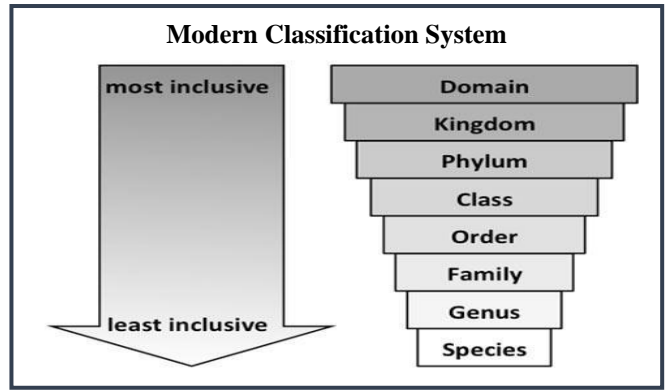
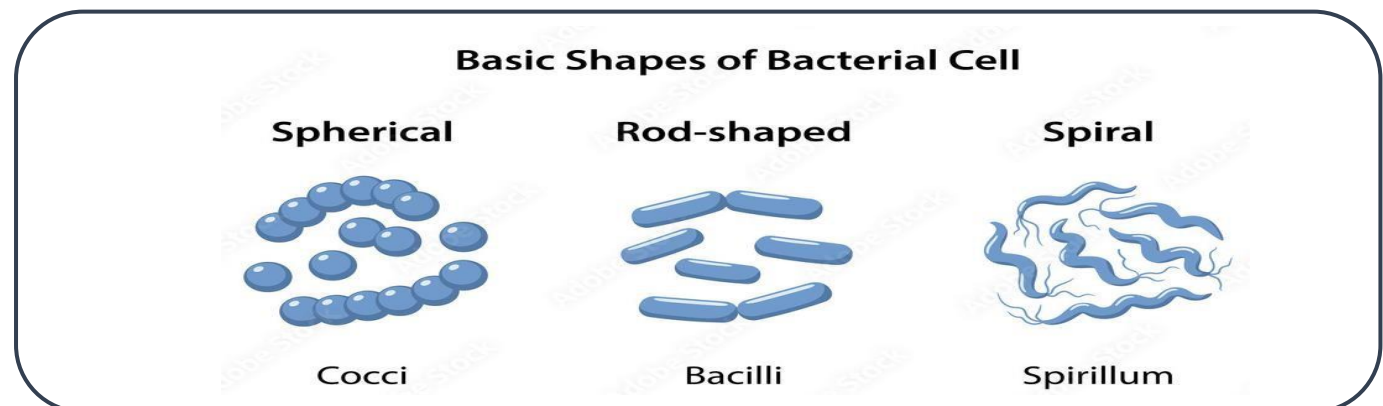
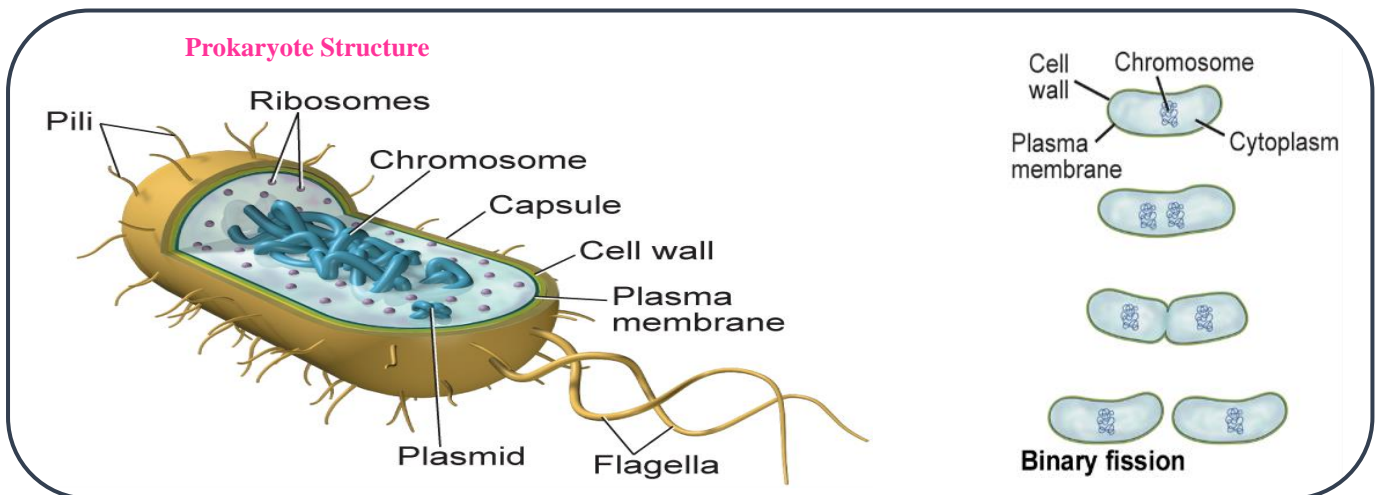


CHAPTER 2: Organizing Life's Diversity

Aristotle's Classification System		
Plants		
Herbs	Shrubs	Trees
Violets Rosemary Onions	Blackberry bush Honeysuckle Flannel bush	Apple Oak Maple
Animals with red blood		
Land	Water	Air
Wolf Cat Bear	Dolphin Eel Sea bass	Owl Bat Crow

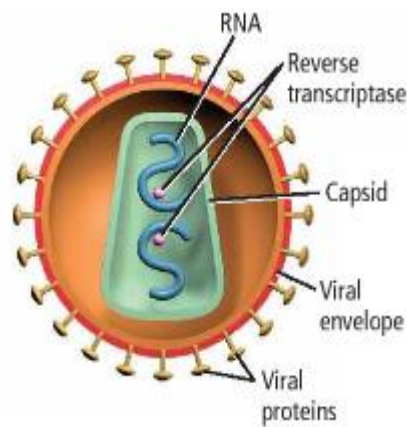
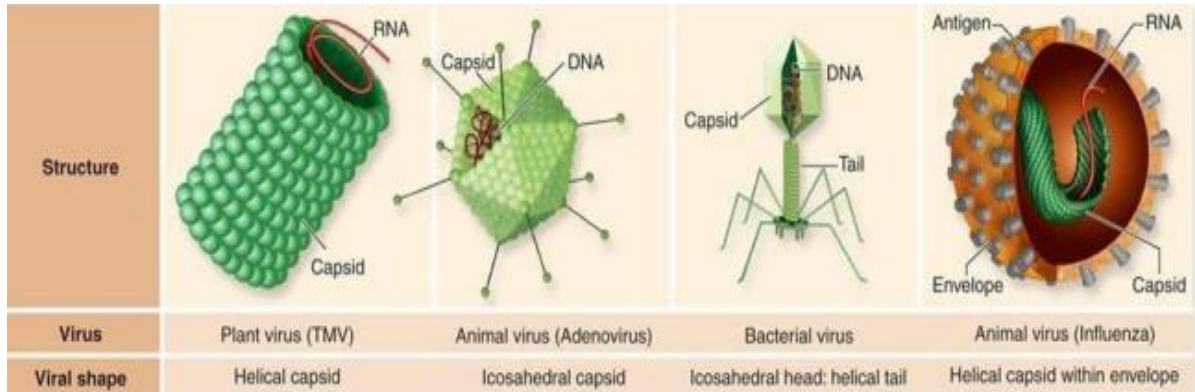


Classification of Living Things						
Domain	Bacteria	Archaea	Eukarya			
Kingdom	Eubacteria	Archaeobacteria	Protista	Fungi	Plantae	Animalia
Cell Type	Prokaryote	Prokaryote	Eukaryote	Eukaryote	Eukaryote	Eukaryote
Cell structure	Cell walls with peptidoglycan	Cell walls without peptidoglycan	Cell walls of cellulose, some of it have chloroplasts	Cell walls of chitin	Cell walls of cellulose, chloroplasts	No cell walls or chloroplasts
Number of Cells	Unicellular	Unicellular	Most of it unicellular, some of it multicellular	Most of it multicellular, some of it unicellular	Multicellular	Multicellular
Made of Nutrition	Autotroph or Heterotroph	Autotroph or Heterotroph	Autotroph or Heterotroph	Heterotroph	Autotroph	Heterotroph
Examples	Streptococcus and Escherichia coli	Methanogens and Halophiles	Amoeba, Paramecium, Giant kelp	Mushrooms and Yeast	Mosses, Ferns, and Flowering plants	Sponges, Worms, Insects, Fish, and Mammals

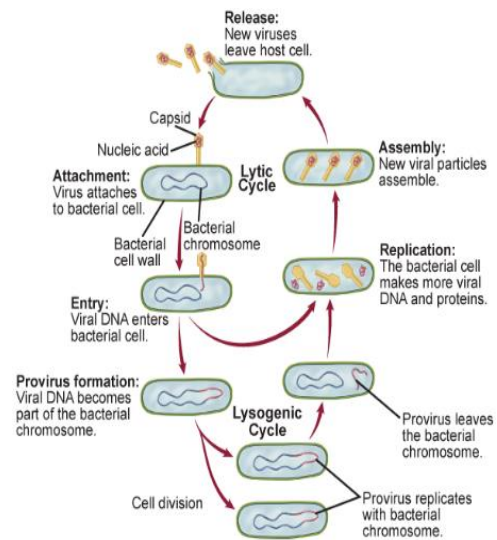


CHAPTER 2: Organizing Life's Diversity

Human Bacterial Diseases	
Category	Disease
Sexually transmitted diseases	Syphilis, gonorrhea, chlamydia
Respiratory diseases	Strep throat, pneumonia, whooping cough, tuberculosis, anthrax
Skin diseases	Acne, boils, infections of wounds or burns
Digestive tract diseases	Gastroenteritis, many types of food poisoning, cholera
Nervous system diseases	Botulism, tetanus, bacterial meningitis
Other diseases	Lyme disease, typhoid fever



HIV structure (Retrovirus)



Human Viral Diseases	
Category	Disease
Sexually transmitted diseases	AIDS(HIV), genital herpes
Childhood diseases	Measles, mumps, Chicken pox
Respiratory diseases	Common cold, Influenza, Co-vid 19
Skin diseases	Warts, shingles
Digestive tract diseases	Gastroenteritis
Nervous system diseases	Polio, viral meningitis, rabies
Other diseases	Smallpox, hepatitis

CHAPTER 2: Organizing Life's Diversity

Part 1: The History of Classification

- Biologists use a system of classification to organize information about the diversity of living things.
- More than 2000 years ago, Aristotle developed the first widely accepted system of biological classification.

Aristotle classified organisms as either animals or plants.

Animals were classified according to the presence or absence of "red blood."

Animals were further grouped according to their habitats and morphology.

Plants were classified by average size and structure as trees, shrubs, or herbs.

Linnaeus's system of classification was the first formal system of **taxonomy**. **Linnaeus** used behavior and morphology to classify animals and plants.

The **taxonomic** categories used by scientists are part of a nested-hierarchical system.

A named group of organisms is called **taxa**.

Each category is contained within another, and they are arranged from broadest to most specific.

(Domain, kingdom, phylum, class, order, family, genus, species.)

The **domain** is the broadest of all the taxa and contains one or more kingdoms, The taxon of related phyla or divisions is a **kingdom**, a **phylum** or **division** contains related classes, a **class** contains related orders, an order contains related families, a **family** consisting of similar related genera, A **genus** (plural, genera) is a group of species that are closely related and share a common ancestor, a **species** is a group of organisms that have similar traits and are able to produce fertile offspring.

Linnaeus's method of naming organisms, called binomial nomenclature, gives each species a scientific name with two parts.

The first part is the genus name, and the second part is the specific epithet, or specific name, that identifies the species.

Biologists use scientific names for species because common names vary in their use.

When writing a scientific name, scientists use these rules:

- The first letter of the genus name always is capitalized, but the rest of the genus name and all letters of the specific epithet are lowercase.
- If a scientific name is written in a printed book or magazine, it should be italicized.
- When a scientific name is written by hand, both parts of the name should be underlined.
- After the scientific name has been written completely, the genus name will be abbreviated to the first letter in later appearances (e.g., *C. cardinalis*).

Q1 Which of the following is a taxon of related phyla or divisions?

- CH A Class B Kingdom
2 C Genus D Order

Taxon of related phyla or divisions is a kingdom → B

Q4 Which of the following categories contains one kingdom or more...

- CH A Phylum B Kingdom C Genus D Domain.
2

The domain is the broadest of all the taxa and contains one or more kingdoms → D

Q2 Which of the following lists the taxa from broadest to most specific?

- CH
2 A Domain, kingdom, class, order, phylum, family, genus, species

B Species, genus, family, order, class, phylum, kingdom, domain

C Domain, kingdom, phylum, class, order, family, genus, species

D Phylum, kingdom, class, family, order, genus, domain, species

Each category is contained within another, and they are arranged from broadest to most specific.

(Domain, kingdom, phylum, class, order, family, genus, species.) → C

Q5 Which of the following represents the base unit for classification...

- CH A Family B Species
2 C Phylum D Genus

Species are the most specific so they will be the base unit of classification. → B

6 On what characteristics did Linnaeus base his system of classification?

- CH A Red blood and bloodless
2 B Evolutionary history
C Behavior and morphology
D Body structure

Linnaeus used behavior and morphology to classify animals and plants. → C

Q1 The scientific name for the African elephant is *Loxodonta africana*. What is the species name?

- Do A *Loxodonta* B *africana*
It? C *L. africana* D *Loxodonta sp*

3 Which of the following is the correct way to write the scientific name of the Northern cardinal?

- CH A *cardinalis cardinalis*
2 B *cardinalis Cardinalis*
C *Cardinalis cardinalis*
D *Cardinalis Cardinalis*

A scientific name is italicized with the first letter of the genus capitalized and the first letter of the species in lower case → C

Q2 Mating between animals takes place between the same...

- Do A Class B Genus
It? C Family D Species

CHAPTER 2: Organizing Life's Diversity

Part 2: Domains and Kingdoms

The broadest category in the classification used by most biologists is the **domain**.

The most widely used biological classification system has six kingdoms and **three domains**.

The three domains are Bacteria, Archaea, and Eukarya.

The six kingdoms are Bacteria, Archaea, Protists, Fungi, Plantae, and Animalia.

Domain Bacteria: Eubacteria are prokaryotes whose cell walls contain peptidoglycan.

Eubacteria are a diverse group that can survive in many different environments.

Domain Archaea: are thought to be more ancient than bacteria and yet more closely related to our eukaryote ancestors, diverse in shape and nutrition requirements, and extremophiles because they can live in extreme environments.

Domain Eukarya: All eukaryotes are classified in Domain Eukarya, which contains Kingdom Protista, Kingdom Fungi, Kingdom Plantae, and Kingdom Animalia.

Kingdom Protista: Protists are eukaryotic organisms that can be unicellular, colonial, or multicellular, classified into three different groups—plant-like, animal-like, and fungus-like.

Kingdom Fungi: A fungus is a unicellular or multicellular eukaryote that absorbs nutrients from organic materials in its environment. Members of Kingdom Fungi are heterotrophic, lack motility, and have cell walls. The cell walls of Fungi contain chitin.

Kingdom Plantae: Members of Kingdom Plantae form the base of all terrestrial habitats. All plants are multicellular and have cell walls composed of cellulose. Most plants are autotrophs, but some are heterotrophic.

Kingdom Animalia: All animals are heterotrophic, multicellular eukaryotes. Animal organs often are organized into complex organ systems. Animals live in the water, on land, and in the air.

Viruses: A virus is a nucleic acid surrounded by a protein coat. Viruses do not possess cells, nor are they cells, and are not considered to be living, because they are nonliving, they usually are not placed in the biological classification system.

AIDS caused by Virus.

Q7 Which of the following Kingdoms is not included in the Domain Eukarya?

CH A Bacteria B Plantae C Fungi D Protista

2 Domain Eukarya: All eukaryotes are classified in Domain Eukarya, which contains Kingdom Protista, Kingdom Fungi, Kingdom Plantae, and Kingdom Animalia →A

Q8 Which character distinguishes Fungi from Plantae?

CH A Presence of membrane-bound organelles

2 B Presence of membrane-bound nucleus

C Cell walls with chitin

D Multicellular

A fungus is a unicellular or multicellular eukaryote that absorbs nutrients from organic materials in its environment. Members of Kingdom Fungi are heterotrophic, lack motility, and have cell walls. The cell walls of Fungi contain chitin. →C

Q9 The modern classification system divides living organisms into six...

CH A Classes B Domains C Kingdoms D Phyla

2 The modern classification system divides living organisms into six Kingdoms →C

Q10 What are the Domain and Kingdom of a paramecium?

CH A Domain Bacteria, Kingdom Eubacteria

2 B Domain Archaea, Kingdom Plantae

C Domain Eukarya, Kingdom Protista

D Domain Archaea, Kingdom Protista

A Domain Eukarya, which contains Kingdom Protista, Kingdom Fungi, Kingdom Plantae, and Kingdom Animalia. →C

Q11 The creature that causes AIDS is classified with...

CH

2 A The animal kingdom because it's surrounded by a protein coat

B The kingdom of bacteria because it contains DNA.

C Prokaryotes that can withstand harsh conditions

D A special classification because it is not considered a living thing.

A virus is a nucleic acid surrounded by a protein coat. Viruses do not possess cells, nor are they cells, and are not considered to be living, because they are nonliving, they usually are not placed in the biological classification system. AIDS →D

Q12 Which cell wall material distinguishes all of the organisms in Kingdom Plantae?

CH A Cellulose

B Chitin

2 C Hyphae

D Peptidoglycan

All plants are multicellular and have cell walls composed of cellulose →A

Q3 To which domain does the American black bear belong?

Do A Animalia

B Chordata

It? C Carnivora

D Eukarya

Q4 Which domain includes organisms that are called extremophiles?

Do A Animalia

B Bacteria

It? C Archaea

D Eukarya

Q5 Which is not classified as a living thing?

Do A Protists

B Bacteria

It? C Archaea

D Virus

CHAPTER 2: Organizing Life's Diversity

Part 3: Prokaryotic

Prokaryotic: a microorganism that lacks a nucleus and membrane-bound organelles like **Bacteria** and **Archaea**.

Prokaryote structure: Chromosome, Capsule, Pili, Flagella, Cell wall

- Capsule: Prevent the cell from drying out
- Pili: Attach to the surface
- Flagella: For movement

Archaea: Prokaryotic organisms have cell walls does not contain peptidoglycan and are considered gram-negative and appear light pink after staining.

Types of archaea:

- 1- Thermoacidophiles: live in a hot environment (temperature above 80 C), and acidic environments.
- 2- Methanogens: they are found in sewage treatment plants and swamps, and cannot live in the presence of oxygen.
- 3- Halophiles live in very salty environments.

Bacteria: Prokaryotes are microscopic, unicellular organisms. They have some characteristics of all cells, such as DNA and ribosomes. Lack a nuclear membrane (Lack of nucleus), and other membrane-bound organelles, contain peptidoglycan and appear dark purple once they are stained and they are called Gram-positive.

Doctors need to know the type of bacterial cell wall that causes a disease, in order to prescribe the right medicine.

Shapes of bacteria: Spherical = Cocci, Rod-shaped = Bacilli, Spiral-shaped = Spirochetes

Reproduction of Prokaryotes:

- Binary Fission: Division of a cell into two genetically identical cells
- Conjugation: Two prokaryotes attach to each other and exchange genetic information.

Ecology of Bacteria:

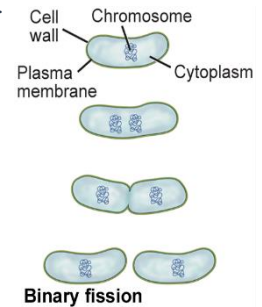
- Photoautotrophs: Carry out photosynthesis in a similar manner as plants
- Chemoautotrophs: Break down and release inorganic compounds that contain nitrogen or sulfur
- Aerobes and Anaerobes: Obligate aerobes are bacteria that require oxygen to grow, Anaerobic bacteria do not use oxygen for growth or metabolism.
- Nutrient cycling and nitrogen fixation: Bacteria are decomposers, returning vital nutrients to the environment.

Nitrogen-fixing bacteria live in a symbiotic relationship in the root nodules of plants such as soybeans, clover, and alfalfa.

- Normal flora: lives in a human digestive (intestine) tract and makes vitamin K and is used in blood clotting.

Foods and Medicines: Some foods are made with the aid of bacteria, Like cheese, yogurt, buttermilk, pickles, and vitamins.

Bacteria Mutations: Bacteria reproduce quickly and their population grows rapidly, Mutations lead to new forms of genes, new gene combinations, new characteristics, and genetic diversity.



Q13 A scientist discovered a new organism and classified it as bacteria. His conclusion was based on what?

- CH A Small vacuoles
 2 B Presence of cell wall
 C There is ribosome in their cytoplasm
 D Lack of nucleus
 Presence of membrane-bound nucleus (Lack of nucleus) → D

17 If a person was infected with a bacterial disease, what should be examined to prescribe the right medicine

- CH A Ribosomes B Chromosomes
 2 C Cell wall D Plasma membrane
 Doctors need to know the type of bacterial cell wall that causes a disease, in order to prescribe the right medicine. → C

Q14 Prokaryote uses flagella for...

- CH A Attach to surface
 2 B Prevent the cell from drying out
 C Feeding
 D Movement
 Flagella: For movement → D

18 The relation between nitrogen fixation bacteria and plant root nodule

- CH A Mutualism B Chromosomes
 2 C Cell wall D Plasma membrane
 The relation between nitrogen fixation bacteria and plant root nodule is Mutualism. → A

Q15 After examining sewage water what type of prokaryote would you find?

- CH A Cyanobacteria B Methanogens
 2 C Acidophilic D Halophiles
 Methanogens are found in sewage treatment plants and swamps. → B

6 A bacteria that is important for producing vitamin (K)

- Do A Bacteriophage
 It? B E. coli
 C Autotrophic bacteria
 D Spirochetes

Q16 If the cell wall of the bacteria contains a large amount of peptidoglycan then it would stain which gram of color

- CH A Pink B Purple
 2 C Yellow D Orange
 Bacteria: are prokaryotic organisms that contain peptidoglycan and appear dark purple once they are stained and they are called Gram-positive. → B

7 Which of the following diseases are caused by bacteria and prevents oxygen from reaching the lungs?

- Do A Bacteriophage
 It? B E. coli
 C Autotrophic bacteria
 D Spirochetes

CHAPTER 2: Organizing Life's Diversity

Part 4: Viruses and Prions

A **virus** is a nonliving strand of genetic material within a protein coat(capsule), no organelles to take in nutrients or use energy, cannot make proteins, cannot move, and Cannot replicate on its own.

Viral Infection:

- In order to replicate, a virus must enter a host cell
- The virus attaches to the host cell using specific receptors on the plasma membrane.
- Many viruses cannot be transmitted between different species.

Lytic Cycle the host cell makes many copies of the viral RNA or DNA.

Ex: Common cold and influenza.

Lysogenic Cycle Viral DNA inserts, or integrates into a chromosome in a host cell.

Infected cells will have the viral genes permanently. Ex: Herpes simplex.

Retroviruses (HIV that causes AIDS), have a complex replication cycle.

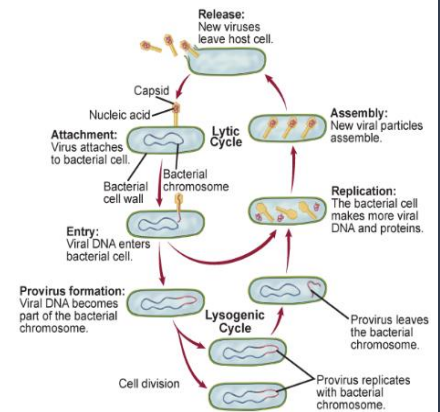
- Viruses that have RNA instead of DNA for their genetic material
- Retroviruses have a protein capsid.
- Lipid envelope is obtained from the plasma membrane of a host cell.

Prions

Protein that can cause infection or disease is called a proteinaceous infectious particle, or prion, normally exist in cells.

Diseases caused by prion

- Mad cow
- Encephalopathies disease infects nerve cells in the brain causing them to burst transmissible spongiform.



Q19 A student was able to isolate a pathogen that its genetic material is surrounded by a protein coat.

- CH A Bacteria B Viruses
2 C Fungus D Prokaryotes

Virus: a nonliving strand of genetic material within protein coat → B

Q20 Which of the following materials is found all viruses

- CH A Genetic material (DNA or RNA) and capsule
2 B Nucleus, DNA, and capsule
C Nucleus, capsule, and ribosomes
D Nucleus, DNA, and membrane

A virus is a nonliving strand of genetic material within a protein coat(capsule). →A

Q21 HIV is classified as which virus?

- CH A Amphoteric B Retrovirus
2 C Hemolytic D Lytic

Retrovirus HIV-AIDS is the Human immunodeficiency Virus, Retrovirus → B

Q22 The influenza virus that replicates by...

- CH A Lytic cycle
2 B Lysogenic cycle
C Cell cycle
D Organic cycle

Lytic cycle: the host cell makes many copies of viral DNA or RNA; the viral gene instruct the host cell to make more viral protein capsid and enzymes needed for viral replication from its

Examples: Common cold and influenza. →A

Q23 Smallpox is caused by

- CH A Bacteria B Virus
2 C Protists D Fungi

Smallpox is a viral disease. → B

24 Which of the following statements is incorrect about viruses?

- CH A Contains nucleic acid
2 B Have protein coat
C All of them are harmful.
D Treated with antibiotics

Antibiotics cannot kill viruses because viruses have different mechanisms and machinery to survive and replicate. →D

25 The virus indicated in the figure is...

- CH A Bacteriophage
2 B Adenovirus
C HIV
D TMV



→C

Q26 Which of the following can infect nerve cells in the brain?

- CH A Herpes B Prion
2 C Aids D Tuberculosis

Prion infects nerve cells in the brain causing them to burst. → B

8 Which describes HIV that causes AIDS?

- Do A Contain highly porous plasma membranes
It? B Has RNA instead of DNA
C Made of cells without nuclei
D use their DNA to replicate host DNA

9 A protein that can cause infection or disease and it's called proteinaceous...

- Do A Prion B Bacteria
It? C Archaea D Virus

Chapter 2: Do It Answer key

1	2	3	4	5	6	7	8	9
B	D	D	C	D	B	B	B	A