**现代生命科学导论C**

**课后习题二**

一、选择题（共40题）

1) The smallest cell structure that would most likely be visible with a standard (not super-resolution) research-grade light microscope is a \_\_\_\_\_.

A) ribosome

B) microtubule

C) mitochondrion

D) microfilament

2) Which structure is common to plant *and* animal cells?

A) chloroplast

B) mitochondrion

C) central vacuole

D) centriole

3) Which organelle or structure is absent in plant cells?

A) mitochondria

B) microtubules

C) peroxisomes

D) centrosomes

4) A cell with a predominance of free ribosomes is most likely \_\_\_\_\_.

A) primarily producing proteins in the cytosol

B) primarily producing proteins for secretion

C) constructing an extensive cell wall or extracellular matrix

D) enlarging its vacuole

5) A cell with an extensive area of smooth endoplasmic reticulum is specialized to \_\_\_\_\_.

A) synthesize large quantities of lipids

B) play a role in storage

C) actively export protein molecules

D) import and export protein molecules

6) The Golgi apparatus has a polarity, or sidedness, to its structure and function. Which of the following statements correctly describes this polarity?

A) Transport vesicles fuse with one side of the Golgi and leave from the opposite side.

B) Proteins in the membrane of the Golgi may be sorted and modified as they move from one side of the Golgi to the other.

C) Lipids in the membrane of the Golgi may be sorted and modified as they move from one side of the Golgi to the other.

D) All of the listed responses correctly describe polarity characteristics of the Golgi function.

7) The liver is involved in detoxification of many poisons and drugs. Which of the following structures is primarily involved in this process and, therefore, abundant in liver cells?

A) smooth ER

B) rough ER

C) Golgi apparatus

D) nuclear envelope

8) Asbestos is a material that was once used extensively in construction. One risk from working in a building that contains asbestos is the development of asbestosis caused by the inhalation of asbestos fibers. Cells will phagocytize asbestos, but are not able to degrade it. As a result, asbestos fibers accumulate in \_\_\_\_\_.

A) mitochondria

B) ribosomes

C) lysosomes

D) peroxisomes

9) In a liver cell detoxifying alcohol and some other poisons, the enzymes of the peroxisome remove hydrogen from these molecules and \_\_\_\_\_.

A) combine the hydrogen with water molecules to generate hydrogen peroxide

B) use the hydrogen to break down hydrogen peroxide

C) transfer the hydrogen to the mitochondria

D) transfer the hydrogen to oxygen molecules to generate hydrogen peroxide

10) Cyanide binds with at least one molecule involved in producing ATP. If a cell is exposed to cyanide, most of the cyanide will be found within the \_\_\_\_\_.

A) endoplasmic reticulum

B) peroxisomes

C) lysosomes

D) mitochondria

11) Amoebae move by crawling over a surface (cell crawling), which involves \_\_\_\_\_.

A) setting up microtubule extensions that vesicles can follow in the movement of cytoplasm

B) growth of actin filaments to form bulges in the plasma membrane

C) reinforcing the pseudopod with intermediate filaments

D) cytoplasmic streaming

12) Which of the following statements about the cytoskeleton is true?

A) The cytoskeleton of eukaryotes is a static structure most resembling scaffolding used at construction sites.

B) Although microtubules are common within a cell, actin filaments are rarely found outside of the nucleus.

C) Chemicals that block the assembly of the cytoskeleton would have little effect on a cell's response to external stimuli.

D) Movement of cilia and flagella is the result of motor proteins causing microtubules to move relative to each other.

13) According to the fluid mosaic model of cell membranes, phospholipids \_\_\_\_\_.

A) frequently flip-flop from one side of the membrane to the other

B) can move laterally along the plane of the membrane

C) occur in an uninterrupted bilayer, with membrane proteins restricted to the surface of the membrane

D) have hydrophilic tails in the interior of the membrane

14) Some regions of the plasma membrane, called *lipid rafts*, have a higher concentration of cholesterol molecules. At higher temperatures, these regions \_\_\_\_\_.

A) are less fluid than the surrounding membrane

B) are more fluid than the surrounding membrane

C) detach from the plasma membrane and clog arteries

D) have higher rates of lateral diffusion of lipids and proteins into and out of these regions

15) An animal cell lacking oligosaccharides on the external surface of its plasma membrane would likely be impaired in which function?

A) cell-cell recognition

B) transporting ions against an electrochemical gradient

C) attaching the plasma membrane to the cytoskeleton

D) establishing a diffusion barrier to charged molecules

16) Which of the following would likely move through the lipid bilayer of a plasma membrane most rapidly?

A) K+

B) an amino acid

C) glucose

D) CO2

17) Which of the following processes includes all others?

A) osmosis

B) facilitated diffusion

C) passive transport

D) transport of an ion down its electrochemical gradient

18) Which of the following is true of osmosis?

A) Osmosis only takes place in red blood cells.

B) Osmosis is an energy-demanding or "active" process.

C) In osmosis, solutes move across a membrane from areas of lower water concentration to areas of higher water concentration.

D) In osmosis, water moves across a membrane from areas of lower solute concentration to areas of higher solute concentration.

19) A sodium-potassium pump \_\_\_\_\_.

A) move three sodium ions out of a cell and two potassium ions into a cell while consuming an ATP for each cycle

B) moves three potassium ions out of a cell and two sodium ions into a cell while producing an ATP for each cycle

C) moves three potassium ions out of a cell and two sodium ions into a cell while consuming 2 ATP in each cycle

D) move three sodium ions out of a cell and two potassium ions into a cell and generates an ATP in each cycle

20) White blood cells engulf bacteria using \_\_\_\_\_.

A) phagocytosis

B) pinocytosis

C) osmosis

D) receptor-mediated exocytosis

21) In eukaryotic cells, chromosomes are composed of \_\_\_\_\_.

A) DNA and RNA

B) DNA only

C) DNA and phospholipids

D) DNA and proteins

22) Scientists isolate cells in various phases of the cell cycle. They find a group of cells that have  times more DNA than G1 phase cells. The cells of this group are \_\_\_\_\_.

A) between the G1 and S phases in the cell cycle

B) in the G2 phase of the cell cycle

C) in the S phase of the cell cycle

D) in the M phase of the cell cycle

23) The microtubule-organizing center found in animal cells is an identifiable structure present during all phases of the cell cycle. Specifically, it is known as the \_\_\_\_\_.

A) microtubulere

B) centromere

C) centrosome

D) kinetochore

24) Some cells have several nuclei per cell. How could such multinucleated cells be explained?

A) The cell underwent repeated cytokinesis but no mitosis.

B) The cell underwent repeated mitosis, but cytokinesis did not occur.

C) The cell underwent repeated mitosis with simultaneous cytokinesis.

D) The cell had multiple S phases before it entered mitosis.

25) Measurements of the amount of DNA per nucleus were taken on a large number of cells from a growing fungus. The measured DNA levels ranged from 3 to 6 picograms per nucleus. In which stage of the cell cycle did the nucleus contain 6 picograms of DNA?

A) G1

B) S

C) G2

D) M

26) Which of the following does NOT occur during mitosis?

A) replication of the DNA

B) condensation of the chromosomes

C) spindle formation

D) separation of the spindle poles

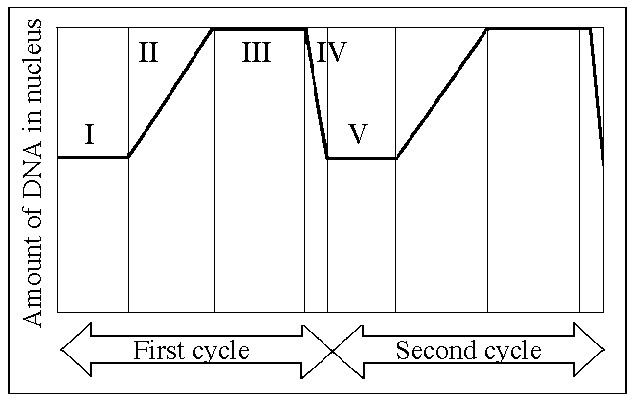
27) Once a cell completes mitosis, molecular division triggers must be turned off. What happens to MPF during mitosis?

A) It is completely degraded.

B) It is exported from the cell.

C) The cyclin component of MPF is degraded.

D) The Cdk component of MPF is degraded and exported from the cell.



28) In the figure above, MPF reaches its highest concentration during this stage.

A) I

B) II

C) III

D) IV

29) For a chemotherapeutic drug to be useful for treating cancer cells, which of the following is most desirable?

A) It is safe enough to limit all apoptosis.

B) It does not alter metabolically active cells.

C) It interferes with rapidly dividing cells.

D) It interferes with cells entering G0.

30) Which of the following defines a genome?

A) the complete set of an organism's polypeptides

B) the complete set of a species' polypeptides

C) the complete set of an organism's genes and other DNA sequences

D) a karyotype

31) Which of the following is a true statement about sexual vs. asexual reproduction?

A) Asexual reproduction, but not sexual reproduction, is characteristic of plants and fungi.

B) In asexual reproduction, offspring are produced by fertilization without meiosis.

C) In sexual reproduction, individuals transmit half of their nuclear genes to each of their offspring.

D) Asexual reproduction produces only haploid offspring.

32) A given organism has 46 chromosomes in its karyotype. Therefore, we can conclude that it must \_\_\_\_\_.

A) be human

B) be an animal

C) reproduce sexually

D) have gametes with 23 chromosomes

33) Which of the following might result in a human zygote with 45 chromosomes?

A) incomplete cytokinesis during spermatogenesis after meiosis I

B) failure of the egg nucleus to be fertilized by the sperm

C) failure of an egg to complete meiosis II

D) an error in either egg or sperm meiotic anaphase

34) Homologous chromosomes \_\_\_\_\_.

A) are identical

B) carry the same alleles

C) carry information for the same traits

D) align on the metaphase plate in meiosis II

35) After telophase I of meiosis, the chromosomal makeup of each daughter cell is \_\_\_\_\_.

A) diploid, and the chromosomes are each composed of a single chromatid

B) diploid, and the chromosomes are each composed of two chromatids

C) haploid, and the chromosomes are each composed of a single chromatid

D) haploid, and the chromosomes are each composed of two chromatids

36) Which of the following happens at the conclusion of meiosis I?

A) Four daughter cells are formed.

B) The chromosome number per cell remains the same.

C) Sister chromatids are separated.

D) Homologous chromosomes of a pair are separated from each other.

37) Which of the following occurs in meiosis but not in mitosis?

A) synapsis of chromosomes

B) chromosome replication

C) alignment of chromosomes at the equator

D) condensation of chromosomes

38) Which of the following can occur by the process of meiosis but not mitosis?

A) Haploid cells fuse to form diploid cells.

B) Haploid cells multiply into more haploid cells.

C) A diploid cell combines with a haploid cell.

D) Diploid cells form haploid cells.

39) For a species with a haploid number of 23 chromosomes, how many different combinations of maternal and paternal chromosomes are possible for the gametes?

A) 23

B) 46

C) about 1000

D) about 8 million

40) How is natural selection related to sexual reproduction as opposed to asexual reproduction?

A) Sexual reproduction utilizes far less energy than asexual reproduction.

B) Sexual reproduction results in the greatest number of new mutations.

C) Sexual reproduction allows the greatest number of offspring to be produced.

D) Sexual reproduction results in many new gene combinations, some of which will lead to differential reproduction.

二、填空题（共6题）

41) Cell size is limited by \_\_\_\_\_.

42) What organelle produces and modifies polysaccharides that will be secreted? \_\_\_\_\_.

43) Motor proteins provide for molecular motion in cells by interacting with what types of cellular structures? \_\_\_\_\_.

44) The force driving simple diffusion is \_\_\_\_\_, while the energy source for active transport is \_\_\_\_\_.

45) If there are 20 centromeres in a cell at anaphase, how many chromosomes are there in each daughter cell following cytokinesis? \_\_\_\_\_.

46) At \_\_\_\_\_ stage of meiosis, homologous chromosomes are aligned at the equator of the spindle; at \_\_\_\_\_ stage of meiosis, centromeres of sister chromatids disjoin and chromatids separate.

三、简答题（共5题）

47) What are the differences between prokaryotic cells and eukaryotic cells?

48) Cell membranes are asymmetrical. Provide the explanation for the membrane's asymmetrical nature?

49) What is the difference between pinocytosis and receptor-mediated endocytosis?

50) How is plant cell cytokinesis different from animal cell cytokinesis?

51) What is a major difference between mitosis and meiosis I in a diploid organism?

**答题页**

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一、选择题

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二、填空题

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三、简答题

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