Student name:_____

1) From the list provided, what would be helpful to differentiate eukaryotes from prokaryotes? (Check all that apply.)

A) The size of the ribosomes
B) The size of the cell
C) The plasma membrane
D) Organelles

2) From the following list, select those that are characteristics of life. (Check all that apply.)

A) The ability to move
B) The ability to reproduce
C) The ability to communicate
D) The ability to acquire materials and energy
E) The ability to respond to the environment

3) DNA nucleotides consist of several parts. From the list below, select the parts that would be found in DNA nucleotides. (Check all that apply.)

A) Phosphate group
B) Ribose
C) Adenine
D) Uracil
E) Deoxyribose

4) Gene expression occurs through transcription and then translation. From the provided list, select all that pertain to transcription. (Check all that apply.)

A) Creation of mRNA
B) Linking together amino acids
C) Using RNA polymerase
D) Using DNA as a template
E) Reading codons

A) DNA is in the nucleus.
B) DNA and RNA are two different types of molecules.
C) Proteins are composed of amino acids.
D) Ribosomes are required for protein expression.
E) RNA polymerase is not efficient.

6) From the following list, select all that can apply to cancerous cells. (Check all that apply.)

A) Damaged DNA
B) Directed apoptosis
C) Uncontrolled cell division
D) Monitoring with checkpoints
E) Daughter cells with correct genetic information

7) From the list, select the most common mutagens. (Check all that apply.)

A) Bacteria
B) Viruses
C) Radiation
D) Animals
E) Chemicals

8) From the list, select all of the following that pertain to this state. (Check all that apply.)
If a patient is screened for cancerous cells, a doctor is looking for cells that are _____.

A) less specialized
B) functioning as part of an organ
C) not in their original location
D) dividing uncontrollably
E) undergoing apoptosis

A) A narrow pH range
B) A wide temperature range
C) A narrow temperature range
D) A narrow salt concentration range
E) A high salt concentration range

10) From the list of organ systems, select the ones that play a major role in homeostasis. (Check all that apply.)

A) Endocrine system
B) Cardiovascular system
C) Urinary system
D) Immune system
E) Digestive system

11) Some antimetabolites are called antibiotics. From the list below, select all statements that characterize these compounds. (Check all that apply.)

A) They are designed to kill bacteria.
B) They interfere with specific enzyme functions.
C) They interfere with RNA formation during gene expression.
D) They interfere with DNA replication.
E) They can be used to treat any infection.

12) From the classes of chemotherapeutic drugs listed below, select those that would interfere with DNA synthesis. (Check all that apply.)

A) Alkaloids
B) Taxanes
C) Antimetabolites
D) Alkylating agents
E) Topoisomerase inhibitors

13) CRISPR is a genetic editing process. From the list provided, select all that are required for this process to be successful. (Check all that apply.)

A) A Cas9 enzyme

to identify the correct DNA sequence

B) A complementary guide DNA molecule to assist the Cas9 enzyme

C) A regulatory region called a PAM sequence

D) A single-stranded break of DNA

E) A target DNA sequence

14) List the nucleotides that are found in DNA.

15) The stages of breast cancer are determined by an oncologist by addressing four questions. Provide three of the four questions.

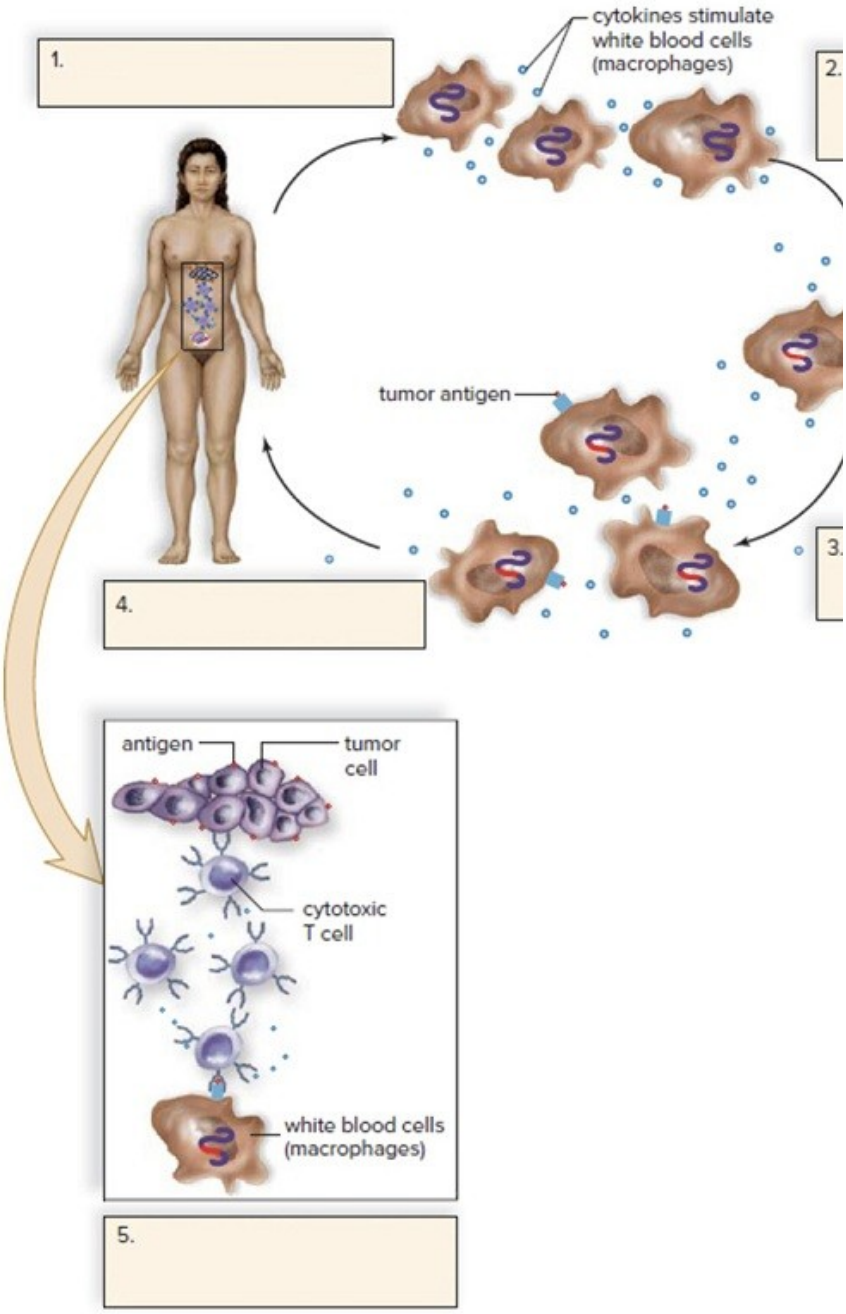
16) Each stage of cancer has defining characteristics. State the characteristics of Stage 2 cancer.

17) If a patient has Stage 4 cancer that has spread to a major organ, how might this disrupt the function of the organ?

18) There are two main types of radiation: external and internal. Provide a description of both processes.

19) The image shown outlines the immune response to a cancer vaccine, a type of immunotherapy treatment. Provide the missing information in the boxes to describe the steps of

response.


1.
cytokines stimulate white blood cells (macrophages)
2.
tumor antigen
3.
4.
antigen
tumor cell
cytotoxic T cell
white blood cells (macrophages)
5.

20) The role of the _____ system is to respond quickly to internal and external stimuli.

21) The two different classes of cells are _____ and _____.

22) In eukaryotes, the _____ is the site of the genetic information of the cell.

23) Some medications bind to the active site of enzymes. This blocks the _____ from binding.

24) The monomers that link together to form DNA are called _____.

25) There are two stages of gene expression. The first stage, _____, produces mRNA that is used in the second step.

26) There are two main steps in gene expression. This first step produces mRNA, and the second step, _____, converts the mRNA into a protein.

27) In eukaryotic cells, transcription occurs in the _____.

28) RNA polymerase copies a gene to provide a transcript of mRNA. What would be the transcript from the following DNA nucleotide sequence?
TACCCGGTAGATATC

29) The three nucleotide segments found on mRNA, which code for amino acids, are called _____.

30) A _____ is a short segment of DNA that encodes a functional protein.

31) In mitosis, the division of the cytoplasm occurs in _____.

32) Individuals receive _____ (how many) chromosomes from their mother?

33) In cellular division, the two parts of M phase are mitosis and _____.

34) Short sections of DNA, called _____, are located on chromosomes.

35) Chemicals, radiation, and viruses can cause _____ to occur in genes. This may lead to the cell becoming cancerous.

36) _____ is the mutagen responsible for structurally changing the DNA molecule during DNA replication.

37) When referring to cancer, the two most associated tumor-suppressor genes are BRCA1 and _____.

38) The main role of the _____ gene is to check for breaks in the DNA.

39) In breast cancer patients, there is over expression of the proto-oncogene ERBB-2. This causes an increase production in the _____ protein.

40) The _____ enzyme allows for continuous cell division of cancerous cells.

41) In _____ tumors, the cells move into local capillaries or lymphatic vessels and spread throughout the body.

42) The _____ vessels can contribute to metastasis as they try to remove the excess fluid from the tumor tissue.

43) In Stage _____ cancer, the cancer has spread extensively to nearby tissues and lymph nodes but has not yet spread to organs.

44) _____ are doctors who use the TNM classification system to define the stages of cancer.

45) Cancer affects the normal operation of the body and the response to the external environment. The normal operation is maintained by a process called _____.

46) Physicians rely on two different genetic tests to determine if someone is susceptible to cancer. A DNA microarray will determine the rate of expression of a gene, while DNA _____ will precisely determine if a mutation is actually present in the gene.

47) A _____ procedure is used to remove a small piece of tissue to test for the presence of cancer cells.

48) In _____ radiation, a radioactive substance is either ingested or injected into the blood. It can then be targeted for therapy.

50) Cancer _____ are used to protect against some forms of cancer and can be used to warn the body of existing cancers.

51) Tumor suppressor genes

A) halt cell division if an error is found in the DNA.
B) cause an increase in cell division if an error is found in DNA.
C) slow the rate of cell division.
D) allow cells to remain at a constant cell division.

52) You are reading an article about a person being diagosed with a type of sarcoma. This type of cancer affects _____.

A) the skin
B) white blood cells
C) connective tissue
D) cells related to the immune system

53) A research oncologist is one who studies the causes and treatments of cancer. What area(s) would a research oncologist study to understand the formation of a new cancer?

A) Genetic factors
B) Environmental factors
C) Prevalence in males versus females
D) All of the answer choices are correct.

A) Cells
B) Organs
C) Organ systems
D) Tissues
E) Organelles

55) Lung cancer was the leading cause of cancer-related deaths during the mid-1990s. Which group was most impacted?

A) Males
B) Females

56) If a person has a cancer that interferes with organs of the urinary system, that person may have trouble

A) getting oxygen to tissues.
B) with regulating the water-salt balance of the blood.
C) getting nutrients and water to tissues.
D) fighting off other diseases.

57) Cancer begins when

A) a tumor forms.
B) there is an abnormal function of an organ system.
C) cells divide uncontrollably.
D) an organ stops functioning.
E) All of the answer choices are correct.

58) Which of the following statements describes DNA?

A) DNA encodes for proteins that are involved in cellular regulation.
B) DNA is the genetic material called the genome.
C) Sections of DNA are called genes.
D) All of the answer choices are correct.

59) The shape of the active site

A) determines the substrate that is broken down.
B) changes to fit all substrates.
C) can be modified by cell signals.
D) changes after breaking down its first substrate.

60) Ribosomes

A) convert energy in food into usable energy for the cell.
B) use genetic information to synthesize proteins.
C) digest incoming nutrients.
D) allow for passage of materials in and out of the cell.

61) What cell organelle converts the energy found in food into a form usable by cells?

A) Mitochondrion
B) Lysosome
C) Centriole
D) Golgi apparatus

62) During the division of eukaryotic cells, the _____ assists by dividing the genetic material and cell contents into the two resulting cells.

A) nucleus
B) centrioles
C) ribosomes
D) lysosome
E) mitochondria

63) Cells are specialized to form tissues and organs through the control of gene expression. Gene expression is regulated (turning on and off genetic instructions) by

A) nearby cell signals.
B) environmental factors.
C) nearby cell signals and environmental factors.

D) rapid cell divisions.
E) nearby cell signals and rapid cell divisions.

64) Cancer cells _____.

A) are less specialized
B) no longer function with neighboring cells
C) divide rapidly
D) ignore the genetic information
E) All of the answer choices are correct.

65) At the cellular level, enzymes work by

A) using more energy to assist the reaction.
B) lowering the activation energy of the reaction.
C) maintaining a constant breakdown of the substrate.
D) being consumed in the reaction.

66) In a biochemical pathway consisting of three enzymes,

A) the first enzyme releases a product that is a substrate for the second enzyme.
B) the first enzyme provides energy for the second enzyme.
C) the first enzyme releases a product that is a substrate for the last enzyme.
D) the second enzyme provides energy for the first enzyme.
E) the first enzyme releases a product that is a substrate for the second enzyme, then the second enzyme releases a product for the third enzyme.

67) DNA is a

A) single strand of nucleotides arranged in helical structure.
B) double strand of nucleotides arranged in a linear structure.
C) double strand of nucleotides arranged in a helical structure.
D) single strand of nucleotides arranged in

either a linear or helical structure.

E) double strand of nucleotides arranged in either a linear or helical structure.

68) The two strands of DNA are held together by hydrogen bonds between complementary nucleotides. Which of the following correctly matches the complementary nucleotides of DNA?

A) Adenine:thymine and cytosine:guanine
B) Adenine:cytosine and guanine:thymine
C) Thymine:cytosine and adenine:guanine
D) Uracil:adenine and cytosine:guanine
E) Uracil:cytosine and adenine:guanine

69) In animal cells, DNA is located in the _____.

A) cytoplasm
B) nucleus
C) ribosomes
D) lysozymes
E) golgi apparatus

70) Ribosomes are located on the _____.

A) nucleus
B) lysosomes
C) smooth endoplasmic reticulum
D) rough endoplasmic reticulum
E) plasma membrane

71) The purpose of transcription is to

A) make mRNA that will carry the instructions for making proteins outside of the nucleus.
B) replicate DNA to provide a new copy for cellular division.
C) link together amino acids to form a polypeptide chain.

D) provide a code that will be read by DNA polymerase.

E) All of the answer choices are correct.

72) The purpose of translation is to

A) make mRNA that will carry the instructions for proteins outside of the nucleus.
B) replicate DNA to provide a new copy for cellular division.
C) use mRNA codons to link together amino acids to form a polypeptide chain.
D) provide a code that will be read by DNA polymerase.
E) All of the answer choices are correct.

73) In eukaryotic cells, translation occurs with the use of free floating ribosomes in the cyptoplasm or ribosomes that are _____.

A) on the mitochondria
B) in the nucleus
C) on the smooth endoplasmic reticulum
D) on the rough endoplasmic reticulum

74) During translation, the _____ reads the codon on the mRNA and brings in the cooresponding amino acid.

A) rRNA
B) tRNA
C) RNA polymerase
D) ribosome
E) protein

75) At the end of gene expression, the amino acids are in a _____ structure. This is also the _____ structure of a protein.

A) linear; primary
B) alpha helix; secondary
C) globular; tertiary
D) grouping;

quarternary

76) Nucleic acids serve as a

A) genetic code.
B) means of energy production.
C) genetic code and a method of cellular control.
D) genetic code and a means of energy production.

77) Which of the following statements best describes the relationships between the genome, genes, and proteins?

A) There is one genome; it consists of many genes that encode for multiple proteins.
B) There is one genome; it consists of one gene that encodes for multiple proteins.
C) There are multiple genomes; they consist of one single gene that encodes for multiple proteins.
D) There is one genome; it consists of one gene that encodes for one protein.
E) There are multiple genomes; they consist of many genes that encode for multiple proteins.

78) In eukaryotic cell division, what are the two major parts of the cell cycle?

A) Interphase and mitosis
B) Mitosis and cytokinesis
C) Interphase and cytokinesis
D) Interphase and prophase
E) Prophase and cytokinesis

79) In a normal cell, G1 phase is the checkpoint for DNA damage. If the damage is too extensive, the cell will undergo _____.

A) division

B) apoptosis
C) alignment of chromosomes
D) separation of the cytoplasm

80) The DNA is compacted into multiple _____ that condense and organize the genetic information before cells divide.

A) genomes
B) chromosomes
C) ribosomes
D) sister chromatids

81) Your instructor is showing you a model of prophase in mitosis. There is an arrow pointing to a structure holding the two sister chromatids together. What structure is your instructor asking you to identify?

A) Centrosome
B) Mitotic spindle
C) Centromere
D) Chromatin

82) Chromosomes are copied

A) during mitosis.
B) in the growth phase of interphase (G_1).
C) immediately before cell division (G_2).
D) between the growth phase (G_1) and preparation for cell division (G_2).

83) In which stage does the cell spend most of its time?

A) Interphase
B) Cytokinesis
C) Anaphase
D) Prophase
E) Telophase

84) Normal cell division is highly regulated by proteins to prevent mutations from occuring. If the cell division is stalled due to excessive DNA damage, the cell is placed in _____ phase in an attempt to repair the DNA.

A) S
B) G_1
C) G_2
D) G_0
E) Interphase

85) There are multiple steps in interphase that prepare the cells for cell division. Select the correct order of steps that prepare cells for division.

A) G_1, G_2, S
B) G_1, S, G_2
C) S, G_1, G_2
D) S, G_2, G_1
E) G_2, G_1, S

86) Cell division occurs in _____ phase.

A) M
B) S
C) G_1
D) G_2
E) G_0

87) Cells have checkpoints to regulate cell division. The G1 checkpoint

A) allows the cell to move into S phase.
B) may delay division.
C) may cause the cell to enter a resting phase.
D) is regulated by growth hormones.
E) All of the answer choices are correct.

A) S
B) G_1
C) G_2
D) G_0
E) M

89) Telomere length can change with age and the type of cell. Which of the following correctly describes telomere length?

A) Telomeres increase as a person ages.
B) Telomeres remain constant throughout a person's life.
C) Telomeres are the longest in stem cells.
D) Telomeres are the shortest in stem cells.
E) Telomeres shorten in cancer cells.

90) A base substitution can result in

A) a change in DNA nucleotide sequence.
B) adenine binding with cytosine.
C) a misfolded protein.
D) a different codon sequence.
E) All of the answer choices are correct.

91) If a gene mutation occurs that results in a premature stop codon in the mRNA sequence, the protein will _____.

A) misfold
B) be incomplete
C) be normal
D) cause other proteins to misfold
E) be larger in size

92) In normal cells, tumor suppressor genes

A) decrease the likelihood of damaged DNA being passed on to the daughter cells.
B) decrease the likelihood of damaged DNA staying in parent

cells.
C) increase the rate of cell division.
D) decrease the rate of cell division.
E) monitor the rate of cell division and check newly synthesized DNA for damage before being passed on to daughter cells.

93) A mutation in a tumor suppressor gene can lead to cancer because these genes are involved in

A) checking the DNA for damage during the cell cycle.
B) aligning chromosomes during mitotic division.
C) creating the cleavage furrow.
D) synthesizing mRNA during transcription.
E) incorporating amino acids during translation.

94) A mutation in the _____ results in uncontrolled cell division. This mutation can lead to cancer.

A) ERBB-2
B) p53 genes
C) BRCA1 genes
D) TP53 genes

95) Proto-oncogenes expression depends on external cell signaling. Under normal conditions, what molecules regulate the expression of proto-oncogenes?

A) Insulin
B) Growth factors
C) p53
D) HER-2
E) All of the answer choices are correct.

96) Mutations in tumor-suppressor genes and in proto-oncogenes can result in cancer. If both are mutated,

A) damaged DNA will be unrecognized by the cell.
B) cell division will increase.
C) the cell will undergo apoptosis.
D) DNA damage

will go unrecognized and cell division will increase.

E) DNA damage will be repaired but cell division will increase.

97) A breast cancer patient may be diagnosed with being hormone receptor positive. This receptor protein is known as the _____ protein.

A) HER-2
B) p53
C) BRCA1
D) HER-1
E) TP53

98) The appearance of cancerous cells differs from normal cells. If you were to view cancerous cells under the microscope, you would notice enlarged _____.

A) nuclei
B) plasma membranes
C) mitochondria
D) ribosomes
E) vacuoles

99) As cancerous cells accumulate mutations, the cells will continue to divide rapidly. This uncontrolled division results in

A) a change in cellular appearance.
B) cells becoming less specialized
C) cells growing in blood vessels.
D) cells moving to different parts of the body.
E) All of the answer choices are correct.

100) Benign tumors are not considered a threat because they

A) do not have mutations.
B) have controlled cell division.
C) do not spread or cause more tumors.
D) maintain their original function.
E) All of the answer choices are correct.

101) Malignant tumors need nutrients and oxygen to grow. From what structures do they obtain nutrients and oxygen?

A) Capillaries
B) Lymphatic vessels
C) Lungs
D) Kidneys
E) Arteries

102) Cells within the inside of a tumor secrete growth factors, which cause capillaries to grow toward the tumor. This process is called _____, and contributes to the growth and spread of the tumor.

A) metastasis
B) angiogenesis
C) biogenesis
D) abiogenesis

103) The main difference between Stage 0 and Stage 1 cancer is that in Stage 1, the cancer cells have

A) begun to spread to a few lymph nodes.
B) formed a larger tumor.
C) spread to all lymph nodes.
D) spread extensively throughout body.
E) spread to neighboring organs.

104) The main difference between Stages 2A and 2B breast cancer, is that in Stage 2B the tumors in nearby lymph nodes are _____.

A) less than 2 cm

B) between 2-5 cm
C) between 5-10 cm
D) greater than 10 cm

105) Stage 3 breast cancer is divided into levels based on the size of the tumor and the degree to which it has spread to nearby tissues and lymph nodes. In which level has the tumor spread to the collar bone or more than ten lymph nodes?

A) 3A
B) 3B
C) 3C

106) If a breast cancer patient has not responded to treatment and the cancer has spread to the brain, the patient is classified as having Stage _____ cancer.

A) 4
B) 1
C) 2
D) 3
E) TNM

107) If cancer invades the _____, this can cause an accumulation of blood calcium and may lead to a coma.

A) brain
B) bone
C) liver
D) stomach
E) kidneys

108) Which of the following blood cells would be measured to evaluate a patient for cancer?

A) Red blood cells
B) Osteocytes
C) White blood cells
D) Platelets
E) All the answer choices are correct.

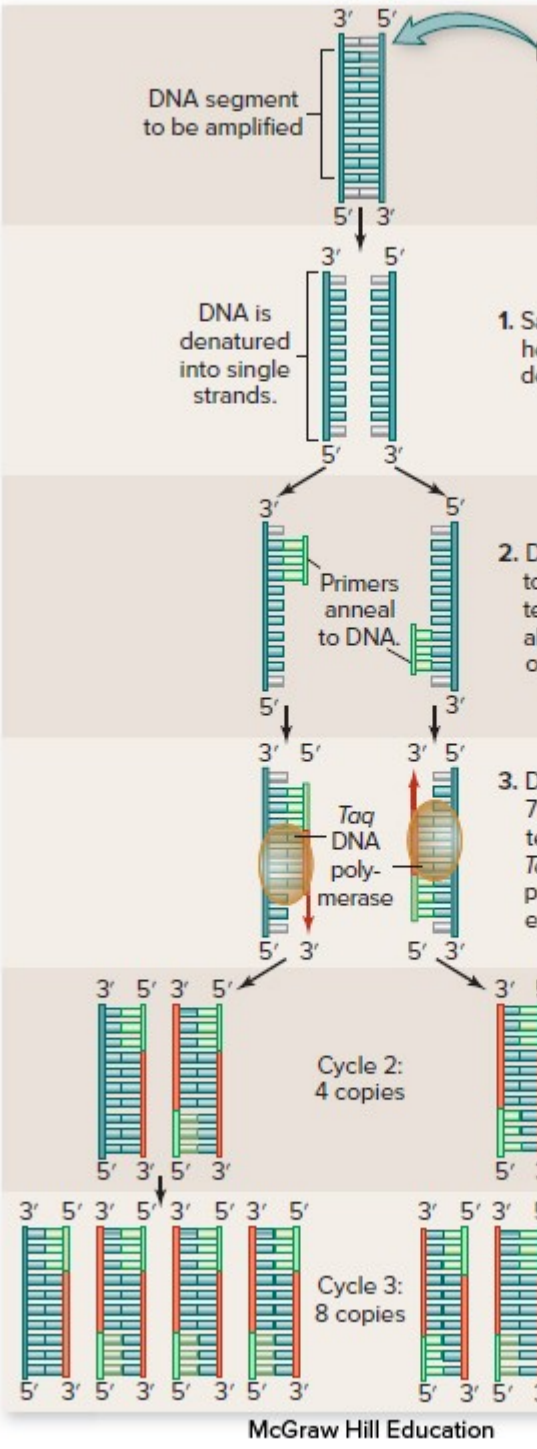
109) Which of the following scanning tools is used to look for abnormalities in the breast that could be associated with cancer?

A) Screening mammogram
B) Diagnostic mammogram
C) CT scan
D) PET scan
E) MRI

110) Which of the following scanning tools is a special type of X-ray that is used to determine if the cancer has spread?

A) Screening mammogram
B) Diagnositic mammogram
C) CT scan
D) PET scan
E) MRI

111) There are several ways a person can be tested to assess their risk of cancer. One is genetic testing. What genetic testing technique is shown in the image provided?



A) PCR
B) MRI
C) Microarray
D) CBC
E) DNA sequencing

112) There are multiple mutations in the BRCA1 gene that physicians use to determine cancer treatments. Which of the following mutations would indicate the patient has breast cancer and treatment should be explored?

A) Deleterious
B) Benign polymorphism
C) Variant, favor polymorphism
D) Suspected deleterious
E) Variation of uncertain significance

113) A CBC is conducted to look for changes in the blood associated with cancer. Which of the following is/are measured to detect cancer in the blood?

A) The number of normal cells
B) The number of tumor cells
C) Abnormal proteins
D) Antibodies
E) All of the answer choices are correct.

114) Physicians will request an analysis of proteins in the blood of possible cancer patients because

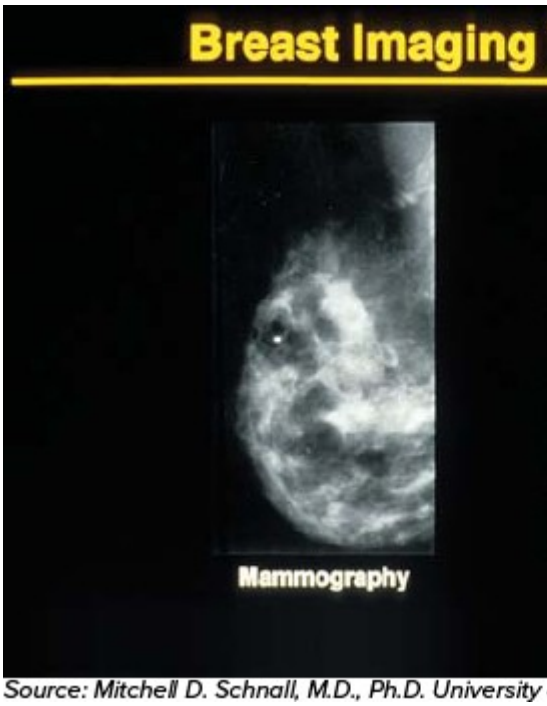
A) proteins from cancer cells are different from normal cells.
B) normal cells will produce more proteins in the blood.
C) normal cells will produce less proteins in the blood.
D) proteins from cancer cells inhibit the growth of normal cells.
E) All of the answer choices are correct.

115) Which of the following would be detected in a blood test that would indicate the immune system is responding to cancer?

A) Calcium
B) Enzymes
C) Ion elevation
D) Antibodies

E) Red blood cells

116) There are several scanning techniques physicians use to determine the extent of tumors. What type of scan, shown here, can be used to determine the extent of the tumor in the breast?



Source: Mitchell D. Schnall, M.D., Ph.D. University

A) MRI
B) Screening mammogram
C) Diagnostic mammogram
D) CAT scan
E) PET scan

117) Chemotherapy can interact with different phases of the cell cycle. What are the main phases that these drugs target?

A) S, G_2, and M
B) G_2, M, and G_1
C) M, G_1, and G_0
D) G_1, G_0, and S
E) G_0, S, and G_2

118) Alkylating agents work by

A) breaking the DNA and introducing mutations.
B) interfering with the spindle fibers that

separate the sister chromatids.

C) mimicking nucleotides, which results in an incorrectly developed DNA molecule.

D) interfering with the cell's ability to unwind DNA during DNA replication.

E) placing the cell in G_0 phase.

119) Antimetabolites work by

A) breaking the DNA and introducing mutations.

B) interfering with the spindle fibers that separate the sister chromatids.

C) mimicking nucleotides, which results in an incorrectly developed DNA molecule.

D) interfering with the cell's ability to unwind DNA during DNA replication.

E) placing the cell in G_0 phase.

120) Topoisomerase inhibitors work by

A) breaking the DNA and introducing mutations.

B) interfering with the spindle fibers that separate the sister chromatids.

C) mimicking nucleotides, which results in an incorrectly developed DNA molecule.

D) interfering with the cell's ability to unwind DNA during DNA replication.

E) placing the cell in G_0 phase.

121) There are different drugs that interfere with the M phase of the cell cycle. _____ interfere with the formation of the spindle fibers and _____ prevent the breakdown of the microtubles.

A) Alkaloids; taxanes

B) Taxanes; antimetabolites

C) Taxanes; alkylating agents

D) Taxanes; alkaloids

E) Alkylating agents; topoisomerase inhibitors

122) In a normal cell, topoisomerase

A) helps unwind DNA during DNA replication.
B) adds in amino acids during protein synthesis.
C) separates sister chromatids during cell division.
D) adds in complementary nucleotides during DNA replication.
E) aligns sister chromatids in the middle of the cell before dividing.

123) Radiation is targeted cancer therapy that works by

A) breaking the DNA and introducing mutations.
B) interfering with the spindle fibers that separate the sister chromatids.
C) mimicking nucleotides, which results in an incorrectly developed DNA molecule.
D) interfering with the cell's ability to unwind DNA during DNA replication.
E) placing the cell in G_0 phase.

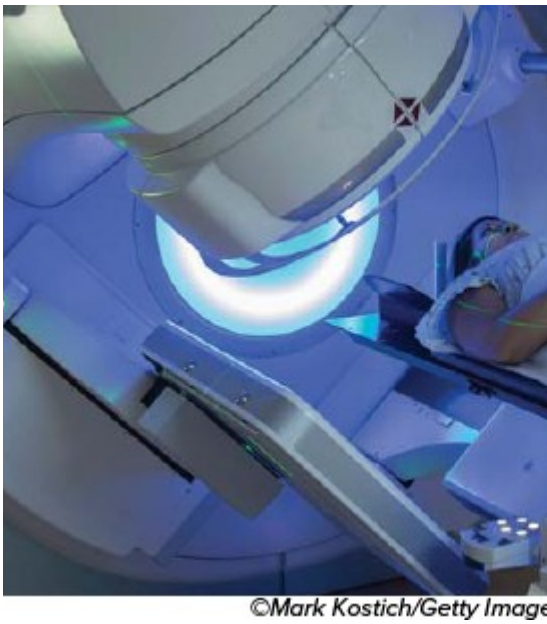
124) One benefit of radiation over chemotherapy is that radiation

A) only targets cancer cells.
B) only mutates DNA in cancer cells.
C) limits the number of healthy cells affected.
D) relies on chemicals being injected into the body.
E) All of the answer choices are correct.

125) In which stage of breast cancer would a physician most likely use radiation and chemotherapy to treat a cancer patient?

A) Stage 1
B) Stage 2
C) Stage 3
D) Stage 4

126) There are several types of radiation. What type of radiation is being administered in the provided image?



A) External
B) High-dose seed
C) Low-dose seed
D) Internal radiation

127) There are two types of brachytherapy. _____ brachytherapy is when the "seed" is placed in the tumor, and _____ brachytherapy is when the "seed" is placed near the tumor.

A) Interstitial; intracavitary
B) Intracavitary; interstitial
C) Internal; external
D) Internal; intracavitary
E) External; intracavitary

128) Internal radiation that requires the seeds to remain in the body is referred to as _____ treatment.

A) high-dose

B) low-dose
C) extended
D) permanent
E) systemic

129) I-131 is a radioactive form of iodine that is used to aid in systemic radiation of thyroid cancer. Why is I-131 used in this treatment?

A) Iodine is used by the thyroid; therefore, the radioactive form would also travel to that area.
B) Radioactive iodine will interfere with cancer cells in the thyroid and throughout the body.
C) Radioactive iodine is harmless to the patient.
D) Iodine is required for DNA replication; therefore, it would be attracted to DNA of cancerous cells.
E) Iodine is required for all cancerous cells to continue to divide; therefore, it would travel to those cells.

130) Which of the following would be the first step in treating a patient with a form of internal radiation?

A) Marking the patient for treatment
B) Placing a radioactive material in the patient
C) Emitting radiation to the treatment area
D) Treating the patient with chemotherapy
E) Removing the radioactive material

131) Chemotherapy works by

A) targeting points during cell division.
B) producing hormones to slow the growth rate of the tumor.
C) forcing the cell into G_0 phase.
D) targeting a specific area of cancerous cells.

132) Immunotherapy is a new method of treatment that

A) uses monoclonal antibodies to target specific antigens on the surface of cancer cells.

B) involves genetically-engineered white blood cells that activate the action of cytotoxic T cells.

C) uses chemicals such as interferons and interleukins to stimulate white blood cell activity.

D) helps the immune system identify cancerous cells and target them for destruction.

E) All of the answer choices are correct.

133) Normally, cancer cells can evade an immune response because the immune system

A) has a difficult time identifying cancerous cells.

B) does not have the ability to kill cancerous cells.

C) does not have the ability to create antigens against it.

D) is surveying different parts of the body that do not involve cancerous cells.

E) All of the answer choices are correct.

134) The role of the immune system is to

A) continuously scan, recognize foreign agents, and destroy them.

B) identify self versus non-self cells.

C) create antibodies for future attacks by the same infectious agent.

D) signal the body of infection.

E) All of the answer choices are correct.

135) There are three checkpoints during cell division. Which checks for DNA damage?

A) M

B) G2

C) G1

A) M
B) G2
C) G1

137) There are three checkpoints during cell division. Which checks for DNA replication?

A) M
B) G2
C) G1

138) Prophase is a step of mitosis. What key event happens during prophase?

A) Chromosomes condense
B) Sister chromatids align on the spindle equator
C) Sister chromatids are pulled apart
D) Nuclear envelopes form and a cleavage furrow forms

139) Anaphase is a step of mitosis. What key event happens during anaphase?

A) Chromosomes condense
B) Sister chromatids align on the spindle equator
C) Sister chromatids are pulled apart
D) Nuclear envelopes form and a cleavage furrow forms

140) Telophase and cytokinesis is a step of mitosis. What key event happens during telophase and cytokinesis?

A) Chromosomes condense
B) Sister chromatids align on the spindle equator
C) Sister chromatids are pulled apart
D) Nuclear envelopes form and a cleavage furrow forms

141) Metaphase is a step of mitosis. What key event happens during

metaphase?

A) Chromosomes condense
B) Sister chromatids align on the spindle equator
C) Sister chromatids are pulled apart
D) Nuclear envelopes form and a cleavage furrow forms

142) Which characteristic corresponds with Stage 0 of breast cancer?

A) Cancer begins invading more lymph nodes and tissue
B) Cancer is localized and less than 2 cm
C) Cancer extensively spreads to nearby tissue
D) Cancer spreads to other organs
E) Cancer is found in a few lymph nodes

143) Which characteristic corresponds with Stage 1 of breast cancer?

A) Cancer begins invading more lymph nodes and tissue
B) Cancer is localized and less than 2 cm
C) Cancer extensively spreads to nearby tissue
D) Cancer spreads to other organs
E) Cancer is found in a few lymph nodes

144) Which characteristic corresponds with Stage 2 of breast cancer?

A) Cancer begins invading more lymph nodes and tissue
B) Cancer is localized and less than 2 cm
C) Cancer extensively spreads to nearby tissue
D) Cancer spreads to other organs
E) Cancer is found in a few lymph nodes

A) Cancer begins invading more lymph nodes and tissue
B) Cancer is localized and less than 2 cm
C) Cancer extensively spreads to nearby tissue
D) Cancer spreads to other organs
E) Cancer is found in a few lymph nodes

146) Which characteristic corresponds with Stage 4 of breast cancer?

A) Cancer begins invading more lymph nodes and tissue
B) Cancer is localized and less than 2 cm
C) Cancer extensively spreads to nearby tissue
D) Cancer spreads to other organs
E) Cancer is found in a few lymph nodes

147) In cancer vaccines, macrophages that display tumor antigens are designed to

A) stimulate cytotoxic T cells to attack tumor cells.
B) promote angiogenesis and the production of cyclins.
C) block apoptosis in tumor cells.
D) correct mutations in cancer-causing genes.

148) List the five characteristics that define cells.

149) Cancer begins with a series of events. One of these events is becoming immortal. Explain how these cells become immortal.

150) If cells are damaged, they are destroyed and removed from the body. These cells are then replaced with new cells.

- ⊙ true
- ⊙ false

151) The only way a physician can diagnose cancer is to detect cancer cells in the blood.

- ⊙ true
- ⊙ false

152) All cells are specialized to have the same function.

- ⊙ true
- ⊙ false

153) DNA is the only nucleic acid found in cells.

- ⊙ true
- ⊙ false

154) In the human genome, there is an equal ratio of genes to proteins expressed.

- ⊙ true
- ⊙ false

155) After transcription, the entire mRNA is translated into a polypeptide.

⊙ true ⊙ false

156) If a mutation occurs that results in the change of an amino acid, this will not alter the shape of the protein, and the protein will function the same.

⊙ true
⊙ false

157) The daughter cells produced through mitosis are genetically unique from the parent cell.

⊙ true
⊙ false

158) Mutations in DNA can result in cancerous cells. These cells are structurally altered but their functions remain normal.

⊙ true
⊙ false

159) Each time the cell divides, the telomerase enzyme shortens the length of the chromosome.

⊙ true
⊙ false

160) In cancerous cells, checkpoints still operate as normal and cell division is monitored.

⊙ true
⊙ false

161) The BRCA1 gene is involved in producing a protein that activates DNA repair enzymes, stopping the cell cycle, and putting the cell in G_0 phase.

- ⊙ true
- ⊙ false

162) Growth factors, in the form of hormones, bind to receptor proteins which decreases the expression of proto-oncogenes and decreases cell division.

- ⊙ true
- ⊙ false

163) In breast cancer patients, there may be overexpression in the ERBB2 gene. This overexpression results in the disregard of damaged DNA.

- ⊙ true
- ⊙ false

164) The life span of normal cells and cancerous cells is the same.

- ⊙ true
- ⊙ false

165) Malignant tumors can spread through tissues by digesting proteins with the enzyme lipase.

- ⊙ true
- ⊙ false

166) The main difference between Stage 1A and 1B is the size of the tumor. In Stage 1B, the tumor has grown much larger than observed in Stage 1A.

- ⊙ true
- ⊙ false

167) In breast cancer patients, lymph nodes are biopsied to determine the size of the tumor.

- ⊙ true
- ⊙ false

168) Negative feedback works to maintain homeostasis within the body.

- ⊙ true
- ⊙ false

169) If an individual has only one mutated copy of the*BRCA1* tumor-suppressor gene, the other copy of the*BRCA1* gene cannot act as a regulator of the cell cycle.

- ⊙ true
- ⊙ false

Answer Key

Test name: Connect Master: Why Biology?
Author: Windelspecht 2th ch1

1) [A, B, D]

2) [B, D, E]

3) [A, C, E]

4) [A, C, D]

5) [A, C]

6) [A, C]

7) [B, C, E]

8) [A, C, D]

9) [A, C]

10) [B, C, E]

11) [B, C, D]

12) [C, D]

13) [A, C, E]

20) nervous

21) [eukaryotes, prokaryotes]

22) nucleus

23) substrate

24) nucleotides

25) transcription

26) translation

27) nucleus

28) AUGGGCCAUCUAUAG

29) codons

30) gene

31) cytokinesis

32) 23

33) cytokinesis

34) genes

35) mutations

36) Radiation

37) p53

38) BRCA1

39) HER-2

40) telomerase

41) malignant

42) lymphatic

43) 3

44) Pathologists

45) homeostasis

46) sequencing

47) biopsy

48) systemic

49) leukemia

50) vaccines

51) A

52) C

53) D

54) C

55) A

56) B

57) C

58) D

59) A

60) B

61) A

62) B

63) C

64) E

65) B

66) E

67) C

68) A

69) B

70) D

71) A

72) C

73) D

74) B

75) A

76) A

77) A

78) A

79) B

80) B

81) C

82) D

83) A

84) D

85) B

86) A

87) E

88) C

89) C

90) E

91) B

92) E

93) A

94) A

95) B

96) D

97) A

98) A

99) E

100) C

101) A

102) B

103) A

104) B

105) C

106) A

107) B

108) C

109) A

110) C

111) A

112) A

113) E

114) A

115) D

116) A

117) A

118) A

119) C

120) D

121) A

122) A

123) A

124) C

125) D

126) A

127) A

128) B

129) A

130) B

131) A

132) E

133) A

134) E

135) C

136) A

137) B

138) A

139) C

140) D

141) B

142) B

143) E

144) A

145) C

146) D

147) A

150) TRUE

151) FALSE

152) FALSE

153) FALSE

154) FALSE

155) FALSE

156) FALSE

157) FALSE

158) FALSE

159) FALSE

160) FALSE

161) FALSE

162) FALSE

163) FALSE

164) FALSE

165) FALSE

166) FALSE

167) FALSE

168) TRUE

169) FALSE