FPGEE® REVIEW

Questions & Answers

2027 Premium Edition



FPGEE Review

PREPARATION

Questions & Answers

By Manan Shroff, R.Ph

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PHARMACYEXAM

FPGEE Questions & Answers Premium Edition

2027 EDITION

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Exam-Style Questions
Detailed Answers & Explanations
Covers Updated Blueprint

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Book Information

Edition: 2027 Edition
Publication Year: 2026
Publisher: PharmacyExam
Website: www.pharmacyexam.com
Support: info@pharmacyexam.com

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PREFACE

RxExam's FPGEE® Review Questions and Answers – Premium Edition has been specifically developed for international pharmacy graduates preparing for the **Foreign Pharmacy Graduate Equivalency Examination (FPGEE®)**.

This Premium Edition contains approximately **1,250 FPGEE®-style questions**, each accompanied by the correct answer and detailed explanations. The FPGEE® emphasizes topics such as pharmacology, pharmaceutical sciences, pharmacy management, biostatistics, immunology, pharmacokinetics, biopharmaceutics, medicinal chemistry, microbiology, and other core pharmacy subjects. Every effort has been made to provide comprehensive coverage of these important areas.

What makes this **Premium Edition** unique is the inclusion of **hundreds of full-color educational illustrations, diagrams, flowcharts, and clinical graphics** throughout the book. Pharmacy is a highly visual science, and many concepts are easier to understand when presented graphically rather than through text alone. Carefully designed illustrations help simplify complex mechanisms, clarify difficult topics, and improve long-term retention. My goal was to create a review guide that not only prepares you for the examination but also enhances your overall learning experience.

Each answer includes a detailed explanation to reinforce fundamental concepts and strengthen your understanding of the subject matter. I strongly encourage you to study the explanations carefully rather than simply memorizing the correct answers. Understanding the underlying principles is the most effective way to prepare for the FPGEE® and for your future pharmacy career.

In addition to this review guide, I recommend reviewing the official FPGEE® competency statements and sample questions provided by the National Association of Boards of Pharmacy (NABP®). These resources will help you better understand the examination format and identify areas that require additional study.

I sincerely hope this Premium Edition serves as a valuable resource in your preparation and contributes to your success on the FPGEE®. It has been a privilege to develop this book, and I wish you confidence, success, and the very best in your examination and professional career.

Good Luck!

Manan Shroff, RPh

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Chapter 1 - Basic Biomedical Sciences

1. Which of the following organelles helps green plants synthesize organic compounds like starch in the presence of sunlight?

A. Mitochondria
B. Chloroplast
C. Ribosomes
D. Golgi body

2. Which of the following is/are useful to measure glomerular filtration rate?

I. Creatinine
II. Inulin
III. Albumin

A. I only
B. I and II only
C. II and III only
D. All

3. Which of the following is described as the "power house of the cell"?

A. Endoplasmic reticulum
B. Ribosomes
C. Mitochondria
D. Vacuoles

4. The normal renal creatinine clearance value lies between:

A. 200 and 300 ml/min
B. 80 and 120 ml/min
C. 30 and 60 ml/min
D. 10 and 20 ml/min

5. Production of ATP is defined as a(n):

A. Exothermic reaction
B. Endothermic reaction
C. Uniforming reaction
D. Interacting-absorbing reaction

6. Which of the following is an example of an oligosaccharide? **(Select ALL That Apply)**

A. Glucose
B. Sucrose
C. Starch
D. Glycogen

7. Which of the following is described as a physical basis of life?

A. Protoplasm
B. Chloroplast
C. Ribosomes
D. Nucleus

8. Ribonucleic acid exists in all of the following forms EXCEPT:

A. r RNA
B. m RNA
C. q RNA
D. t RNA

9. Virus should be classified as:

A. Akaryotic
B. Eukaryotic
C. Prokaryotic
D. Nokaryotic

10. Which of the following structures is the host for Krebs' cycle?

A. Mitochondria
B. Golgi bodies
C. Cytoplasmic membrane
D. Ribosome

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11. Which of the following is NOT present in prokaryotic organisms but found in eukaryotic organisms? **(Select ALL That Apply)**

A. Cell wall
B. Nuclear membrane
C. Ribosome
D. Nucleolus

12. Endoplasmic reticulum is visible in the cytoplasm of all Eukaryotic cells EXCEPT:

A. Amoeba
B. Yeast
C. Mushroom
D. Sperm

13. The synthesis of glucose from sources other than carbohydrates is generally known as:

A. Glycolysis
B. Gluconeogenesis
C. Glycogenolysis
D. Glucogenesis

14. Which of the following is the major source of digestive enzymes? (Select ALL That Apply)

A. Golgi body
B. Mitochondria
C. Lysosome
D. Chloroplast

15. The oxidation of one glucose molecule will generate how many molecules of ATP during one Krebs cycle?

A. 16
B. 22
C. 38
D. 2

16. Which of the following amino acids should be considered an essential amino acid(s) for the body?

I. Phenylalanine
II. Leucine
III. Tryptophan

A. I only
B. I and II only
C. II and III only
D. All

17. Which of the following plays an important role in the process of photosynthesis?

A. Grana
B. Thylakoids
C. Lamellae
D. Chlorophyll

18. Which of the following is an essential organelle for the survival of cell?

A. Mitochondria
B. Nucleus
C. Lysosome
D. Nucleolemma

19. Which of the following enzymes catalyzes the coupling of two molecules of nucleotides to form the DNA?

A. Transferase
B. Ligase
C. Isomerase
D. Aldehyde dehydrogenase

20. Which of the following differentiates the nucleus from the cytoplasm?

A. Ribosomes
B. Nucleus
C. Vacuoles
D. Nucleolemma

21. A plant cell wall is normally formed of:

A. Chlorophyll
B. Cellulose
C. Chitin
D. Periactin

22. The ratio of the mass of object measured in a vacuum at specific temperature to volume (in ml) of an object at the same temperature is defined as:

A. Absolute density
B. Specific gravity
C. Relative density
D. Apparent density

23. A small saclike structure filled with liquid and appearing like small dots in the cytoplasm is known as:

A. Chromosomes
B. Nucleus
C. Vacuoles
D. Nucleolus

24. In the process of Mitosis, if the number of chromosomes in the mother cell is designated as 2n, how many chromosomes will be present in each daughter cell?

A. 2n
B. n
C. 4n
D. 8n

25. Which of the following is a polysaccharide?

A. Dextrose
B. Dextran
C. Lactose
D. Sucrose

26. In which stage of the cell cycle is the cell synthesizing its structural proteins and enzymes to perform its functions?

A. S phase
B. G1 phase
C. G2 phase
D. G3 phase

27. How many chromosomes will be present in red blood cells of humans?

A. 46
B. 23
C. 92
D. 0

28. In the prophase of mitosis, the protoplasm forms ray-like structures surrounding each centrosome known as:

A. Chromatid
B. Centromere
C. Asters
D. Karyokinesis

29. How many numbers of chromosomes are found in sex cells of humans?

A. 92
B. 46
C. 23
D. 0

30. Which of the following is the basic unit of classification?

A. Genus
B. Species
C. Family
D. Class

31. Blue green algae should be classified under which of the following living kingdoms?

A. Monera
B. Protista
C. Metaphyta
D. Metazoa

32. All of the following are TRUE ABOUT the Monera kingdom EXCEPT:

A. Monera is so small in size that it can be only seen with the help of microscope.

B. Organisms found in this kingdom have cell walls surrounding the cell.

C. Mitochondria, endoplasmic reticulum, and Golgi bodies are present in the cytoplasm of Monera organisms.

D. A Monera organism contains primitive nuclei in their cytoplasm.

33. Which of the following portions of the bacteriophage play an important role in transferring genetic information?

A. Capsid
B. Core
C. Tail
D. Tail fibers

34. There are very minute hair-like processes that are present on the cell wall of E.coli. These processes are known as:

A. Pili
B. Flagella
C. Cilia
D. Plasmids

35. Microorganisms that convert complex organic compounds into simple inorganic compounds are known as: **[Select All That Apply]**

A. Transformers
B. Dictators
C. Decomposers
D. Protectors

36. The substance that is isolated from the brain and produces fatty acid, galactose and sphingosine upon hydrolysis is known as:

A. Sterols
B. Phospholipids
C. Glycolipids
D. Saponins

37. Which of the following is NOT a hydrolyzed product of lecithins?

A. Fatty acid
B. Glycerol
C. Phosphoric acid
D. Sphingosine

38. Nitrogen fixing bacteria on root nodules of leguminous plants are known as:

A. Azobacteria
B. Nanobacteria
C. Rhizobium bacteria
D. Mycobacteria

39. Red is the dominant color for flowers, and white is the recessive color. What percentage of the second generation offspring is expected to be white homozygous if the homozygous red flower is crossed with the homozygous white flower?

A. 50%
B. 75%
C. 25%
D. 100%

40. Which of the following cells of humans contain multiple alleles? **[Select All That Apply]**

A. RBC
B. WBC
C. Thrombocytes
D. Eosinophils

41. Albumin is an example of a:

A. Simple protein
B. Conjugated protein
C. Derived protein
D. Hydrolyzed protein

42. For microbial assay of vitamin B-12, the test organism should be:

A. L. leichmannii
B. L. plantarum
C. P. aeruginosa
D. S. pneumonia

43. Which of the following is NOT classified as a titrimetric method of analysis?

A. Direct titration
B. Gravimetric titration
C. Complexation reaction
D. Redox reaction

44. Hemolytic anemia with abnormal hemoglobin is generally found in patients with:

A. Vitamin B-12 deficiency anemia
B. Sickle cell anemia
C. Iron deficiency anemia
D. Folic acid deficiency anemia

45. All of the following drugs may cause hemolysis in a patient with G6PD deficiency **EXCEPT:**

A. Chloroquine
B. Sulfonamide
C. Dimercaprol
D. Penicillin

46. Which of the following drugs is useful in an Rh negative mother with an Rh positive infant?

A. Rho gam
B. Octreotide acetate
C. Immunoglobulin
D. Pneu-immune

47. Which of the following is NOT TRUE about PKU?
[Select ALL That Apply]

A. It is a disease usually characterized by mental abnormalities.

B. A high concentration of phenylpyruvic- acid is found in urine.

C. It occurs due to excessive secretion of Phenylalanine hydroxylase enzyme.

D. A Guthrie test is normally performed to detect it.

48. The metabolic product of epinephrine and norepinephrine is:

A. Gama butyric acid
B. Vanillylmandelic acid
C. Homovanillic acid
D. 5-Hydroxyindoleacetic acid

49. Which of the following is an anaerobic organism?

A. L. pneumophilia
B. Cl. tetani
C. N. meningitis
D. E. coli

50. Which of the following organisms is responsible for causing most of the UTI?

A. S. pharyngitis
B. E. coli
C. N. gonorrhea
D. T. palladium

51. The accurate diagnostic test for a patient with cystic fibrosis is:

A. Mantoux test
B. Sweat test
C. Breath test
D. Sick test

52. The allergic skin reaction characterized by wheel formation is known as:

A. Eczema
B. Urticaria
C. Impetigo
D. Erythema

53. Which of the following characteristics in a human is due to a condition known as polygenetic inheritance?

A. Skin color
B. Strength of the bone
C. Nail of middle finger
D. Free earlobes

54. Due to a sex-linked trait, which of the following disorders is more frequently seen in men compared to women? **[Select ALL That Apply]**

A. Hypertension
B. Colorblindness
C. Hemophilia
D. Sickle cell anemia

55. Which of the following is NOT classified as an insect control chemical?

A. Insecticides
B. Repellents
C. Attractants
D. Antiseptics

56. Which of the following is the building block of nucleic acids?

A. Protein
B. Amino acids
C. Starch
D. Nucleotides

57. If one of the chains of the DNA has the sequence of nitrogen bases AAGCC, what would be the sequence of nitrogen bases on the other chain?

A. CCAGG
B. GCATT
C. TTCGG
D. GGATT

58. Which of the following nitrogen bases is present in RNA but absent in DNA?

A. Cytosine
B. Uracil
C. Guanine
D. Adenine

59. Which of the following types of RNA is used to synthesize ribosomes?

A. r RNA
B. t RNA
C. m RNA
D. u RNA

60. Hydrolysis of a molecule of maltose yields:

A. glucose + glucose
B. glucose + galactose
C. glucose + fructose
D. fructose + lactose

61. Which of the following components of a starch is insoluble in water?

A. Amylose
B. Amylodextrin
C. Amylopectin
D. Amylase

62. Which of the following polysaccharides is largely stored in the liver and muscles?

A. Cellulose
B. Starch
C. Glycogen
D. Inulin

63. The addition of Ascorbyl palmitate in the manufacturing process serves as a(n):

A. Preservative
B. Antioxidant
C. Coloring agent
D. Flavoring agent

64. Which of the following alcohol is a principal constituent of a lipid?

A. Ethanol
B. Methanol
C. Glycerol
D. Butanol

65. Which of the following steroids contains hydroxyl (-OH) groups but does not contain any carboxyl (-COOH) or keto (-C = O) groups?

A. Cholesterol
B. Progesterone
C. Cortisone
D. Cortisol

66. Upon oxidation one gram of fat provides:

A. 4 calories
B. 9 calories
C. 7 calories
D. 5 calories

67. Which of the following is NOT part of the general structure of an amino acid?

A. Amino group
B. Carboxyl group
C. Phosphate group
D. Variable side chain - (R group)

68. In a protein, two amino acids are linked together by:

A. Hydrogen bond
B. Peptide bond
C. London forces
D. Van Der Walls force

69. Which of the following proteins is found in the hair and nails of humans?

A. Casein
B. Actin
C. Melanin
D. Keratin

70. What is a nonprotein moiety of chlorophyll?

A. Iron
B. Carbohydrate
C. Magnesium
D. Lipid

71. Which of the following are classified as certified colors?

I. FD and C

II. D and C

III. External D and C

A. I only
B. I and II only
C. II and III only
D. I, II, and III only

72. Which of the following is not considered as a primary taste?

A. Saline
B. Sweet
C. Spicy
D. Bitter

73. Some enzymes become active only in the presence of certain substances. These substances are known as:

A. Proenzymes
B. Coenzymes
C. Prenzymes
D. Retroenzymes

74. The final product of anaerobic respiration is:

A. Carbon dioxide
B. Water
C. Glucose
D. Lactic acid

75. How many molecules of ATP are formed in the process of glycolysis from one molecule of glucose?

A. 2
B. 4
C. 6
D. 8

76. For the complete oxidation of one molecule of glucose, how many Krebs cycles are required?

A. 2
B. 4
C. 6
D. 8

77. In animals, polygonal cells with straight margins are present in all of the following EXCEPT:

A. Peritoneum
B. Wall of blood vessels
C. Epidermis
D. Wall of Bowman’s capsules

78. The inner lining of the alveoli of lungs consists of which of the following tissues?

A. Squamous epithelium
B. Cuboidal epithelium
C. Ciliated epithelium
D. Columnar epithelium

79. The cells from the inner lining of hepatic ducts, bile ducts and ureters are classified as:

A. Squamous epithelium
B. Cuboidal epithelium
C. Ciliated epithelium
D. Columnar epithelium

80. Blood should be classified as:

A. Stratified epithelial tissue
B. Connective tissue proper
C. Liquid connective tissue
D. Skeletal tissue

81. What is the structural and functional unit of striated muscle fiber?

A. Myofibrils
B. Sarcolemma
C. Krause's membrane
D. Sarcomere

82. Cyton is the principal component of the:

A. Neuron
B. Liver
C. Heart
D. Kidney

83. A cell process that carries impulses away from the cyton is known as:

A. Myelin sheath
B. Nissl's granules
C. Axon
D. Dendron

84. A constriction in the myelin sheath, occurring at varying intervals along the length of a nerve fiber, is called:

A. Neuraxon
B. Schwann's cell
C. Myelin sheath
D. Node of Ranvier

85. Which of the following enzymes is required for the synthesis of m-RNA?

A. DNA ligase
B. RNA polymerase
C. DNA polymerase
D. RNA isomerase

86. The type of chromosome in which the centromere is in the center and all four chromatids are of equal length is known as:

A. Metacentric
B. Submetacentric
C. Acrocentric
D. Telocentric

87. Turner Syndrome is a genetic disorder normally seen in females, the 23rd pair of chromosomes of will be:

A. XX
B. XY
C. X
D. YX

88. Which of the following muscles are controlled by the autonomic nervous system? **[Select All That Apply]**

A. Skeletal muscles
B. Cardiac muscles
C. Visceral muscles
D. None of the above

89. Which of the following about moist heat sterilization is **NOT TRUE**?

A. It is a widely used method for sterilization of mineral oil, greases and waxes.

B. The cause of death of organisms is generally attributed to coagulation of cellular proteins of organisms.

C. The substance should be kept loose to allow direct penetration of steam.

D. The substance should be kept at least 15 minutes under pressure steam at a minimum of 121° temperature.

90.

Which of the following gases are generally implied for sterilization of pharmaceuticals?

I. Ethylene oxide
II. Formaldehyde
III. Sulfur dioxide

A. I only
B. I and II only
C. II and III only
D. I, II, and III only

91. Sterilization by U.V. radiation generally requires a wavelength of:

A. 320 nm
B. 253 nm
C. 150 nm
D. 475 nm

92. The hardness of bone structure is due to the presence of:

A. Water
B. Organic solids
C. Inorganic acids
D. Salts of calcium

93. The substance that is found between the bone plates of the spongy substance and in the bone canal is known as:

A. Sacrum
B. Carpels
C. Fibula
D. Bone marrow

94. Which of the following provides the necessary freedom for bones as well as protect joints from external injury and bones from dislocation?

A. Cartilage
B. Ligaments
C. Tendons
D. Muscles

95. A disease of the bone usually found in adults due to vitamin D and calcium deficiency is called:

A. Osteomalacia
B. Osteoporosis
C. Osteomyelitis
D. Myeloma

96. Which of the following serves as a lubricant between two movable joints?

A. Ligaments
B. Synovial fluid
C. Tissues
D. Cartilage

97. A chronic inflammatory disease mostly affecting small joints, characterized by stiffness and pain in joints is defined as: **[Select ALL That Apply].**

A. Osteoarthritis
B. Rheumatoid arthritis
C. Bursitis
D. Gout

98. Which of the following lipids in a cell membrane acts as a selective barrier for controlling the exit and entry of substances into and out of the cell?

A. Cholesterol
B. Glycolipids
C. Phospholipids
D. Lipoproteins

99. A process by which materials move across cell membranes without the use of cellular energy is defined as:

A. Active transport
B. Passive transport
C. Facilitated diffusion
D. None of the above

100. Oxygen is carried by the pigment hemoglobin of the RBC in the loosely combined form called:

A. Carboxyhemoglobin
B. Oxyhemoglobin
C. Paradoxyhemoglobin
D. Hydroxyhemoglobin

101.
Which of the following tests are used to identify Laminar flow efficiency and quality of sterilization?

I. Smoke test
II. DOP test
III. Microbial test

A. I only
B. I and II only
C. II and III only
D. I, II, and III only

102. A normal RBC count in an adult male will be:

A. 2.5 million cells/cmm
B. 5 million cells /cmm
C. 7.5 million cells /cmm
D. 10 million cells /cmm

103. Which of the following is the principal PROTEIN component of an RBC?

A. Iron
B. Phospholipid
C. Globin
D. Potassium phosphate

104. At what concentration does sucrose retard the growth of microorganisms?

A. 20% w/w
B. 30% w/w
C. 65% w/w
D. 85% w/w

105. An average life span of RBC is:

A. 30 days
B. 60 days
C. 90 days
D. 120 days

106. The most important property of hemoglobin is its ability to bind and carry oxygen. Generally, one gram of hemoglobin can take up:

A. 2 cc of oxygen
B. 0.05 cc of oxygen
C. 1.34 cc of oxygen
D. 0.001 cc of oxygen

107. Which of the following gases can replace oxygen and form a more stable complex with hemoglobin?

A. CO_2
B. NO
C. CO
D. H_2S

108. Iron deficiency anemia is known as:

A. Hypochromic anemia
B. Hyperchromic anemia
C. Hereditary anemia
D. None of the above

109. Which of the following provides the first line of defense against microorganisms?

A. Erythrocytes
B. Thrombocytes
C. Leukocytes
D. None of the above

110. What happens when an Rh -ve mother bears an Rh +ve fetus?

A. Normal delivery
B. Caesarean delivery
C. Miscarriage
D. None of the above

111. Which of the following cells plays an important role in the clotting process of the blood?

A. RBC
B. WBC
C. Platelets
D. None of the above

112. The clotting of the blood is a complex mechanism. Which of the following describes the correct path in the process of blood clotting?

A. Prothrombin, Thrombin, Fibrinogen, Fibrin
B. Fibrinogen, Fibrin, Prothrombin, Thrombin
C. Thrombin, Prothrombin, Fibrinogen, Fibrin
D. Fibrin, Thrombin, Fibrinogen, Prothrombin

113. Which of the following vitamins plays an important role in the process of blood clotting?

A. Vitamin A
B. Vitamin E
C. Vitamin D
D. Vitamin K

114. Which of the following cells are ABSENT in the lymph fluid?

A. Erythrocytes
B. Lymphocytes
C. Thrombocytes
D. Both a and c

115. Which of the following phase(s) is/are generally dominated by estrogen?

I. Follicular phase
II. Ovulatory phase
III. Luteal phase

A. I only
B. I and II only
C. II and III only
D. I, II and III only

116. Which of the following about Metabolic Acidosis is NOT TRUE?

A. It generally occurs due to loss of bicarbonate from the body.

B. Hypokalemia is generally a result of metabolic acidosis.

C. Administration of Arginine HCl generally resolves metabolic acidosis.

D. It stimulates the respiratory center to increase excretion of CO_2 from the body.

117. Small, bean-sized organs of the immune system, distributed widely throughout the body to filter germs, their toxins and foreign bodies are known as:

A. Thalamus
B. Cerebrospinal fluid
C. Lymph nodes
D. Pleura

118. Which of the following organs of the body helps the destruction of old red blood cells and removal of other debris from the bloodstream, and is a great reservoir of blood?

A. Liver
B. Kidney
C. Lung
D. Spleen

119. Which of the following carries oxygenated blood from the heart to different organs?

A. Arteries
B. Veins
C. Pulmonary arteries
D. None of the above

120. A small area of specialized heart tissue located in the right atrium that conducts impulses through the right and left atria; signaling these chambers to contract and pump blood into the ventricles is known as:

A. Bundle of His
B. Purkinje fibers
C. SA node
D. AV node

121. Which of the following is NOT the sign of Graves' disease?

A. Fast heartbeat
B. Weight gain
C. Soft skin
D. High basal metabolic rate

122. Which of the following is/are caused by thyroid hormone deficiency?

I. Myxedema

II. Cretinism

III. Graves' disease

A. I only
B. I and II only
C. II and III only
D. I, II and III only

123. Which of the following principal enzymes is found in saliva of the mouth?

A. Amylase
B. Lipase
C. Sucrase
D. Lactase

124. Which of the following enzymes in gastric juice digests protein molecules into peptides?

A. Trypsin
B. Nuclease
C. Chymotrypsin
D. Pepsin

125. Which of the following enzymes in the pancreatic juice digests protein molecules into peptides?

A. Trypsin
B. Pepsin
C. Chymotrypsin
D. Both a and c

126. The inner surface of the small intestine contains numerous fingerlike projections called:

A. Colon
B. Jejunum
C. Duodenum
D. Villi

127. Which of the following glasses are most chemically resistant or least leachable? [Select All That Apply].

A. Type I borosilicate glass
B. Type II soda lime treated glass
C. Type III soda lime glass
D. Type IV glass

128. According to Federal standard class 100 clean room is generally defined as:

A. Not more than 100 people working in a room.

B. Not more than 100 particles per cubic ft of 0.5 mcm or larger size.

C. Not more than 100 bacteria per cubic ft of 40 mcm or larger size.

D. Not more than 100 viruses per cubic ft of 40 mcm or larger size.

129. Which of the following is NOT TRUE about the HEPA filter?

A. It is generally described as a high efficiency particulate air filter.

B. It has an efficiency of removing 100% of particles 0.3 mcm or larger.

C. A Dioctyl Phthalate test (DOP) generally finds out the efficiency of HEPA filters.

D. It is useful for the preparation of parenteral products.

130. Cold sterilization of parenteral solution is defined as:

A. Removing 2 mcm or larger particles from the solution.

B. Removing 0.2 mcm or larger particles, including microorganisms, from the solution.

C. Sterilization of the parenteral solution with hot and cold compresses.

D. Sterilization of the parenteral solution by freezing the solution below freezing point.

131. Lyophilization is defined as:

A. The removal of water by method of sublimation from the product after it is frozen.

B. Direct evaporation of a substance from its solid form.

C. Preparation of colloidal solution.

D. None of the above.

132. Which of the following is NOT described as the quality assurance or control test for parenteral solution?

A. Sterility test
B. Particulate matter evaluation
C. Pyrogen test
D. Schilling test

133. Which of the following digestive juices is secreted by the liver and stored in the gall bladder, and aids in the digestion of fat molecules?

A. Gastric juice
B. Pancreatic juice
C. Bile juice
D. None of the above

134. In which portion of the small intestine, does most absorption of food and other nutrients occur?

A. Duodenum
B. Jejunum
C. Ileum
D. Cecum

135. The transport of glucose and amino acids from the small intestine to blood normally occurs through the process of:

A. Diffusion
B. Active transport
C. Osmosis
D. Facilitated diffusion

136. The excessive glucose in the blood is stored as a reservoir in the liver in the form of:

A. Lactic acid
B. Glycogen
C. Bile pigments
D. Pyruvic acid

137. The movement of the molecules from a higher concentration to a lower concentration is known as:

A. Diffusion
B. Osmosis
C. Facilitated diffusion
D. Active transport

138. In humans, an exchange of oxygen and carbon dioxide take place through the process of:

A. Diffusion
B. Osmosis
C. Facilitated diffusion
D. Active transport

139. The tiny, microscopic area of the lung where the actual exchange of oxygen and carbon dioxide into and out of the blood occurs is known as the:

A. Microvilli
B. Alveoli
C. Stomata
D. Gills

140. The main part of the large intestine, responsible for absorbing water and salts from the digested products of the small intestine and passing the digested products into the rectum for removal from the body is called the:

A. Uterus
B. Colon
C. Anus
D. Vagina

141. The hypersensitivity reaction that generally occurs due to pollen or grasses is classified as:

A. Type I hypersensitivity reaction
B. Type II hypersensitivity reaction
C. Type III hypersensitivity reaction
D. Type IV hypersensitivity reaction

142. Which of the following is NOT the Type III hypersensitivity reaction?

A. Rheumatoid arthritis
B. Lupus erythematosus
C. Contact dermatitis
D. Sjogren syndrome

143. Graves' disease is generally classified as:

A. Type I hypersensitivity
B. Type V hypersensitivity
C. Type II hypersensitivity
D. Type III hypersensitivity

144. Which of the following is NOT an organ specific autoimmune disorder?

A. Hashimoto's thyroiditis
B. Myasthenia gravies
C. S.L.E.
D. Multiple sclerosis

145. Which of the following about monoclonal antibodies is/are true?

I. Monoclonal antibodies are a specific antigen derived from a single cell line.

II. Murine monoclonal antibody and Digibind are the only two FDA approved monoclonal antibodies available in market.

III. They are safer and more specific compared to regular antibodies.

A. I only
B. I and II only
C. II and III only
D. I, II and III only

146. Which of the following secretes endocrine hormones such as insulin and glucagon?

A. Caudate lob
B. Kupffer cells
C. Islets of Langerhans
D. Epithelial cells of villus

147. Which of the following is the primary site for the storage of bile?

A. Liver
B. Pancreas
C. Gall bladder
D. Appendix

148. Bile mainly helps the digestion of:

A. Fats
B. Proteins
C. Carbohydrates
D. Bile pigments

149. Which of the following chemicals is generally classified as a neurotransmitter?

A. Acetylcholine
B. Acetic acid
C. Hydrochloric acid
D. Sodium bicarbonate

150. A watery, colorless, clear fluid that bathes and protects the brain and spinal cord is known as:

A. Lymph
B. CSF
C. Vitreous humor
D. Aqueous humor

151. Metabolic alkalosis is reported with:

A. Spironolactone
B. Hydrochlorothiazide
C. Amiloride
D. Triamterene

152. Which of the following glands generally matures the T cell?

A. Thyroid gland
B. Thymus gland
C. Pituitary gland
D. Adrenal gland

153. Which of the following is NOT an example of live attenuated vaccine?

A. Measles
B. Diphtheria
C. Rubella
D. Mumps

154. Which of the following is known as the digestive organ of cell?

A. Lysosome
B. Endoplasmic reticulum
C. Mitochondria
D. Golgi body

155. Which of the following is normally NOT found in bacteria but present in human cells?

A. Golgi body
B. Mitochondria
C. Lysosome
D. Endoplasmic reticulum

156. Which of the following is/are true about Lysozyme?

I. It is generally known as the power house of the cell.

II. It helps removal of damaged cell.

III. It contains the bactericidal agent such as lysozyme that kills bacteria before it damages the cell.

A. I only
B. I and II only
C. II and III only
D. I, II and III only

157. The autonomic nervous system regulates all of the following activities EXCEPT:

A. Blood pressure
B. Secretion of glands
C. Activity of skeletal muscle
D. Activity of smooth muscle

158. Which of the following statements is NOT TRUE about ANS?

A. Each ANS consists of a ganglion, a preganglionic nerve fiber and postganglionic nerve fibers.

B. Ganglia of parasympathetic system lie near to or within the organ, whereas ganglia of sympathetic nervous system lie close to the spinal cord or away from the organ.

C. The preganglionic nerve fiber of parasympathetic system is shorter than the preganglionic fiber of sympathetic system.

D. Sympathetic division of ANS is formed by all twelve thoracic nerves and the first three lumbar nerves, whereas parasympathetic division of ANS is formed by oculomotor, facial, glossopharyngeal and vagus cranial nerves and the third to fifth spinal nerves.

159. The chemical transmitter for the preganglionic fiber of sympathetic system will be:

A. Histamine
B. Acetylcholine
C. Adrenaline
D. Dopamine

160. A visual pigment contained in the rods of the retina in the eye is known as:

A. Rhodopsin
B. Scotopsin
C. Photopsin
D. Melanin

161. Which of the following helps absorption of vitamin B12?

A. Erythropoietin
B. Intrinsic factor
C. Hemoglobin
D. Apoferritin

162. Which of the following is a good source of Folic acid?

A. Carrots
B. Green vegetables
C. Milk
D. Fish

163. Which of the following about iron is/are TRUE?

I. Reticuloendothelial cells, liver hepatocytes and apoferritin are important iron storage sites.

II. Apotransferrin is generally combined with iron in the small intestine, which later is secreted into the blood.

III. The spleen and bone marrow are important sites for the destruction of RBC.

A. I only
B. I and II only
C. II and III only
D. I, II and III only

164. The lack of function of bone marrow generally results in:

A. Sickle cell anemia
B. Aplastic anemia
C. Megaloblastic anemia
D. Pernicious anemia

165. Polycythemia Vera is defined as an:

A. Increase of WBC.
B. Increase of RBC.
C. Increase of lymphocytes.
D. Increase of thrombocytes.

166. Which of the following organisms is found in normal flora of the human respiratory tract?

A. S. Pyrogen
B. S. Viridans
C. S. Aureus
D. S. Epidermis

167. Which of the following organisms is/are responsible for causing meningitis in humans?

I. N. meningitis
II. H. influenza
III. S. pneumonia

A. I only
B. I and II only
C. II and III only
D. I, II and III only

168. Which of the following organisms is responsible for causing 80% or more of bone infections?

A. S. pyrogen
B. S. aureus
C. Cl. difficile
D. M. pneumonia

169. Which of the following about Lyme disease is NOT TRUE?

A. The origin or occurrence of this disease is the bite of ticks.

B. It can be identified by the presence of annular skin lesions found on the thighs and buttocks.

C. The bite of a tick is extremely painful.

D. The disease is usually associated with CVS and neurological complications.

170. Which of the following gram-negative organisms is responsible for causing most urinary tract infections?

A. S. aureus
B. E. Colli
C. K. pneumonia
D. P. aeruginosa

171. Which of the following causes syphilis?

A. Neisseria Gonorrhea
B. Treponema Pallidum
C. Granulomatosis shigella
D. Candida albicans

172. Which of the following organisms is found in a normal flora of guts?

I. Salmonella species
II. Escherichia Colli
III. Neisseria Meningitis

A. I only
B. I and II only
C. II and III only
D. I, II and III only

173. Which of the following tests differentiates between gram positive and gram negative microorganisms?

A. Phenol coefficient test
B. Acid fast stain
C. Gram stain
D. Chick martin test

174. Which of the following tests is indicated to identify a person's immunity against tuberculosis?

A. Schick test
B. Mantoux test
C. Schilling test
D. Virulence test

175. Collected blood should be stored at:

A. 10 to 20 degree Celsius
B. 4 to 6 degree Celsius
C. 8 to 15 degree Celsius
D. 25 degree Celsius

176. Which of the following hormones is secreted through the anterior pituitary?

I. Growth hormone
II. Thyrotropic hormone
III. Oxytocin

A. I only
B. I and II only
C. II and III only
D. I, II and III only

177. The function of the anterior pituitary gland is controlled by the:

A. Thymus gland
B. Hypothalamus
C. Brain
D. Pineal gland

178. Any fall in the level of thyroid hormone in the blood generally stimulates the release of:

A. GHRF
B. TRF
C. FSRF
D. ACRF

179. The hypersecretion of growth hormone in human may cause:

I. Gigantism
II. Acromegaly
III. Dwarfism

A. I only
B. I and II only
C. II and III only
D. I, II and III only

180. Which of the following hormones is responsible for lactation in the postpartum state of women?

A. Vasopressin
B. Prolactin
C. Oxytocin
D. Calcitonin

181. Which of the following takes an active part in the function of the thyroid gland?

A. Mono iodothyronine
B. Di iodothyronine
C. Tri iodothyronine
D. Tetra iodothyronine

182. All of the following thyroid disorders occur due to deficiency of thyroid hormone EXCEPT:

A. Cretinism
B. Myxedema
C. Goiter
D. Grave's disease

183. All of the following are signs of hyperthyroidism EXCEPT:

A. Weight loss
B. Slow heartbeats
C. High BMR
D. Staring eyes

184. Which of the following glands regulates the mobilization of calcium between bone and blood?

A. Adrenal
B. Parathyroid
C. Pituitary
D. Pancreas

185. A healthy person's pancreas secretes how many units of insulin per day?

A. 10
B. 50
C. 100
D. 200

186. The synthesis of glucose from non-carbohydrate sources is defined as:

A. Glycolysis
B. Gluconeogenesis
C. Glycogenolysis
D. Glycogenesis

187. Which of the following is a major precursor of steroid hormone?

A. Cholesterol
B. Triglyceride
C. Bile acid
D. Sphingoid

188. Which of the following is a naturally occurring glucocorticoid?

A. Prednisone
B. Cortisol
C. Triamcinolone
D. Dexamethasone

189. Which of the following is a good source of vitamin A?

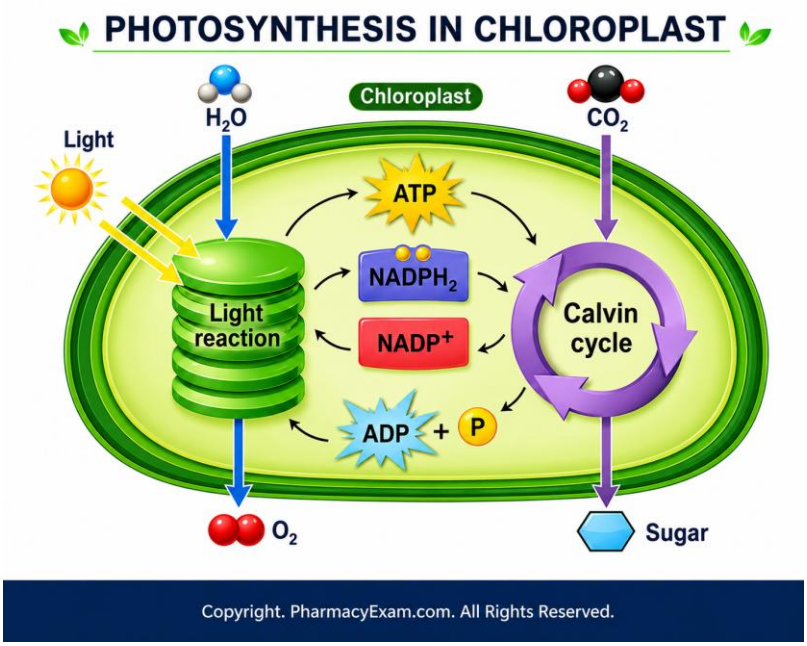
A. Cod liver oil
B. Carrots
C. Citrus fruits
D. Leafy vegetables

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Chapter 1 - Basic Biomedical Sciences

1. Correct Answer: B

Green plants, with the help of sunlight and in the presence of enzymes, synthesize organic compounds like starch from inorganic compounds like CO_2 and H_2O. This is known as photosynthesis. Chloroplast is the organelle to perform photosynthesis. Plants that are devoid of chloroplast cannot synthesize starch.



2. Correct Answer: B

The creatinine (endogenous substance obtained from creatinine phosphate during muscle metabolism) and Inulin (exogenous substance, a polysaccharide) are useful to measure the rate of glomerular filtration.

The ideal characteristics of drug to measure glomerular filtration rate:

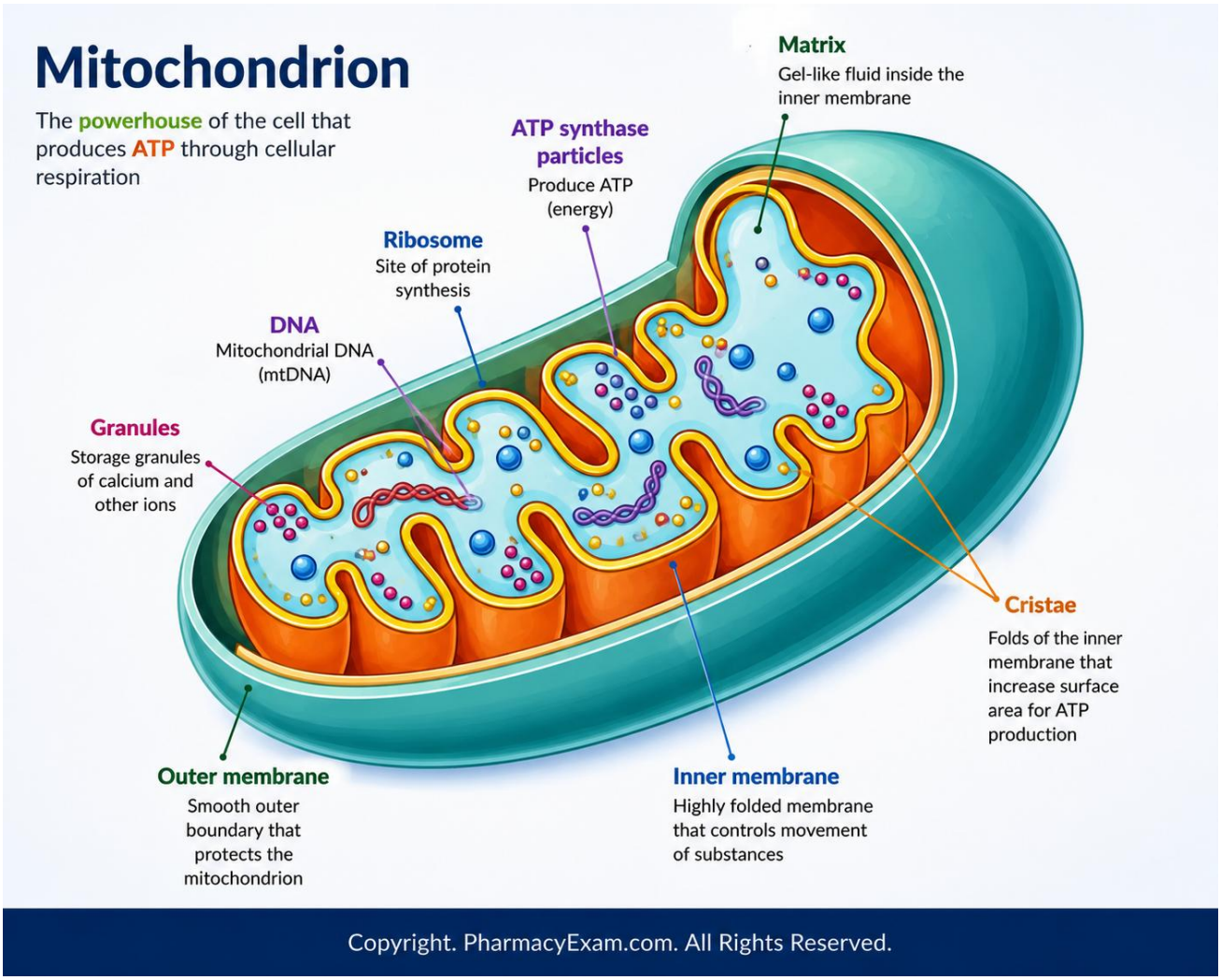
1. It must be non-toxic and non-reabsorbable from the renal tubules.
2. It must not affect the renal function.
3. It should be actively secreted through renal tubules and should be easily measured in urine or plasma.
4. It should not be metabolized by the liver.

Creatinine clearance is the most widely acceptable test to measure the function of kidney. Normal creatinine clearance lies between 80 and 120 ml/min. Creatinine clearances below 60ml/min indicates renal function impairment.

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3. Correct Answer: C

Mitochondria is known as the "power house of the cell." It is involved in the continuous production of energy. It releases necessary energy for different functions of the cell through processes like respiration, electron transport and oxidative phosphorylation.



4. Correct Answer: B

The normal creatinine clearance value lies between 80 and 120 ml/min.

5. Correct Answer: B

The chemical reactions taking place in the systems of organisms are classified into two categories:

1. Exothermic reactions

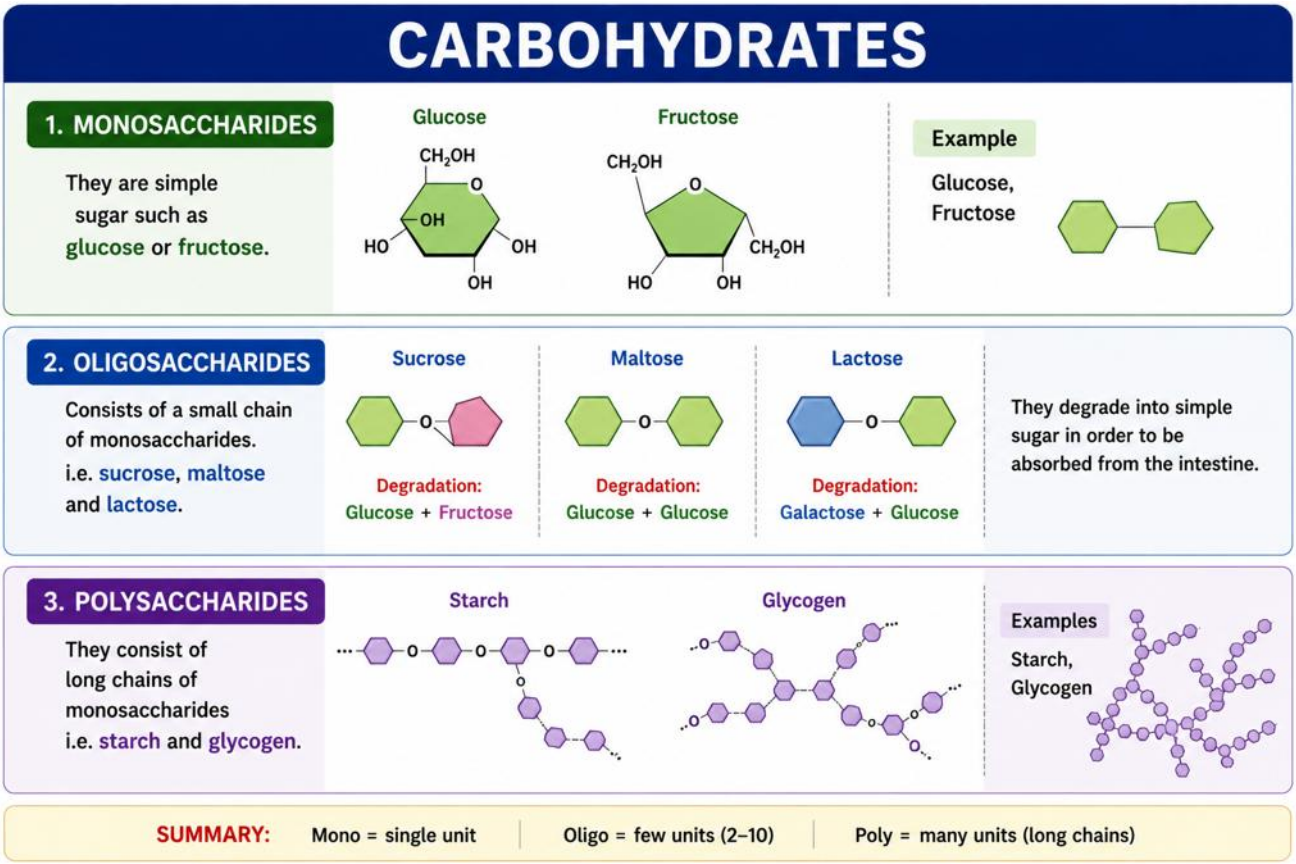
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2. Endothermic reactions Exothermic reactions are those which release energy and endothermic reactions are those which absorb energy at the end of the process.

Production of ATP (Adenosine Triphosphate) is classified as an endothermic reaction since it requires energy, while utilization of ATP is classified as an exothermic reaction since it releases energy.

6. Correct Answer: B

Sucrose is an example of Oligosaccharide. It consists of a short chain of monosaccharide. It consists of one molecule of glucose and one molecule of fructose.



7. Correct Answer: A

The term "protoplasm" was first used by the scientist Hugovan Mohle in 1845. Then later on Schultz and Huxley described protoplasm as a physical basis of life. It is because of protoplasm that every organism, during its life span, can carry on physiological processes like movement, respiration, digestion, excretion, reproduction, etc. The activity of protoplasm means life, and its passivity means death.

Review Figure: Plant Cell Detail (page 147).

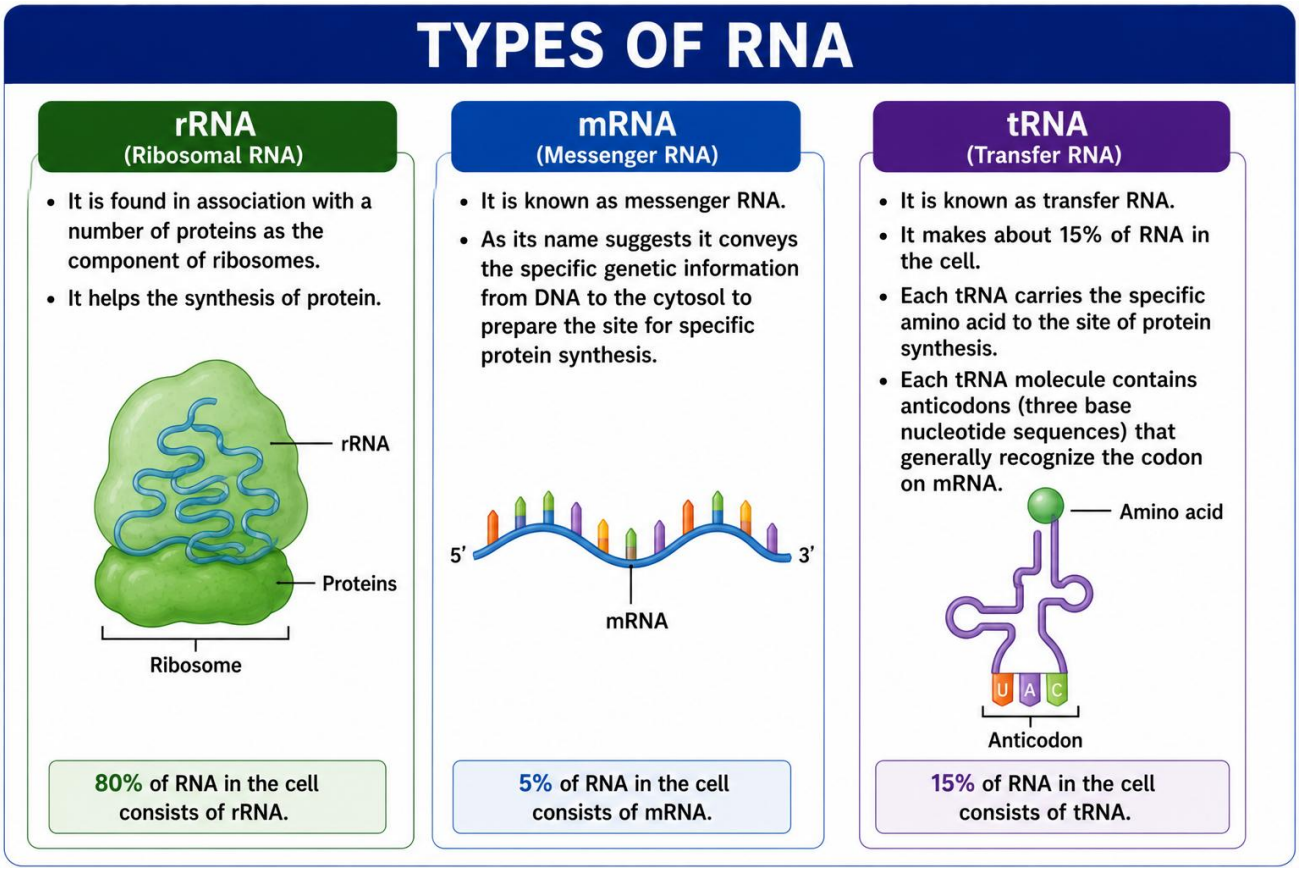
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8. Correct Answer: C

Nucleic acids consist of long chains of nucleotides. They can be subdivided into two different categories:

I. DNA (Deoxyribose nucleic acid)
II. RNA (Ribose nucleic acid)



9. Correct Answer: A

Each cell has two main components - Cytoplasm and the nucleus. Usually there is a nucleus in the cell.

1. Organisms without any cytoplasmic organizations and devoid of definite nuclear material are grouped as Akaryota. (e.g. Virus).

2. Organisms having a primitive type of nucleus in cell are classified Prokaryotae (e.g. Bacteria and Blue green algae.)

3. Organisms having a cell with a well-developed nucleus are grouped as Eukaryota (e.g. Fungi-yeast, mushroom).

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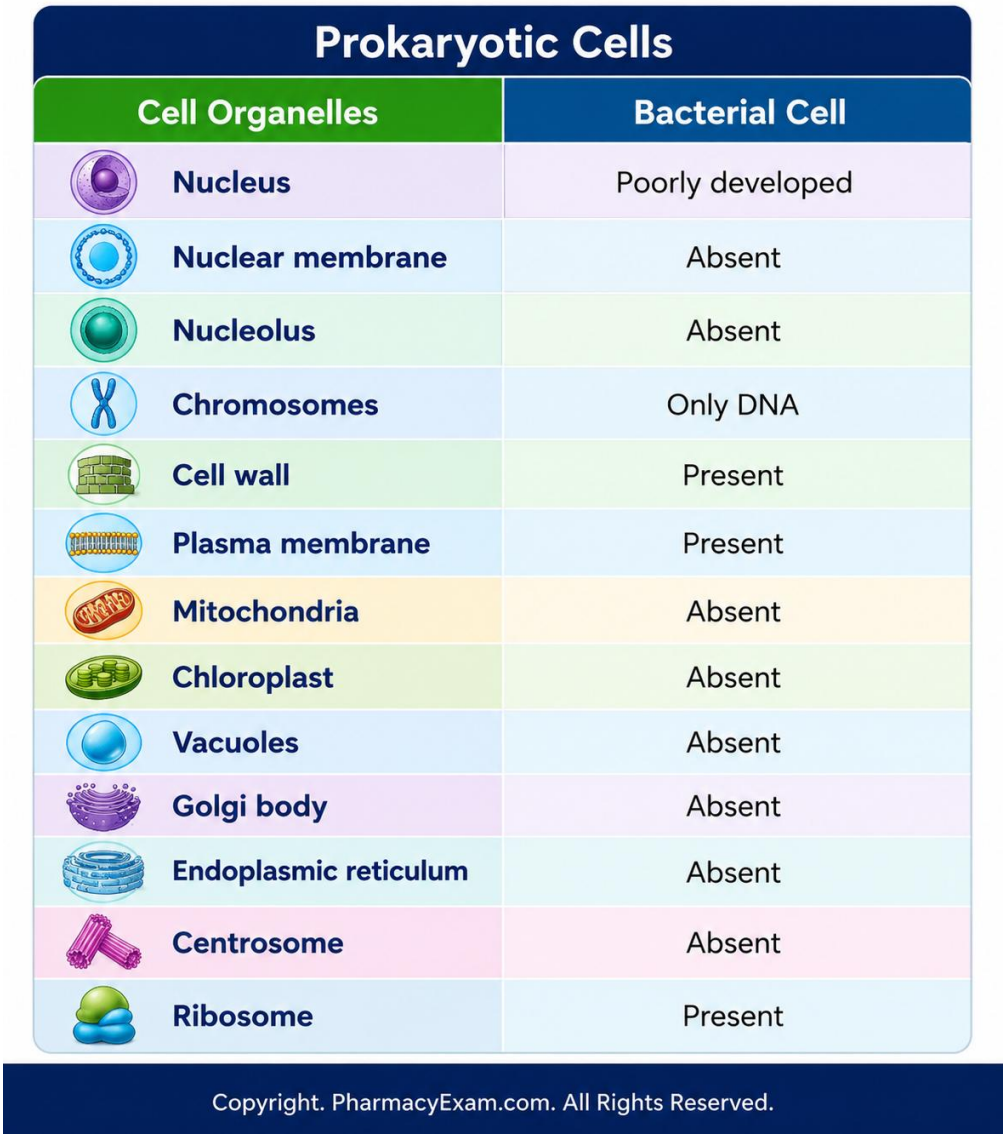
10. Correct Answer: A

Mitochondria are the host for Krebs's cycle. They are known as the powerhouse of the cell. A series of oxidative reactions occur in mitochondria, and energy from such reactions is stored as ATP. Energy in the form of ATP is usable by cells for their activities.

Review Figure: Mitochondria (page 137).

11. Correct Answer: A

Nucleolus and nuclear membranes are absent in prokaryotic organisms.

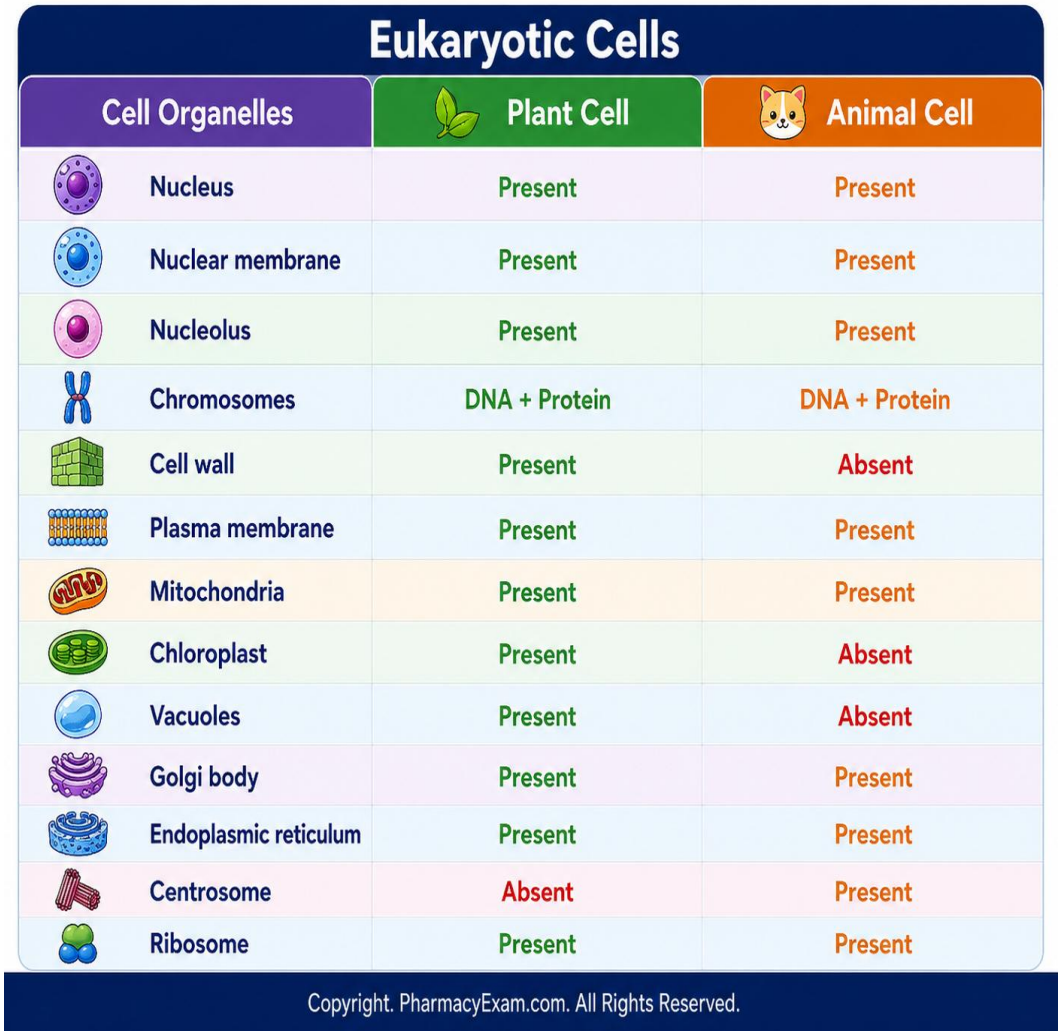


Prokaryotic Cells

Cell Organelles	Bacterial Cell
Nucleus	Poorly developed
Nuclear membrane	Absent
Nucleolus	Absent
Chromosomes	Only DNA
Cell wall	Present
Plasma membrane	Present
Mitochondria	Absent
Chloroplast	Absent
Vacuoles	Absent
Golgi body	Absent
Endoplasmic reticulum	Absent
Centrosome	Absent
Ribosome	Present

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Eukaryotic Cells		
Cell Organelles	Plant Cell	Animal Cell
Nucleus	Present	Present
Nuclear membrane	Present	Present
Nucleolus	Present	Present
Chromosomes	DNA + Protein	DNA + Protein
Cell wall	Present	Absent
Plasma membrane	Present	Present
Mitochondria	Present	Present
Chloroplast	Present	Absent
Vacuoles	Present	Absent
Golgi body	Present	Present
Endoplasmic reticulum	Present	Present
Centrosome	Absent	Present
Ribosome	Present	Present

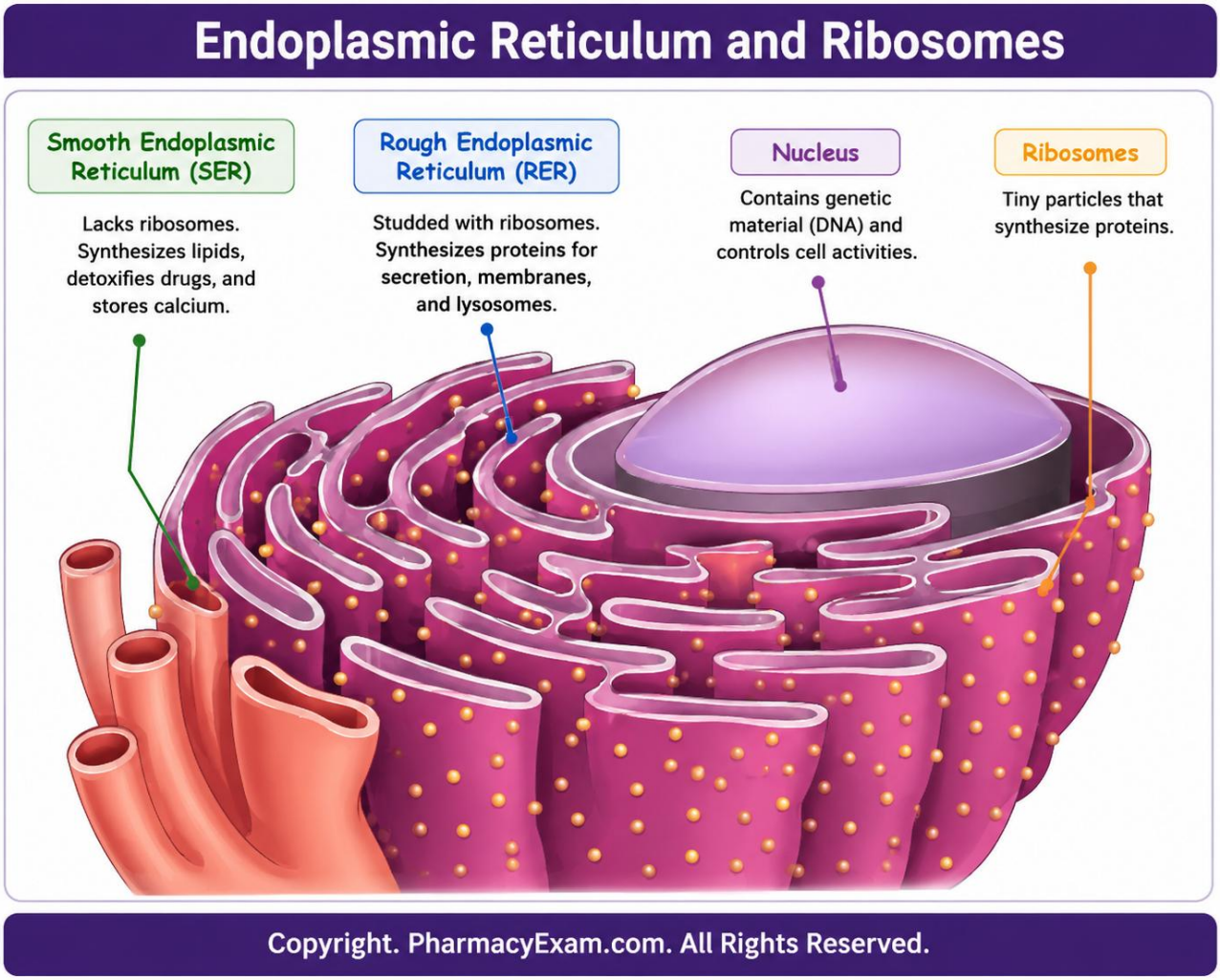
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12. Correct Answer: D

Endoplasmic reticulum is a concentrically arranged tabular system in the area of cytoplasm. It is visible in the cytoplasm of all the Eukaryotic cells except sperm and egg cells.

There are two types of endoplasmic reticulum:

1. Granular
2. Smooth



13. Correct Answer: B

Gluconeogenesis: The synthesis of glucose from sources other than carbohydrates.

Glycolysis: Breakdown of sugar into pyruvate or lactate.

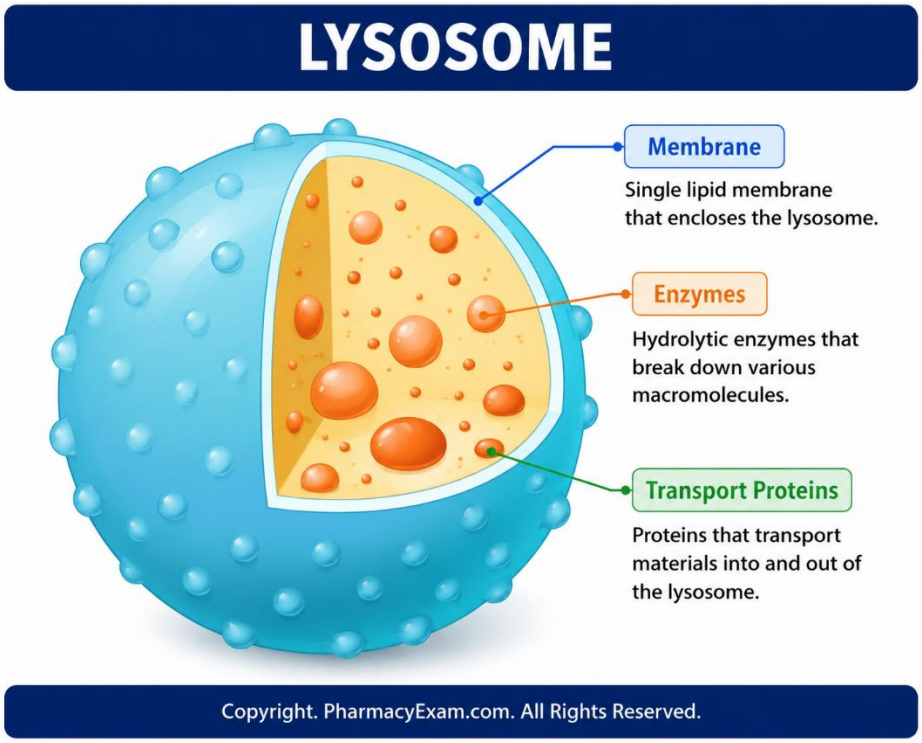
Glycogenesis: The synthesis of glycogen from glucose.

Glycogenolysis: The breakdown of glycogen into glucose.

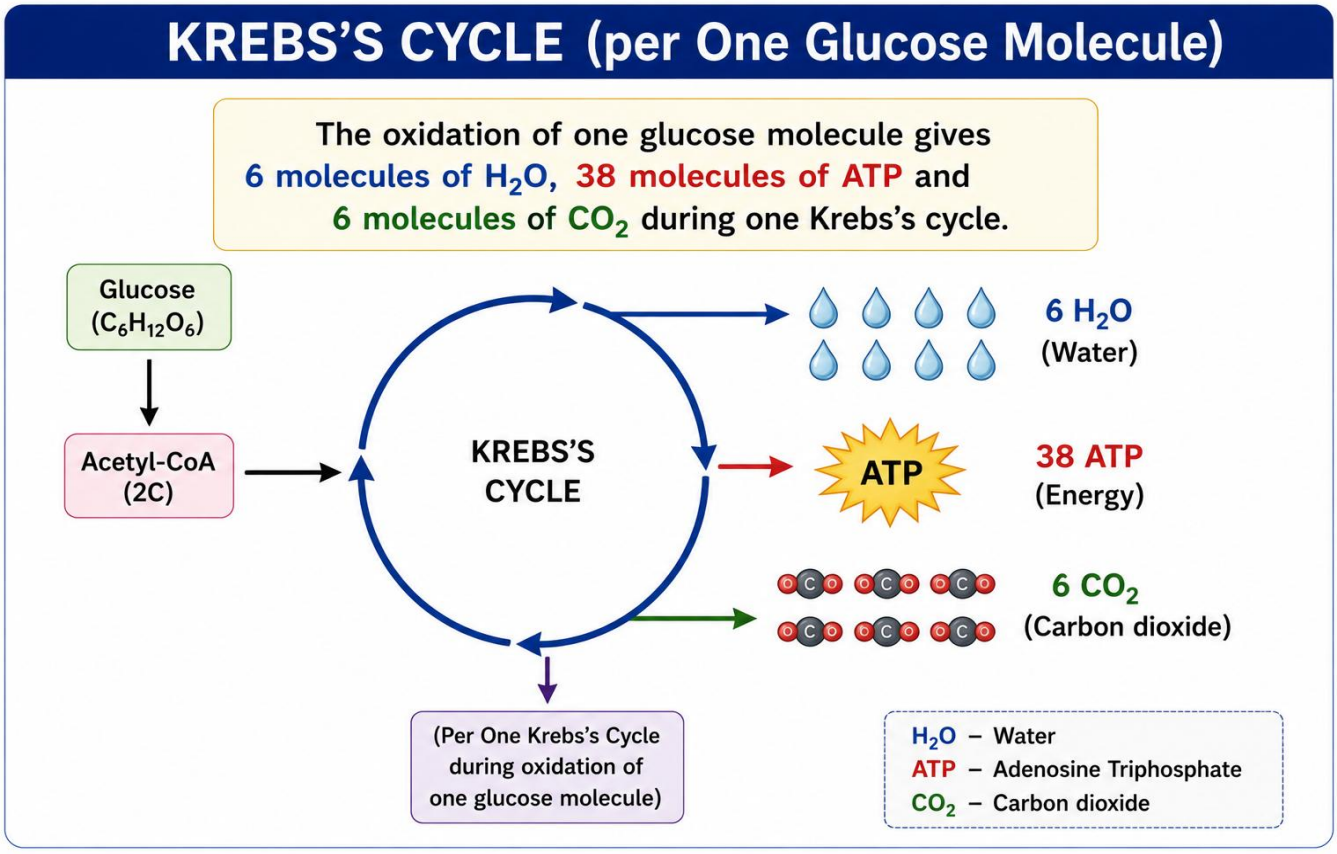
14. Correct Answer: C

Lysosomes are the major source of digestive enzymes. They develop from the Golgi body. There are different digestive enzymes in Lysosomes. These enzymes are capable of digesting any biomolecules or organelles. They also digest and destroy pathogenic microorganisms.

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15. Correct Answer: C



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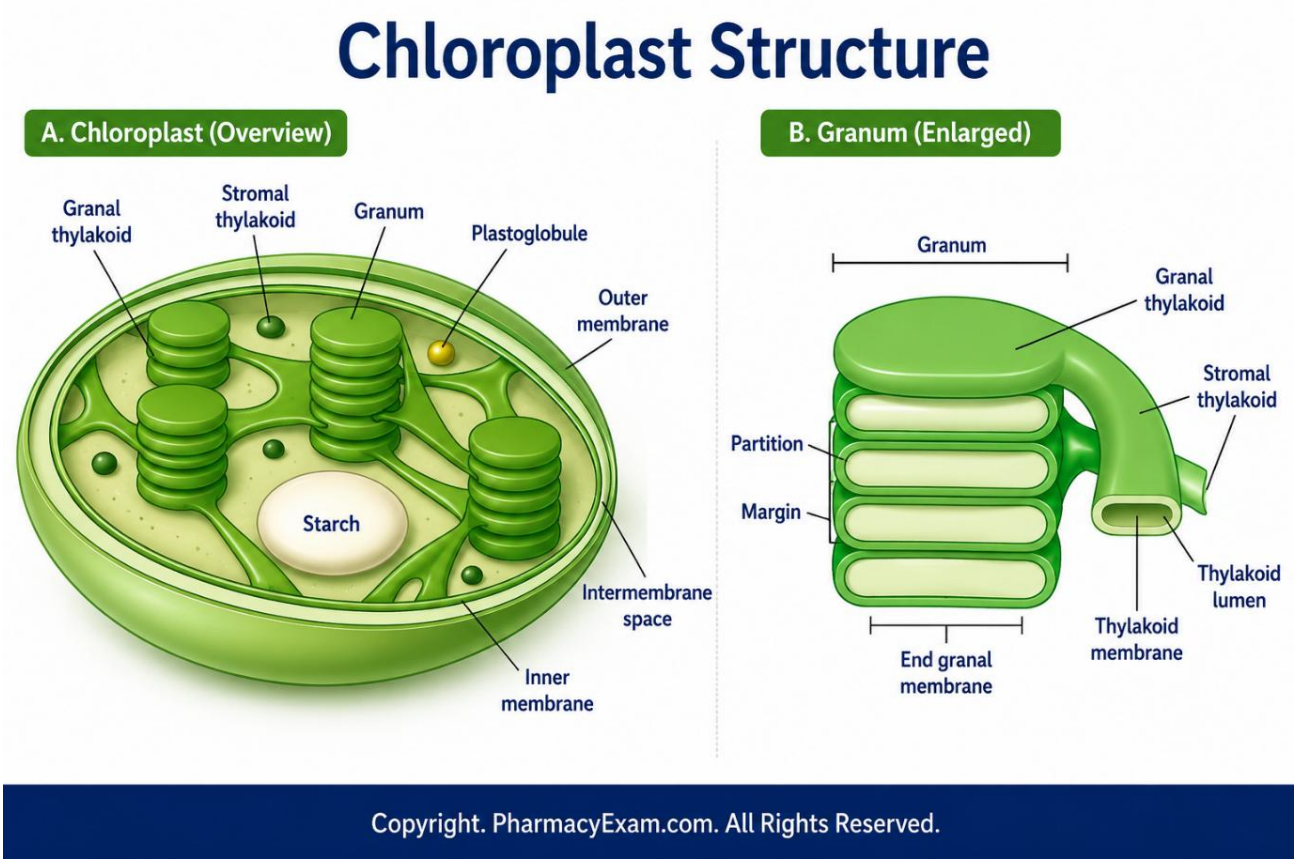
16. Correct Answer: D

The list of the essential amino acids includes:

Isoleucine	Tryptophan
Arginine	Valine
Methionine	Phenylalanine
Leucine	Histidine
Lysine	
Threonine	

17. Correct Answer: D

Chlorophyll plays an important role in the process of photosynthesis. The molecules of chlorophyll are located in thylakoids. In the chloroplast, a unit formed by the stacks of double walled lamellae arranged like a pile of coins is known as granum. Each two-layer independent unit is known as the thylakoids. Chloroplasts are found only in green plants.



18. Correct Answer: B

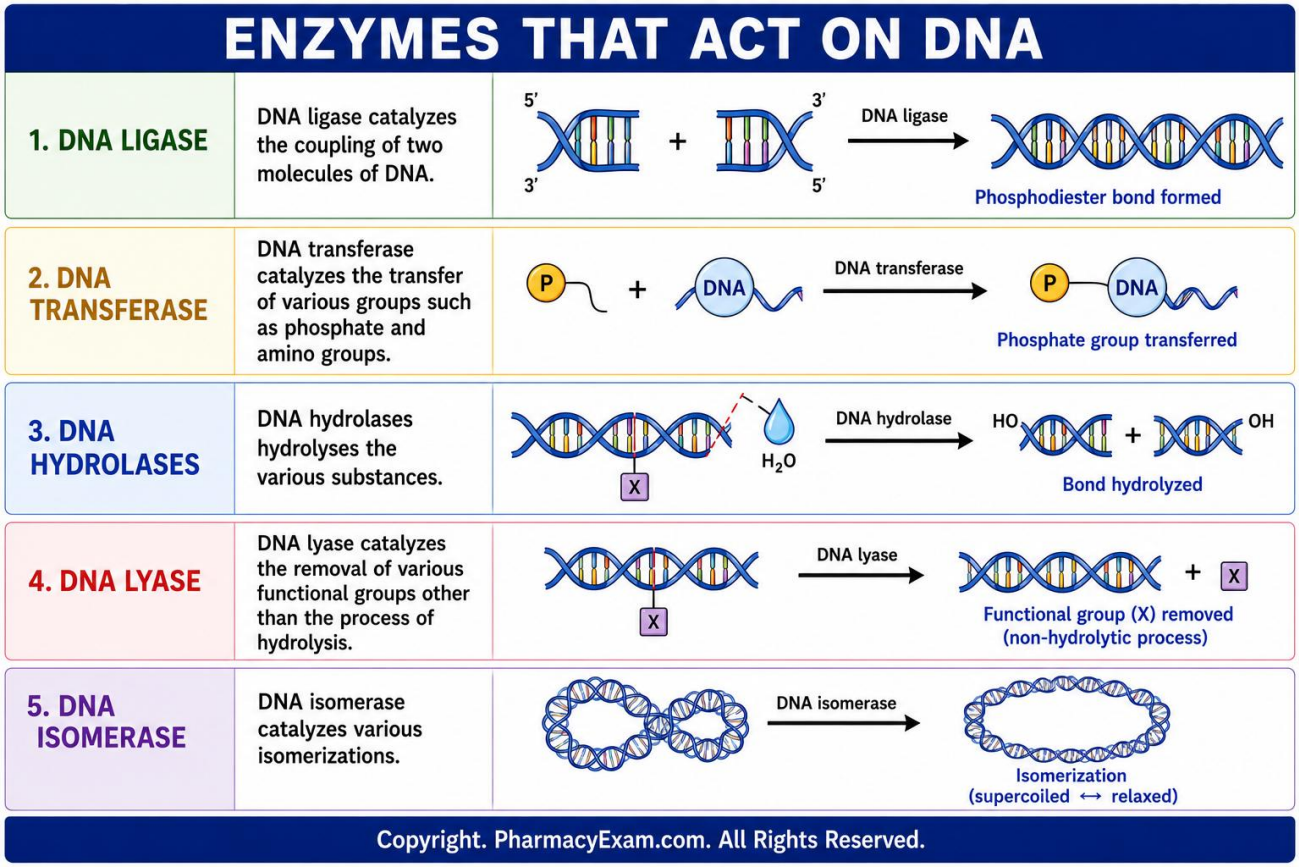
The nucleus is an essential organelle for survival of a cell. If a nucleus is removed from any cell it dies within a short period.

Moreover an enucleated cell neither divides regularly nor differentiates since there is DNA in the nucleus which is responsible for all the life processes of an organism. Every Eukaryotic cell, during the interphase stage (when the cell is not dividing it is said to be in the interphase stage), possesses a distinct nucleus.

Review Figure: Plant Cell Detail (page 147).

19. Correct Answer: B

DNA ligase catalyzes the coupling of two molecules of DNA.



20. Correct Answer: D

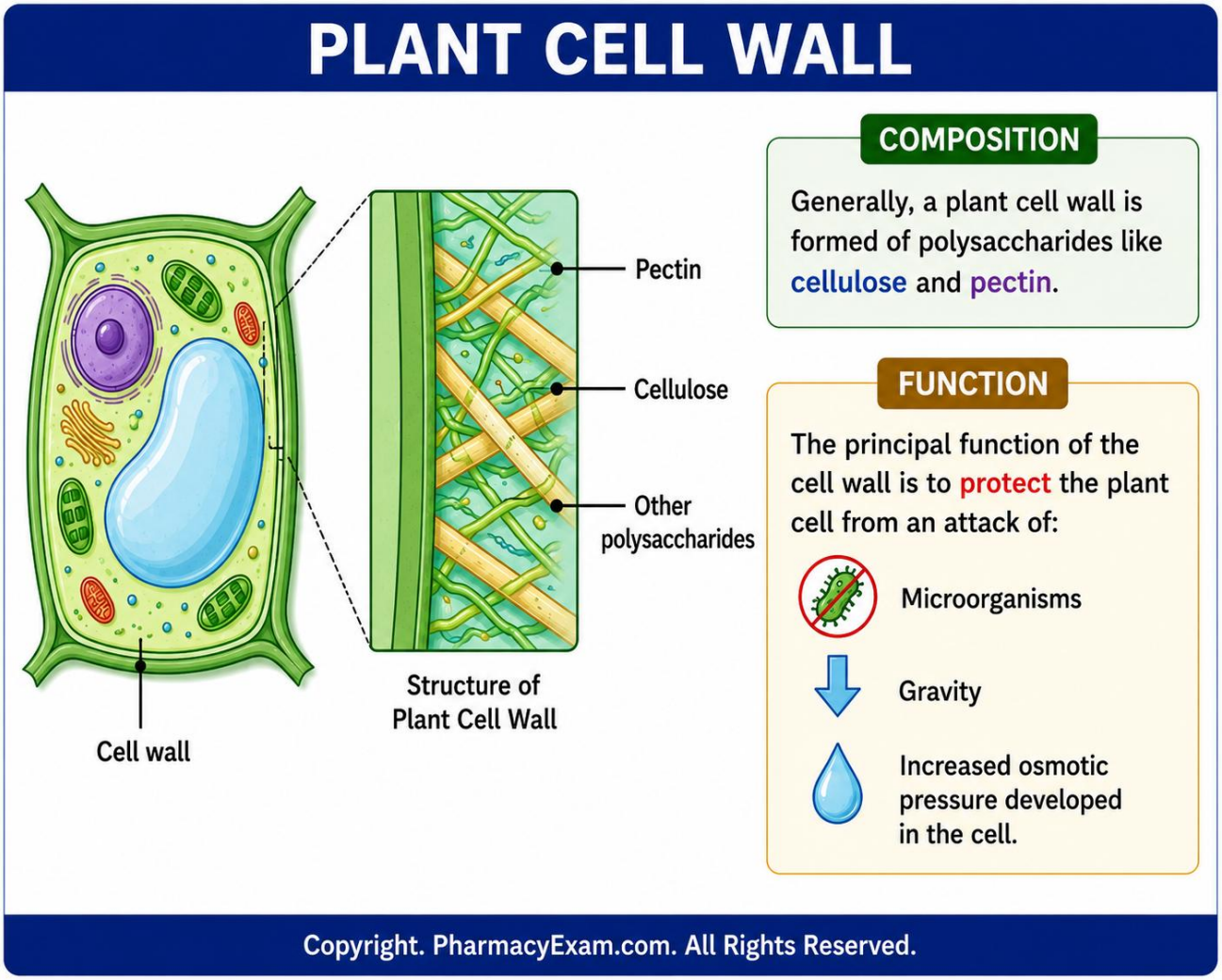
Nuclear membrane (Nucleolemma) is a membrane surrounding the nucleus. It separates the nucleus from the cytoplasm.

The presence of nuclear membrane is of great significance for the mutual exchange taking place between the nucleus and the cytoplasm. The pores in the nuclear membrane are believed to be the paths for the exchange of giant molecules between the cytoplasm and nucleus.

Review Figure: Plant Cell Detail (page 147*).*

21. Correct Answer: B

Generally, a plant cell wall is formed of polysaccharides like cellulose and pectin.



22. Correct Answer: A

Absolute density: The ratio of the mass of an object measured in a vacuum at a specific temperature to the volume (in ml) of an object at the same temperature.

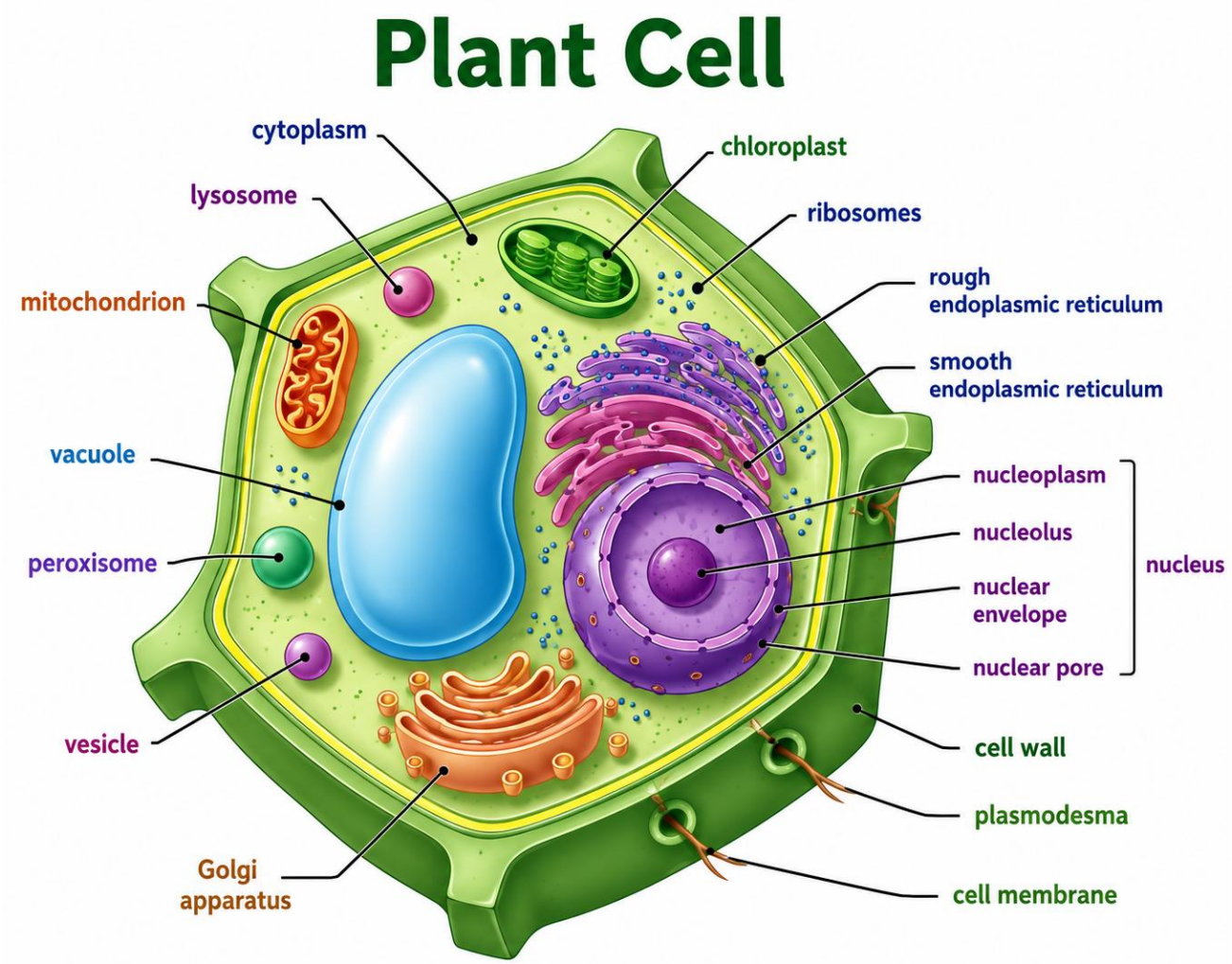
Specific gravity: The ratio of the mass of a substance to the mass of another substance an equal volume taken as standard.

Relative density: The mass of 1 ml of a standard substance at a specified temperature, relative to water at 4°C.

Apparent density: The ratio of mass of object measured in air at specific temperature to the volume of the object in ml at the same temperature.

23. Correct Answer: C

A small saclike structure filled with liquid and appearing like small dots in the cytoplasm is known as the vacuole. It consists of different types of soluble and insoluble substances and water.



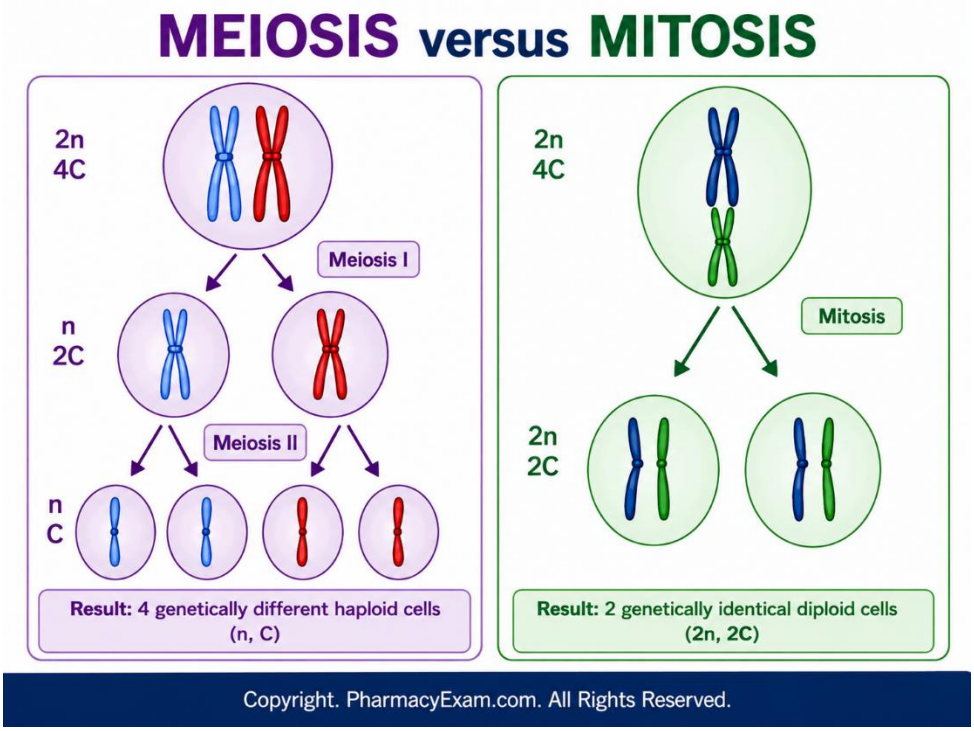
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24. Correct Answer: A

Cell division is a very complex process. There are two main types of cell division:

1. Mitosis
2. Meiosis

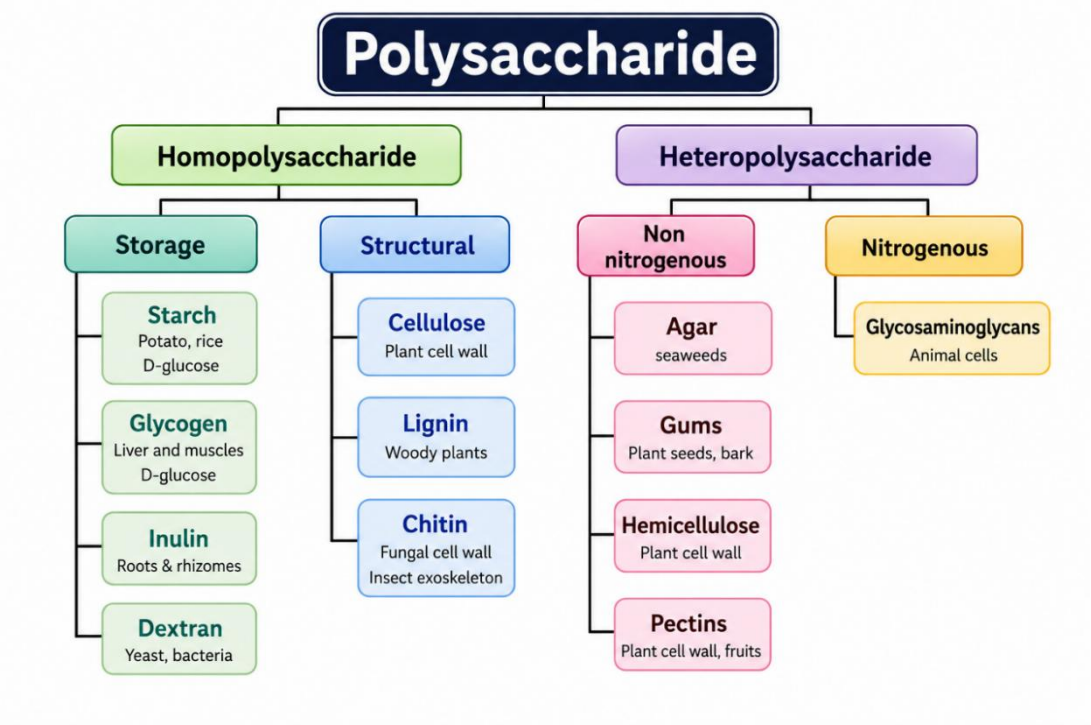
Mitosis: In this type of cell division, chromosomes are equally distributed in each daughter cell. As a result, the numbers of chromosomes in the mother cells and daughter cells are the same (e.g. somatic cells division).



Meiosis: In this type of cell division, chromosomes are divided in half of the original numbers of chromosomes found in mother cells (e.g. reproductive or sex cells division).

25. Correct Answer: B

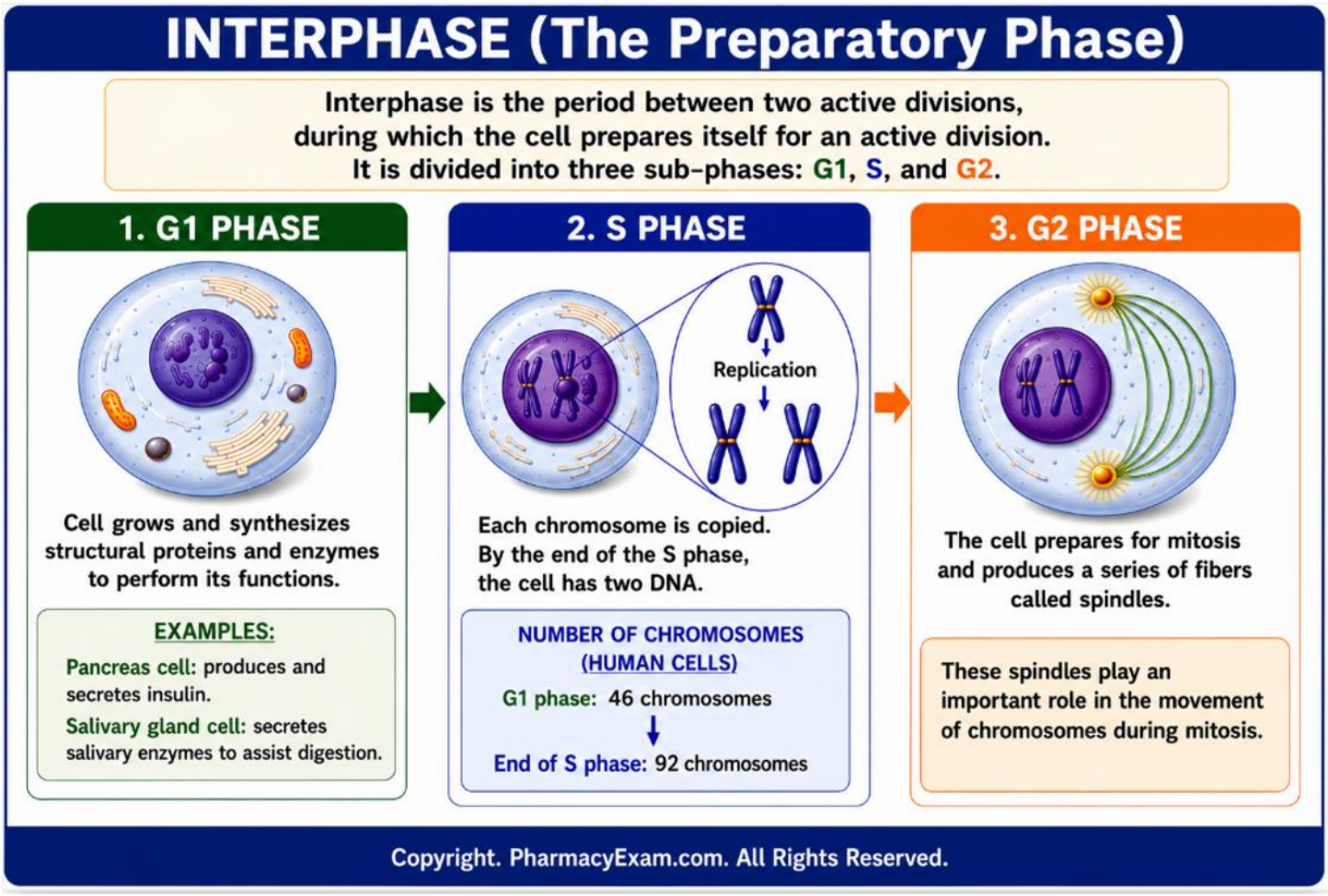
Dextran is an example of a polysaccharide. Other polysaccharides include:



26. Correct Answer: B

The cell cycle is normally divided into two phases:

1. Interphase
2. Mitosis (Describe in detail in Answer 28)



27. Correct Answer: D

Normally, in human cells there are forty- six chromosomes. The red blood cells have no nucleus and therefore no chromosomes.

28. Correct Answer: C

Mitosis is very complex and continuous process. The whole process is divided into five sub-phases. These are:

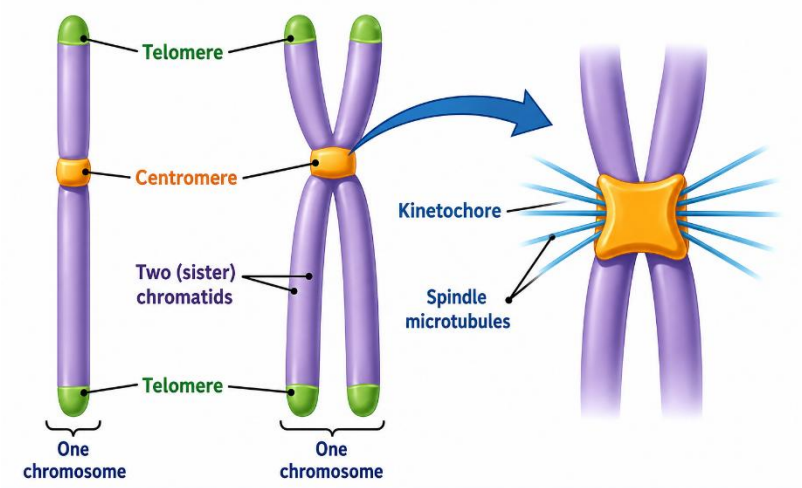
1. Prophase
2. Metaphase

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3. Anaphase
4. Telophase
5. Cytokinesis

Prophase: At the end of the interphase the chromosomes are visible. This marks the onset of the Prophase. In the beginning of the Prophase, the chromosomes are long, thin and thread like and appear double. Each one is known as a chromatid. Two chromatids are joined to one another at a region called the centromere.

The big nuclei in the nucleus gradually become smaller and smaller and finally disappear at the end of the Prophase. At the same time, both centrosomes slowly migrate to opposite poles. The protoplasm forms ray-like structures surrounding each centrosome; these structures are known as asters.



Metaphase: In this phase, nuclear membrane starts disappearing; because of this, chromosomes get scattered. During this time, centrosomes (migrated to opposite poles) form spindles and get attached to scattered chromosomes through their centromeres. The chromosomes arrange themselves in one line on the equatorial plane of the spindle in such a way that the chromatids of each chromosome remain parallel to each other.

Anaphase: In this phase, the chromatid of each chromosome gets attached to the opposite spindle fibers, than due to shortening of the spindle fibers the chromatid are pulled toward the opposite poles. Each chromatid at this stage is now known as a chromosome.

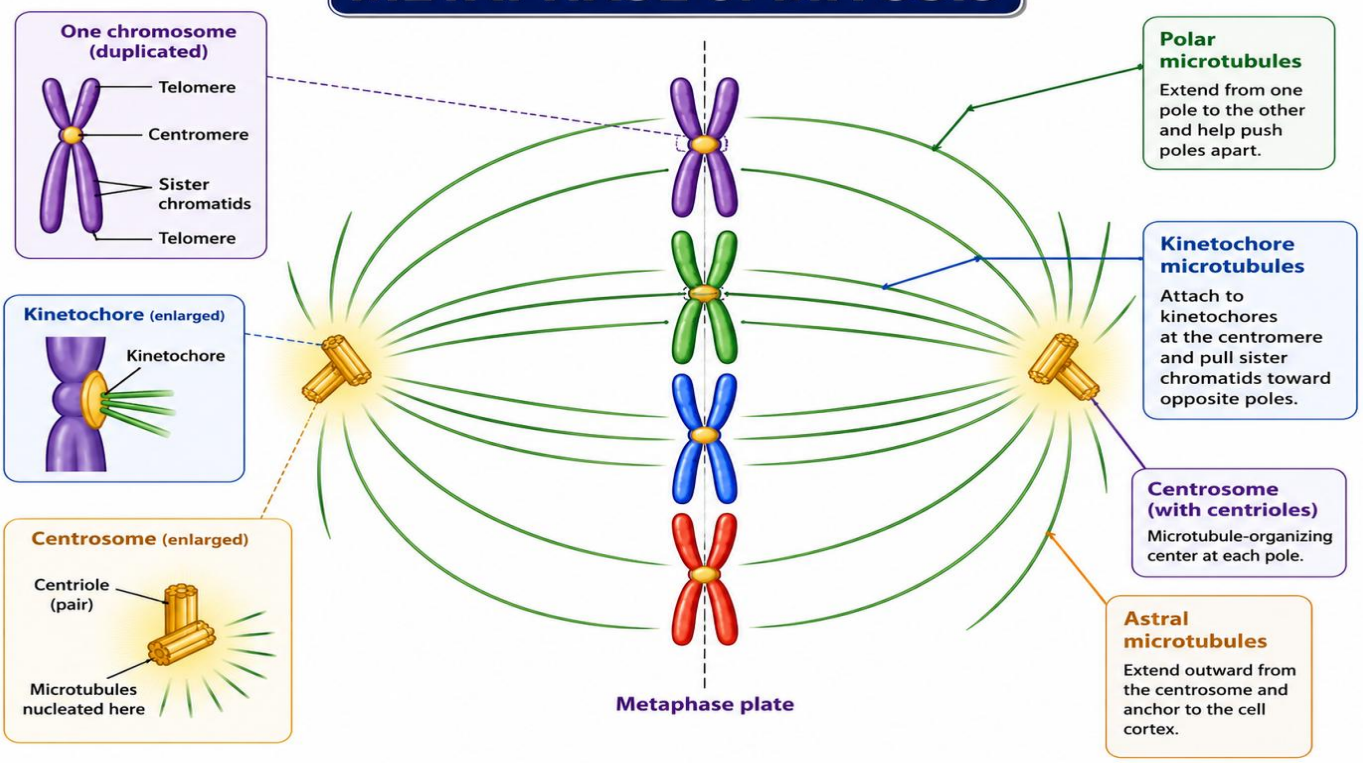
Telophase: In this phase, chromosomes reach the opposite poles by the contraction of the spindle fibers. New nuclei and nuclear membrane are also formed. This gives the birth of two daughter nucleosis.

Cytokinesis: This is the final phase of the cell division. The beginning of this phase starts with a constriction in the middle of the cell during the telophase. This constriction leads to the division of one (mother) cell into two (daughter) cells. Also in this phase, new plasma membrane is formed resulting in the formation of two independent daughter cells.

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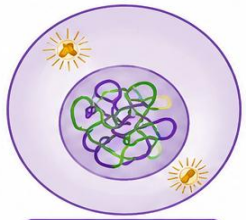
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METAPHASE of MITOSIS



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First Division of Meiosis

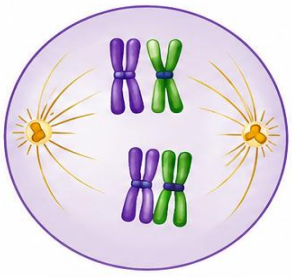


INTERPHASE

DNA is replicated.

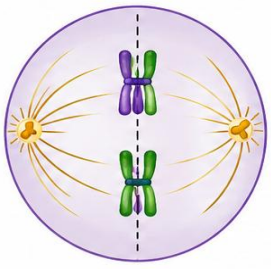
maternal chromosomes

paternal chromosomes



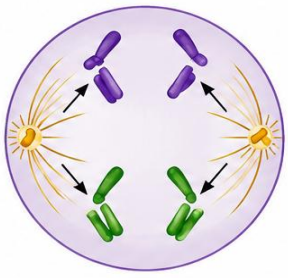
PROPHASE I

Homologous chromosomes pair up (synapsis) to form tetrads. Crossing over may occur.



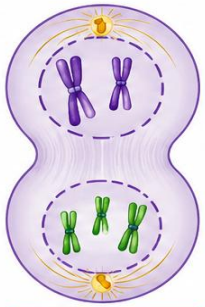
METAPHASE I

Tetrads line up along the metaphase plate.



ANAPHASE I

Homologous chromosomes separate and move to opposite poles. Sister chromatids remain joined.

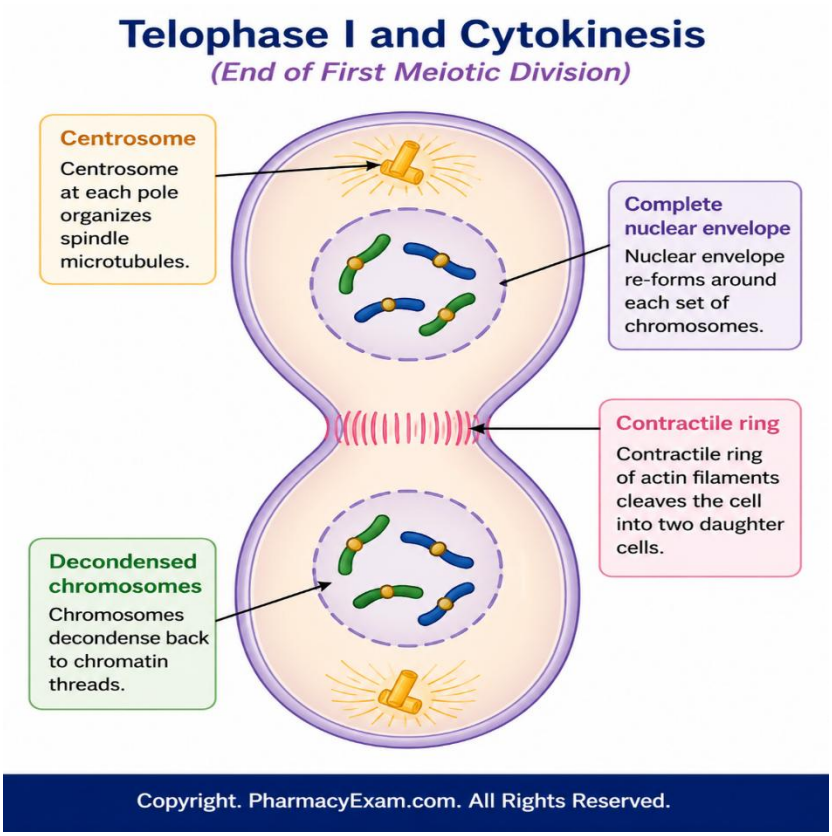


TELOPHASE I

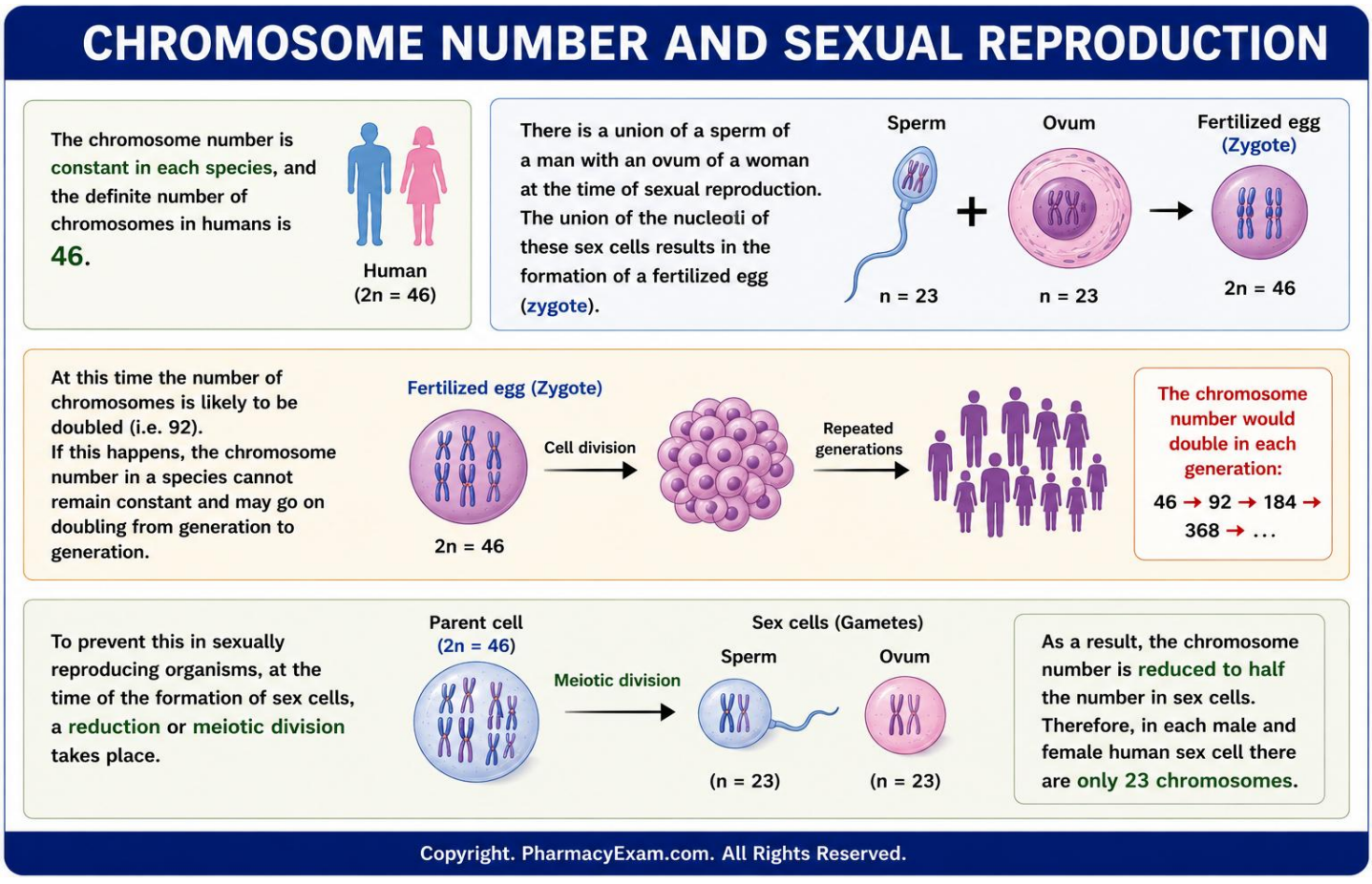
Nuclear envelopes may re-form. Cytokinesis occurs, producing two haploid cells.

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29. Correct Answer: C



The chromosome number is reduced to half the number in sex cells. Therefore, in each male and female human sex cell there are only 23 chromosomes.

30. Correct Answer: B

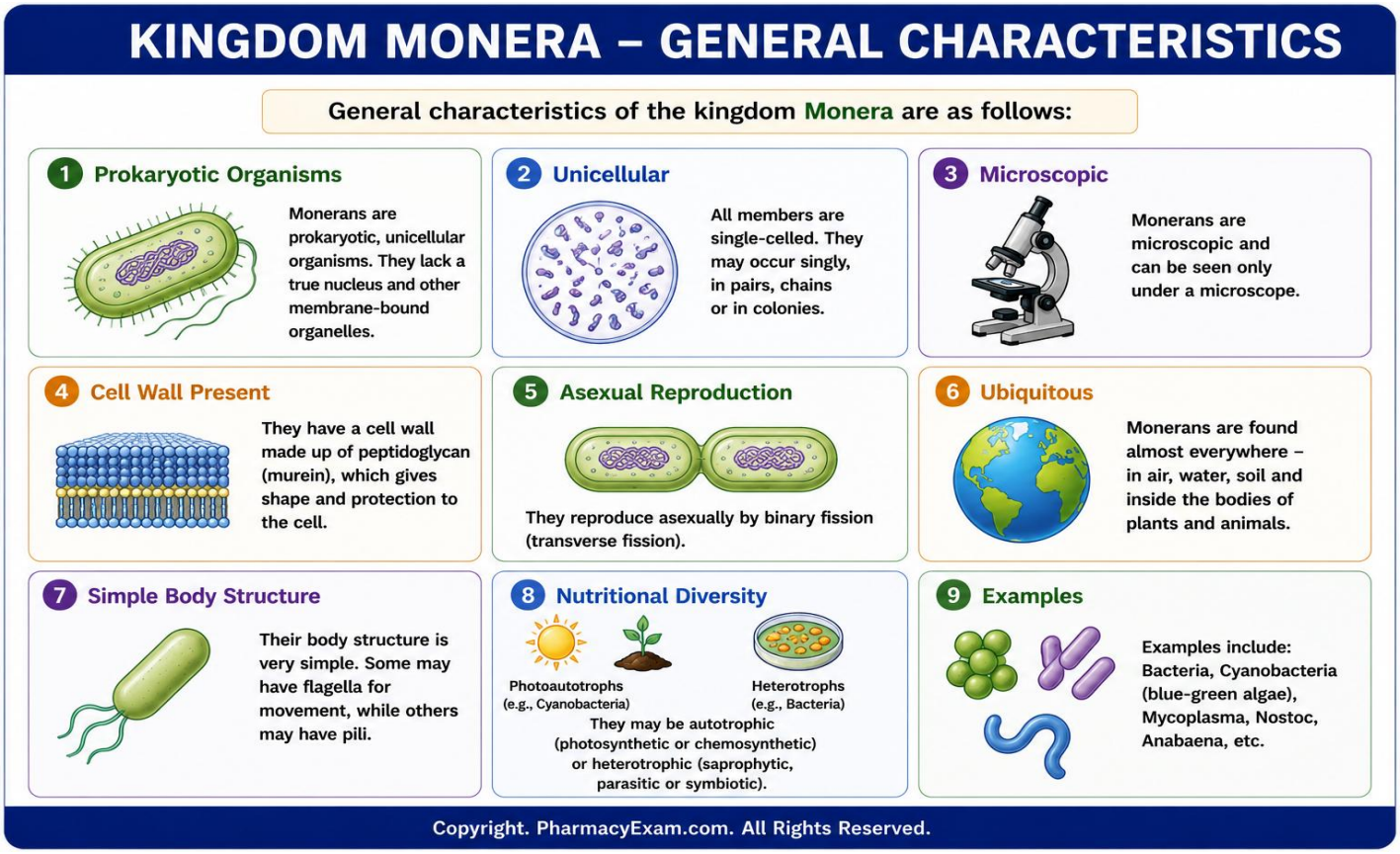
A species is a basic unit of classification in Biological science. It is defined as the unit of classification formed of such organisms having more similarity in many characters, who through interbreeding can produce offspring capable of reproduction. The individuals of different species differ in their external characteristics, and therefore the individual of one species cannot reproduce with those of other species.

31. Correct Answer: A

Blue green algae should be classified under the Monera (Prokaryotae) kingdom. Organisms included in this group do not have a well-developed nucleus with a nuclear membrane.

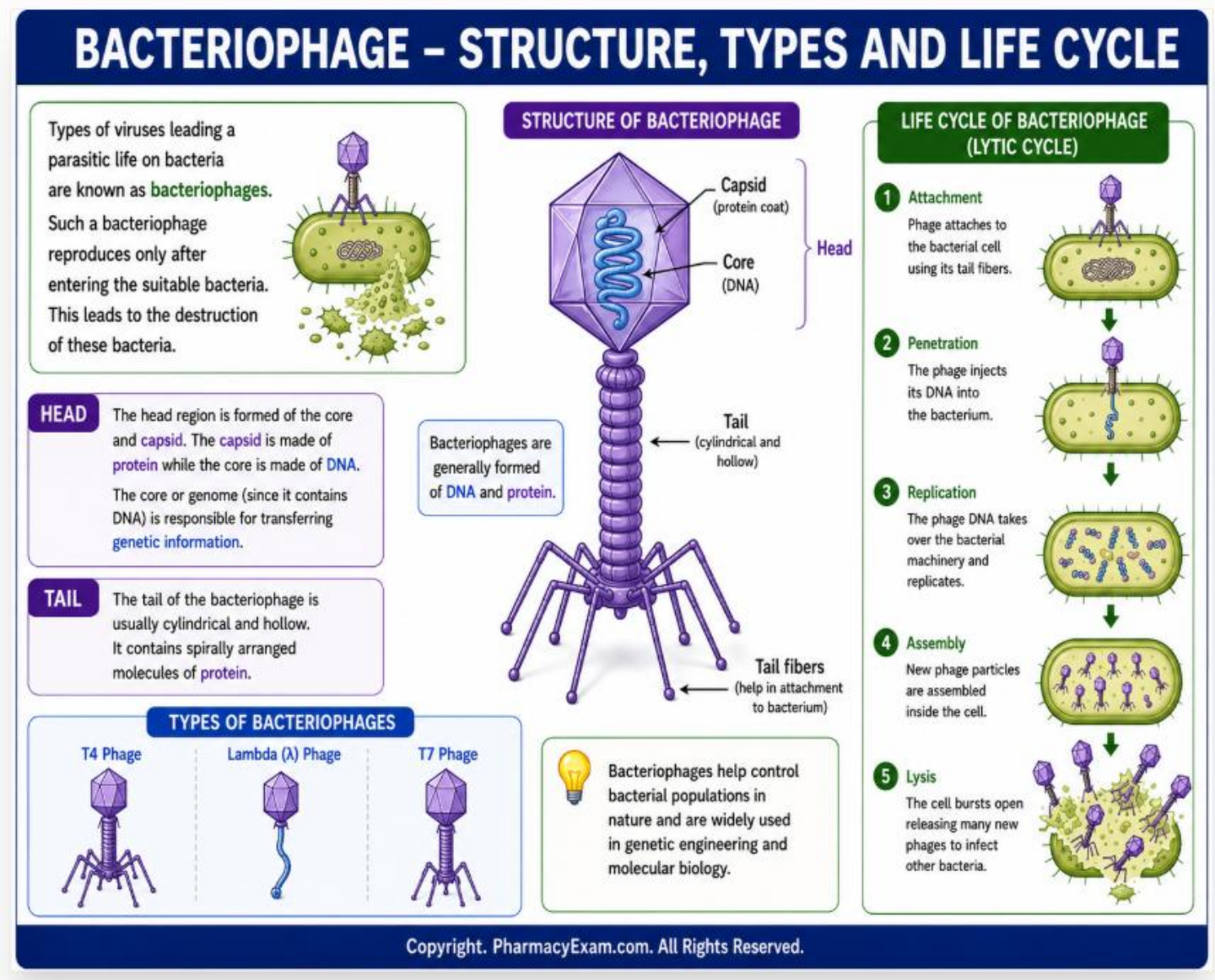
32. Correct Answer: C

General characteristics of the kingdom Monera are as follows:



33. Correct Answer: B

Types of viruses leading a parasitic life on bacteria are known as bacteriophages. Such a bacteriophage reproduces only after entering the suitable bacteria. This leads to the destruction of these bacteria. The core or genome of bacteriophage (since it contains DNA) is responsible for transferring genetic information.

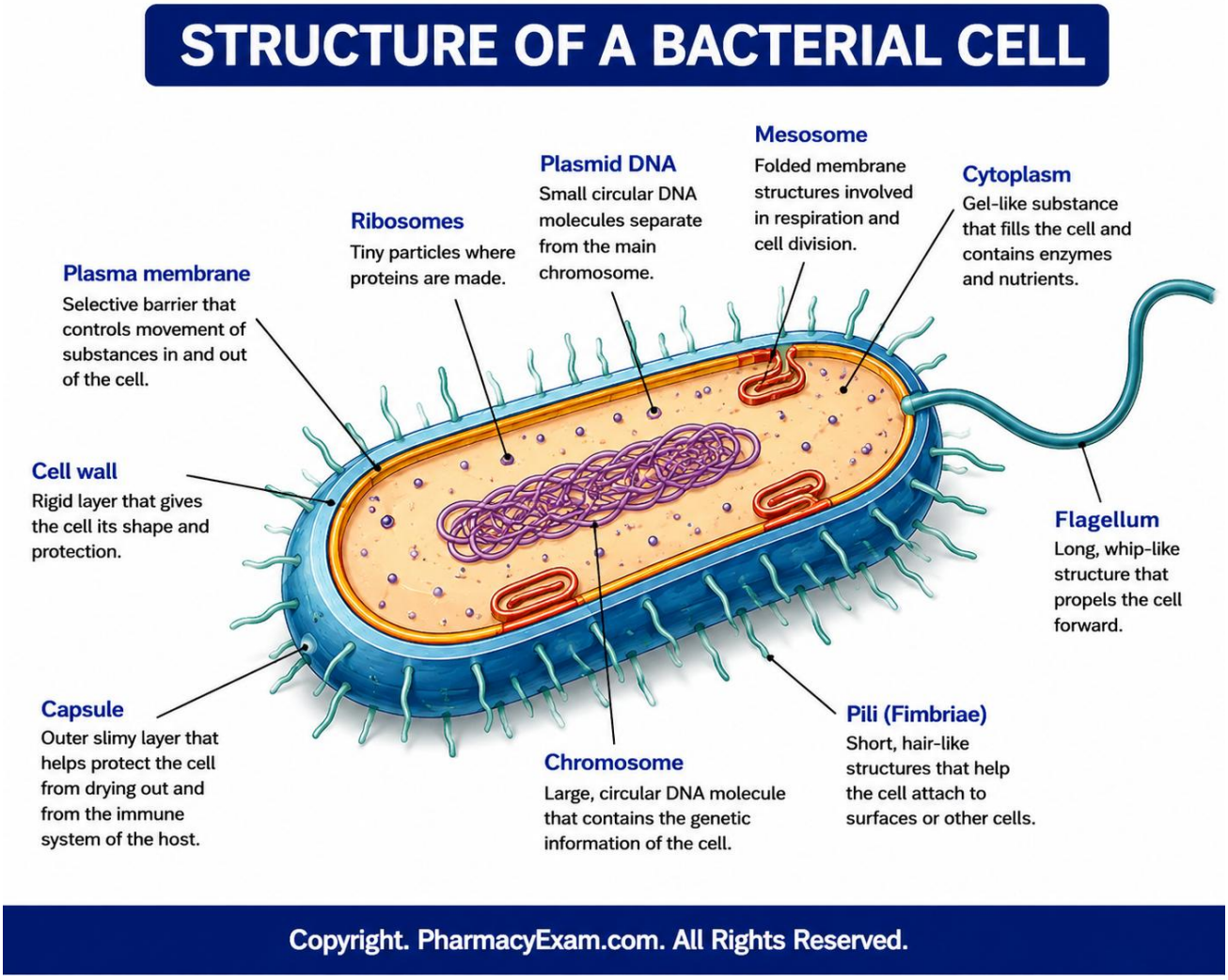


34. Correct Answer: A

Pili are very minute hair-like processes found on the cell wall of E.coli. They protrude from the plasma membrane. They are also known as fimbria. They form conjugation tubules during reproduction in bacteria.

Plasmids: In addition to a primitive nucleus, there are few pieces of DNA present in the cytoplasm of the bacterial cell. These pieces of DNA are known as plasmids or episomes. When these plasmids are

associated with bacterial chromosomes, they are known as episomes. Plasmids are important for bacterial reproduction and developing immunity against different antibiotics.



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35. Correct Answer: C

Microorganisms play an important role in balancing the environment through converting organic compounds into simple inorganic compounds.

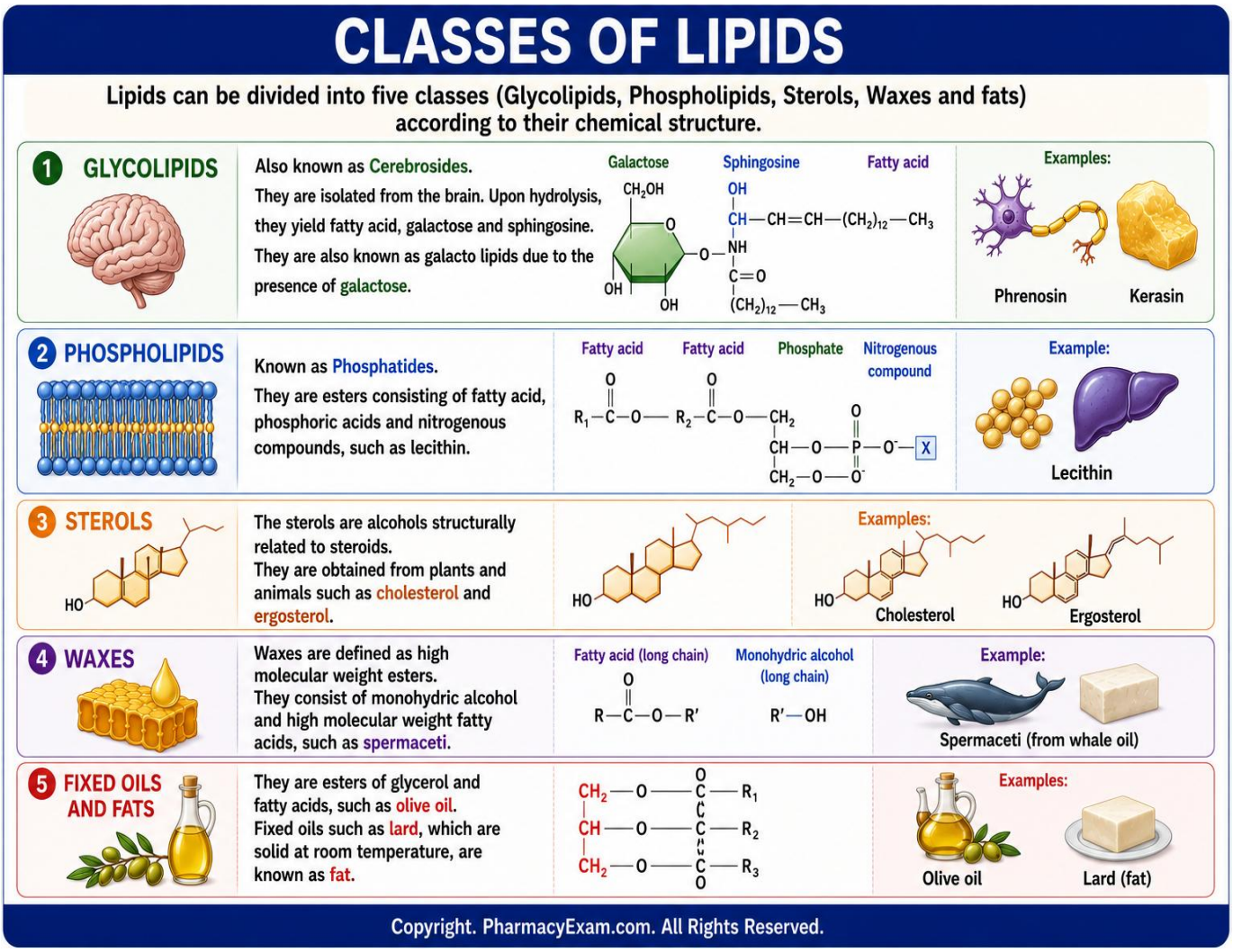
Microorganisms, which convert complex organic compounds into simple inorganic compounds, are known as **decomposers**.

Microorganisms that convert simple organic compounds into simple inorganic compounds are known as **transformers**.

36. Correct Answer: C

Lipids can be divided into five classes (Glycolipids, Phospholipids, Sterols, Waxes and fats) according to their chemical structure.

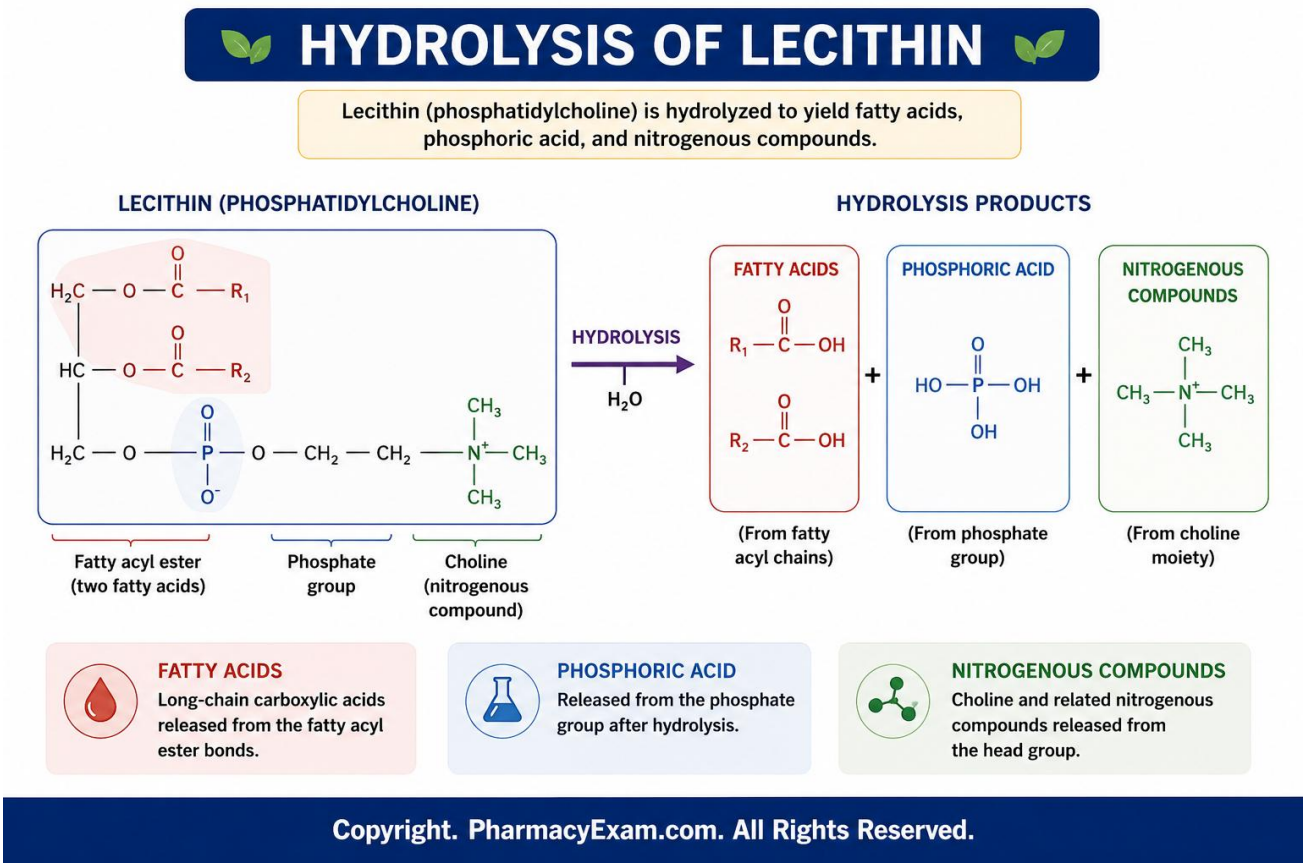
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37. Correct Answer: D

Sphingosine is not a hydrolyzed product of lecithin. Lecithins are phospholipids and are generally hydrolyzed to fatty acid, phosphoric acid and nitrogenous compounds other than sphingosine.

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38. Correct Answer: C

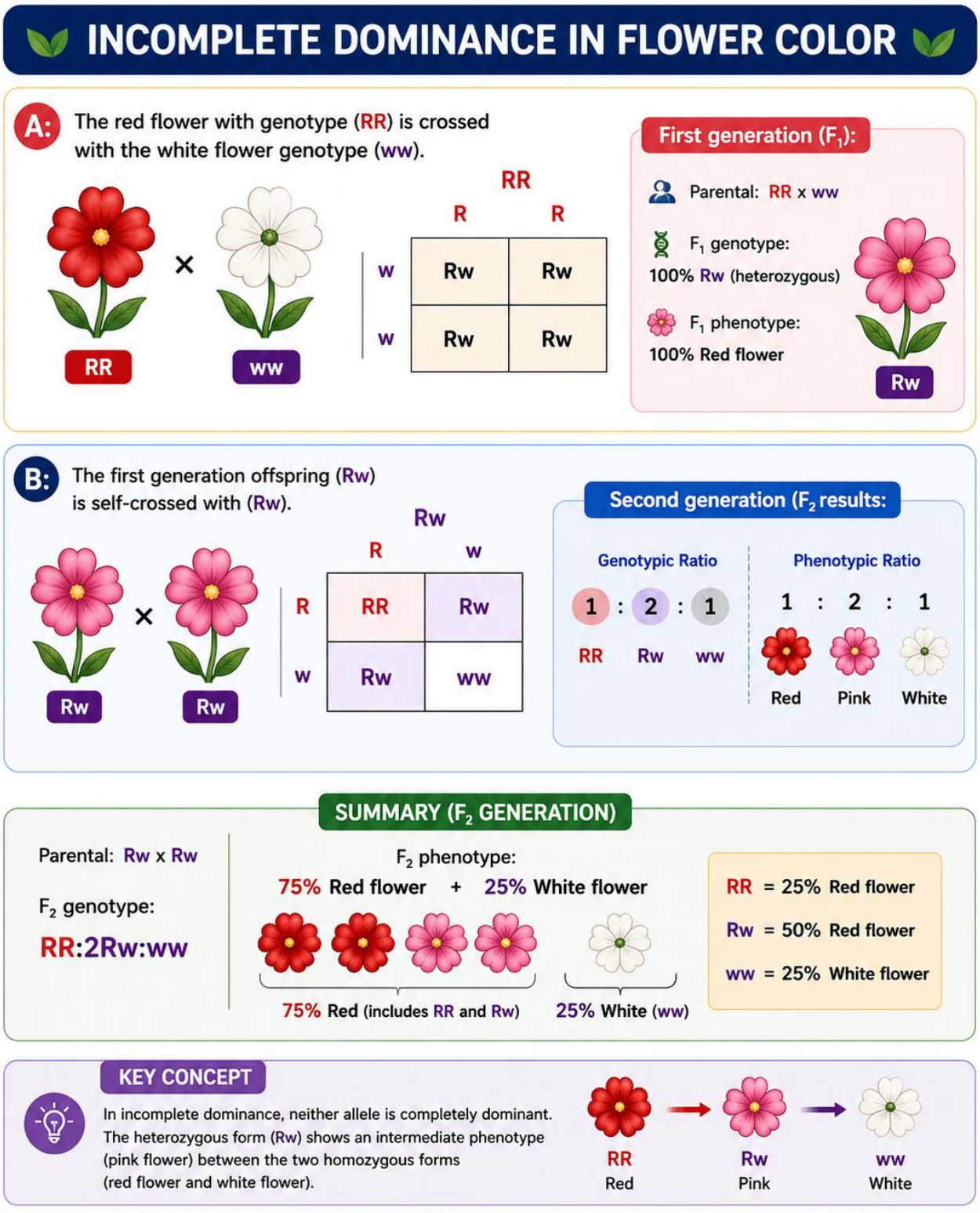
Nitrogen fixing bacteria on root nodules of leguminous plants are known as Rhizobium. They fix the atmospheric nitrogen and convert it into ammonia. The nitrogen fixing bacteria are also known as nitrifying bacteria.

Azobacteria are present in the soil. They convert atmospheric nitrogen into nitrates and nitrites. In this way, they increase the fertility of the soil. These ammonium nitrates and nitrites are then absorbed by plants to obtain nitrogen.

39. Correct Answer: C

To solve this type of question, study the Punnett square shown below.

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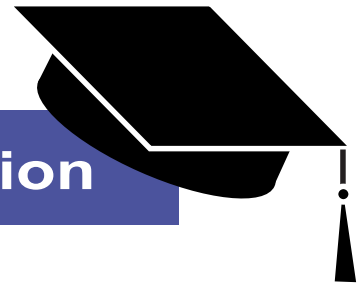


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40. Correct Answer: A

Normally, each living organism cell contains only two alleles (genes). However, in few instances, there are more than two alleles for a given characteristic. This condition is known as multiple alleles. The best example of the multiple alleles is Red Blood Cells (RBC) of humans.

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