in interphase.

19. The first known sketches of human chromosomes were drawn in   
A. 1776.  
B. 1814.  
**C.** 1882.  
D. 1951.

20. In the earliest karyotypes, chromosomes were distinguished by   
A. specific size order.  
**B.** general size classes.  
C. banding patterns.  
D. stage of the cell cycle.

21.  The technique called fluorescence in situ hybridization (FISH) uses   
A. stains to sort chromosomes into general size classes, designated A through G.  
**B.** DNA probes with attached fluorescent molecules that indicate specific DNA sequences.  
C. lures to pull out specific sequences from their chromosomes.  
D. stains that distinguish AT-rich from GC-rich sequences.

22. A person who is 46, XX is a   
**A.** chromosomally normal female.  
B. chromosomally abnormal female.  
C. chromosomally normal male.  
D. chromosomally abnormal male.

23.  \_\_\_\_\_ are illustrations that show chromosome arm and major regions.   
**A.** Ideograms  
B. Chromatograms  
C. Polygrams  
D. Anagrams

24. A karyotype with an extra set of chromosomes indicates   
A. aneuploidy.  
**B.** polyploidy.  
C. diploidy.  
D. haploidy.

25. Polyploidy can result when   
A. a translocation occurs between two chromosomes.  
B. one pair of homologous chromosomes does not separate during meiosis.  
C. a developing gamete is haploid.  
**D.** a haploid sperm fertilizes a diploid egg.

26. A cell that has three copies of every chromosome is   
A. euploid.  
**B.** triploid.  
C. aneuploid.  
D. tetraploid.

27. Cells that have an extra 21st chromosome are   
A. tetrasomic.  
B. triploid.  
C. haploid.  
**D.** trisomic.

28. A man with trisomy 21 could pass Down syndrome to offspring if he   
**A.** produces sperm that have two copies of chromosome 21.  
B. produces sperm lacking chromosome 21.  
C. also has Turner syndrome.  
D. is a carrier of a deletion for chromosome 21.

29. The meiotic error that results in aneuploid cells is   
A. crossing over.  
**B.** nondisjunction.  
C. recombination.  
D. unequal segregation.

30. Only nine types of aneuploids are known in newborns because   
A. only nine chromosomes undergo nondisjunction.  
**B.** most types of aneuploids are lethal early in development.  
C. most aneuploids do not cause detectable defects.  
D. most aneuploids do not affect the phenotype.

31. In humans, the most frequently seen autosomal aneuploid is   
A. monosomy 21.  
B. trisomy 13.  
**C.** trisomy 21.  
D. tetraploidy.

32.  People with Turner syndrome have \_\_\_\_\_ chromosome constitution.   
A. XX  
B. XXY  
**C.** XO  
D. XXX

 33.  People with Klinefelter syndrome have \_\_\_\_\_ chromosome constitution.

**A.** XXY  
B. XY  
C. YO  
D. XXX

34.  Chorionic Villus Sampling reveals that a fetus has the karyotype 47, XX, +21. What is the diagnosis?   
A. Edward syndrome  
B. Turner syndrome  
**C.** Down syndrome  
D. Klinefelter syndrome

35. Chorionic villus sampling reveals that a fetus has the karyotype 45, X. What is the diagnosis?   
A.  Normal male  
B. Klinefelter syndrome  
**C.** Turner syndrome  
D. Down syndrome

36. Chorionic villus sampling reveals a fetus has the karyotype 47, XYY. What is the diagnosis?   
A. Normal female  
B. Klinefelter syndrome  
C. Edward syndrome  
**D.** Jacobs syndrome

37. Aneuploidy may occur in some cells of an individual if nondisjunction happens in   
**A.** an early embryo.  
B. a sperm cell.  
C. an oocyte.  
D. a polar body.

38.  Which of these has never been observed in a viable human birth?   
**A.** YO male  
B. XO female  
C. XXY male  
D. XXX female

39. Most males born with an extra Y chromosome   
A. die shortly before or after birth.  
B. are violent and anti-social.  
**C.** are tall but are otherwise normal.  
D. are phenotypically female.

40.  \_\_\_\_\_ syndrome can only result from non-disjunction in the male and female.   
A. YO  
B. XO  
C. XXY  
**D.** XXYY syndrome

41. Cri-du-Chat syndrome is caused by a   
A. reciprocal translocation between chromosomes 2 and 20.  
B. paracentric inversion of chromosome 21.  
**C.** deletion of part of chromosome 5.  
D.  non-reciprocal translocation between chromosomes 14 and 21.

42. A chromsomal inversion that does not include the centromere is   
A. epicentric.  
**B.** paracentric.  
C. metacentric.  
D. isocentric.

43. A chromosome that results when the centromere splits in the wrong plane during meiosis, forming identical arms, is a(n)   
A. ring chromosome.  
B. metachromosome.  
C. parachromosome.  
**D.** isochromosome.

44. The type of chromosome abnormality that yields a long chromosome consisting of most of two acrocentric chromosomes is a(n)   
**A.** Robertsonian translocation.  
B. pericentric inversion.  
C. paracentric inverson.  
D. reciprocal translocation.

45. A karyotype that uses FISH that shows two chromosomes, each with two colors, but in the opposite patterns, most likely indicates a   
A. Robertsonian translocation.  
B. pericentric inversion.  
C. paracentric inverson.  
**D.** reciprocal translocation.

46. Uniparental disomy results when a child inherits   
A. two recessive alleles for the same gene, one from each parent.  
**B.** two alleles for the same gene from one parent.  
C. one recessive allele from one parent.  
D. more than two alleles for the same gene from one parent.

47. Uniparental disomy explains   
A. a person with dwarfism who has autosomal dominant achondroplasia born to parents of normal height.  
B. some cases of severe blood infections.  
C. a new mutation in which a child has a condition that no other relative has.  
**D.** a child with an autosomal recessive condition who has one wild type parent and one carrier parent.