

Cell Division

1. Bacteria divide by binary _____, in which the cell divides into two nearly equal halves.
2. DNA coiled around histone proteins forms a complex known as a _____.
3. Most eukaryotic cells go through a repeating process of growth and division referred to as the cell _____.
4. The accommodation of the very long DNA fiber into a limited space of the nucleus is achieved by coiling around beads of histones into repeating subunits. These subunits of chromosomes are given the name _____.
5. Each chromosome has a region called the _____ somewhere between the two ends where attachment of protein rays occurs.
6. _____ is that portion of the cell cycle in which the chromosomes are invisible under the light microscope because they are not yet condensed.
7. Prophase is the first stage of mitosis characterized by the _____ of the chromosomes.
8. _____ is the stage of mitosis characterized by the alignment of the chromosomes in a ring along the inner circumference of the cell.
9. The stage of mitosis characterized by the physical separation of sister chromatids is called _____.
10. The last stage of mitosis is characterized by the disassembly of spindle apparatus, the reestablishment of the nuclear membrane, and the decondensation of the chromosomes into invisible threads. This stage is known as _____.
11. The progress of mitosis is regulated by _____ and their dependent kinases.
12. Binary fission in prokaryotes concludes with the accumulation of _____ protein at the midpoint of the cell which facilitates septum formation.
13. Normally _____ functions in the cell to stop cell division if the cell has experienced extensive DNA damage.
14. Eukaryotic chromosomes are composed of a complex of 60% protein and 40% DNA. The name of this chemical complex is
 - A. a histone complex
 - B. chromatin
 - C. a histamine complex
 - D. a chromatid
 - E. a centromere

15. If a eukaryotic cell has a single set of chromosomes, it is called
- A. haploid
 - B. diploid
 - C. polypoid
16. The physical map of the array of chromosomes is called
- A. ecotype
 - B. a haplotype
 - C. a karyotype
 - D. a phenotype
 - E. a genotype
17. By the end of this phase of mitosis, the centromere joining each pair of sister chromatids is attached by microtubules to opposite poles of the spindle apparatus. This phase is called
- A. prophase
 - B. metaphase
 - C. anaphase
 - D. telophase
 - E. interphase
18. The physical distribution of cytoplasmic material into the two daughter cells is called
- A. DNA replication
 - B. mitosis
 - C. cytokinesis
 - D. binary fission
 - E. syngamy
19. Which of the following cell functions are maintained by cell division?
- A. growth, reproduction
 - B. death
 - C. metabolism
 - D. movement
 - E. organization
20. The bacterial genome exist as a
- A. single, circular, protein-coated, double stranded DNA molecule
 - B. single, circular, uncoated, double stranded DNA molecule
 - C. single, circular, uncoated, double stranded RNA molecule
 - D. single, linear, uncoated, double stranded DNA molecule
 - E. many, circular, uncoated, double stranded DNA molecules

21. The division of a bacterial cell occurs as the
- A. cell wall develops cracks around the equator of the cell
 - B. chromosomes are pulled toward the ends of the cell
 - C. cytoplasm forms a cell plate around the middle of the cell
 - D. microfilaments and microtubules constrict the cytoplasm
 - E. plasma membrane pinches inward constricting the cell
22. The number of chromosomes characteristic of eukaryotes, in general,
- A. can usually be determined without the use of a microscope
 - B. can usually be predicted from the size of the organism
 - C. change as the organisms grow and age
 - D. vary considerably from 2 to 100s in different species
 - E. vary depending on the type of the cell in the same organism
23. Eukaryotic chromosomes are coated with proteins containing a high proportion of basic amino acids. These proteins are given the name
- A. albumins
 - B. antibodies
 - C. enzymes
 - D. histamines
 - E. histones
24. Some of the portions of the chromatin are permanently condensed so that their DNA is never expressed. All of these portions stain very intensely and are given a common name of
- A. DNA dark bands
 - B. euchromatin
 - C. heterochromatin
 - D. genome
 - E. haploid DNA
25. In the human, the body cells (non-sex cells) contain two sets of chromosomes totaling
- A. 2
 - B. 22
 - C. 44
 - D. 46
 - E. 23
26. The two copies of each chromosome in body cells are called
- A. chromatids
 - B. homologous chromosomes
 - C. sister chromosomes
 - D. daughter chromosomes
 - E. genes

27. Before cell division of the body cells, each homologue replicates into two parts. These parts are connected by a centromere and are called
- A. sister chromatids
 - B. daughter chromatids
 - C. sister chromosomes
 - D. daughter chromosomes
 - E. genes
28. Which of the following sequence of cell-cycle phases is characteristic of eukaryotes?
- A. G to S to M
 - B. G₁ to S to G₂ to M to C
 - C. S to M to C
 - D. G₁ to G₂ to S to C
 - E. G₁ to G₂ to G₃ to S to C
29. The phase of cell division in which the cell grows most is
- A. G₁
 - B. S
 - C. G₂
 - D. M
 - E. C
30. The phase of the cell cycle during which the cytoplasm divides to form two cells is
- A. G₁
 - B. S
 - C. M
 - D. C
 - E. G₂
31. The cell organelles replicate prior to genomic separation in
- A. G₁ phase
 - B. S phase
 - C. G₂ phase
 - D. M phase
 - E. C phase
32. The first stage of mitosis, when the chromosomes become visibly shorter and thicker is
- A. anaphase
 - B. interphase
 - C. metaphase
 - D. prophase
 - E. telophase

33. In prophase, ribosomal RNA synthesis stops when the chromosomes condense, and this makes
- A. chromosomes longer
 - B. the nuclear envelope to show up
 - C. the nucleolus to disappear
 - D. chromosomes to line up at the equator
 - E. staining very light
34. The chromosomes line up at the equator of the spindle during
- A. anaphase
 - B. interphase
 - C. metaphase
 - D. prophase
 - E. telophase
35. The framework of microtubules that appears in cell division which eventually moves the chromatids apart is called the
- A. aster
 - B. cell plate
 - C. centriole
 - D. spindle apparatus
 - E. centromere
36. Which one of the following represents the interphase?
- A. $G_1 + G_2 + S$
 - B. $S + M + C$
 - C. prophase + metaphase + anaphase + telophase
 - D. cytokinesis + mitosis
 - E. $G_0 + G_1 + G_2$
37. The attachment of what molecules is critical for the proper separation of sister chromatids?
- A. chromosomes
 - B. asters
 - C. microtubules
 - D. cyclins
 - E. protein kinases
38. Microtubules become shorter, pulling chromatids to the ends of the spindle, during
- A. anaphase
 - B. interphase
 - C. metaphase
 - D. prophase
 - E. telophase

39. Which of the following is essentially the reverse of prophase?
- A. anaphase
 - B. interphase
 - C. metaphase
 - D. telophase
 - E. cytokinesis
40. Animal cells typically achieve cytokinesis by
- A. binary fission
 - B. forming a cell plate across the middle of the cell
 - C. forming a cleavage furrow that pinches the cell into two
 - D. chromosome condensation
 - E. chromosome elongation
41. Plant cells typically achieve cytokinesis by
- A. binary fission
 - B. forming a cell plate across the middle of the cell
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42. The three checkpoints for eukaryotic cell cycle control are found in
- A. cytokinesis
 - B. G₁ phase
 - C. G₂ phase
 - D. M phase
 - E. in a, b, and c
43. The proteins that participate in the functioning of the checkpoints for cell cycle control are
- A. microtubules
 - B. asters
 - C. histones
 - D. cyclins and cyclin-dependent kinases
 - E. channel proteins
44. Recent studies on cell cycle controls have revealed that animal cells can employ certain factors to override the inhibitory controls of cell division. These belong to a class of proteins called
- A. histones
 - B. channel proteins
 - C. growth factors
 - D. gating proteins
 - E. neurotransmitters

45. Cell division in eukaryotic cells is called

- A. meiosis
- B. mitosis
- C. binary fission
- D. cytokinesis
- E. syngamy

46. Cell division in prokaryotic cells is called
- A. meiosis
 - B. mitosis
 - C. binary fission
 - D. cytokinesis
 - E. syngamy
47. Nuclear division in eukaryotic cells is called
- A. meiosis
 - B. mitosis
 - C. binary fission
 - D. cytokinesis
 - E. syngamy
48. A scientist wants to study histones. Histones are
- A. proteins that are tightly bound to the double strands of DNA
 - B. proteins that are tightly bound with only one of the strands of DNA
 - C. proteins that are tightly bound to mRNA
 - D. proteins that serve as spindle fiber to pull the sister chromatids apart during anaphase
 - E. proteins that are tightly bound to inside of the nuclear membrane
49. Nucleosomes are located in the
- A. nucleus attached to the ends of DNA strands
 - B. nucleus and are associated with DNA and histones
 - C. nucleus and are associated with the nuclear membrane
 - D. nucleus and are associated with mRNA and histones
 - E. nucleus and are associated with the nucleolus and therefore aid in the development of RNA
50. A cell biologist is conducting a karyotype procedure on alligator red blood cells. Exactly what does this mean?
- A. It means that red blood cells from the alligator will be examined with a microscope and the nuclei will be counted.
 - B. It means that red blood cells from the alligator will be examined using restriction enzymes to count the number of centromeres that are present on the chromosomes.
 - C. It means that chromosomes from the red blood cells of the alligator will be examined with a microscope, photographed, counted, lined up with their respective homologous partner, and displayed.
 - D. It means that chromosomes from the red blood cells of the alligator will be examined with a microscope to determine the amount of hemoglobin present.

51. In humans the diploid number of chromosomes is 46. The haploid number is 23. Prior to mitosis in the cell cycle, the cell is in the G₂ phase. Which of the statements is true?
- A. The homologous chromosomes are lined up on the equator.
 - B. The homologous chromosomes have all been copied through DNA replication and are now sister chromatids.
 - C. The homologous chromosomes have been pulled to their respective poles by the spindle apparatus.
 - D. The homologous chromosomes have not been replicated yet.
 - E. The homologous chromosomes are now in the haploid or n condition.
52. Chromosomes have centromeres and when chromosomes are replicated they are called sister chromatids. Which statement is accurate?
- A. In humans somatic cells there are 46 chromosomes and thus 46 centromeres. When replicated there are 92 sister chromatids and 92 centromeres.
 - B. In humans somatic cells there are 46 chromosomes and thus 46 centromeres. When replicated there are 92 sister chromatids and 23 centromeres.
 - C. In humans somatic cells there are 46 chromosomes and thus 46 centromeres. When replicated there are 92 sister chromatids and 46 centromeres.
 - D. In humans somatic cells there are 23 chromosomes and thus 23 centromeres. When replicated there are 46 sister chromatids and 46 centromeres.
 - E. In humans there are 23 chromosomes and thus 46 centromeres. When replicated there are 46 sister chromatids and 92 centromeres.
53. Cytokinesis occurs right after
- A. prophase
 - B. G₁
 - C. G₂
 - D. anaphase
 - E. telophase
54. All of the following phases occur during interphase of the cell cycle except:
- A. G₁
 - B. S
 - C. G₂
 - D. M
55. If a somatic cell has 32 chromosomes prior to S and undergoes mitosis followed by cytokinesis, each new daughter cell will have how many chromosomes?
- A. 64
 - B. 32
 - C. 16
 - D. 8

56. Match each of the following (a letter may be used more than once or not at all).

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|--|-------------------|
| _____ A. Cytoplasmic organelles are partitioned
equally between two daughter cells. | 1. G ₁ |
| _____ B. Hereditary information is partitioned
equally between two daughter cells. | 2. S |
| _____ C. Duplicate copy of the hereditary
information is made. | 3. G ₂ |
| _____ D. Growth of the cell; synthesis of enzymes;
normal metabolism. | 4. M |
| _____ E. Chromosomes are readily visible under
the microscope. | 5. C |

Answer Key

No. on Test	Correct Answer
1	fission
2	nucleosome
3	cycle
4	nucleosomes
5	centromere
6	Interphase
7	condensation
8	Metaphase
9	anaphase
10	telophase
11	cyclins
12	FtsZ
13	p53
14	B
15	A
16	C
17	A
18	C
19	A
20	B
21	E
22	D
23	E
24	C
25	D
26	B
27	A
28	B
29	C
30	D
31	C
32	D
33	C
34	C

35	D
36	A
37	C
38	A
39	D
40	C
41	B
42	E
43	D
44	C
45	D
46	C
47	B
48	A
49	B
50	C
51	B
52	C
53	E
54	D
55	B
56	1-E, 2-D, 3-B, 4-A, 5-D