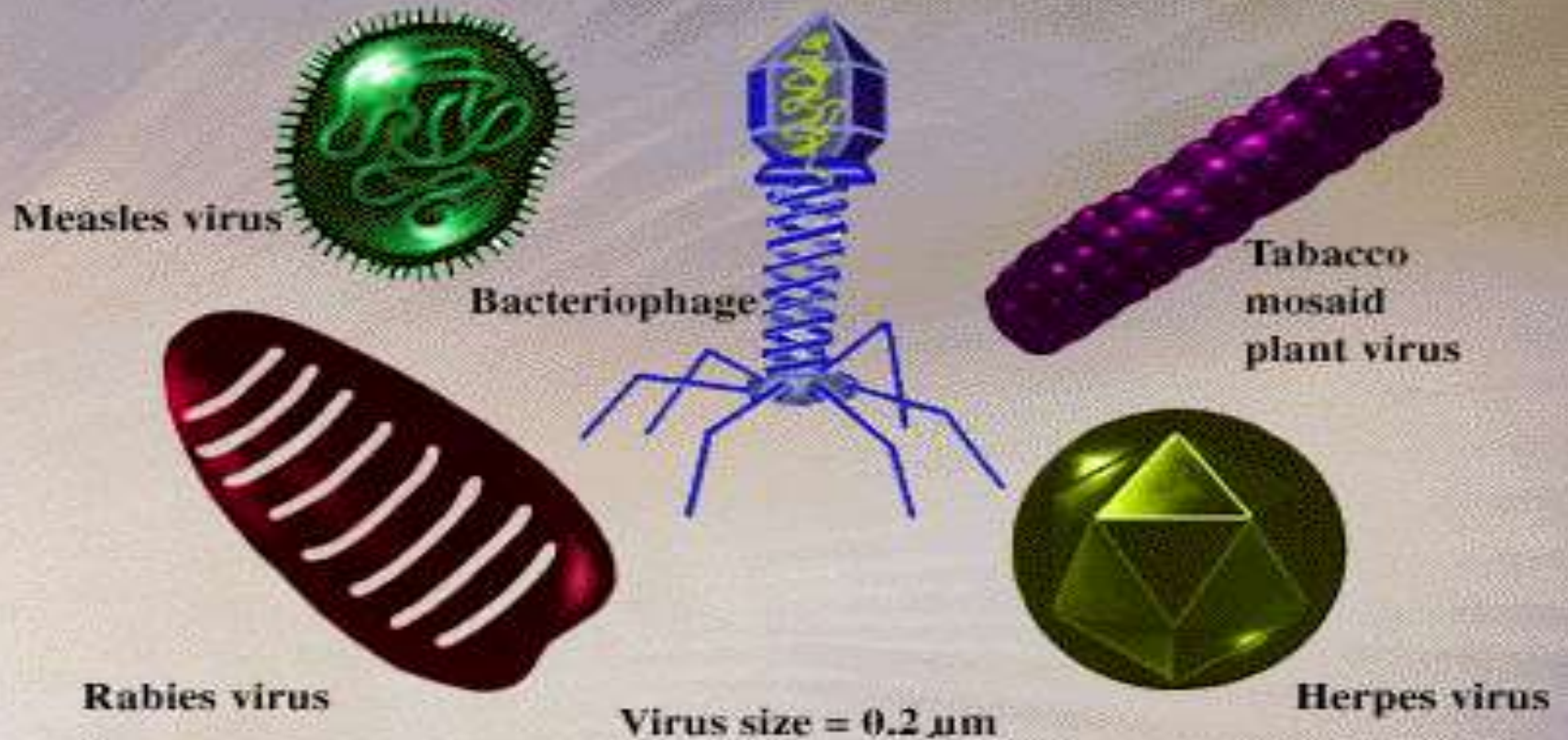


# MICRO-ORGANISMS

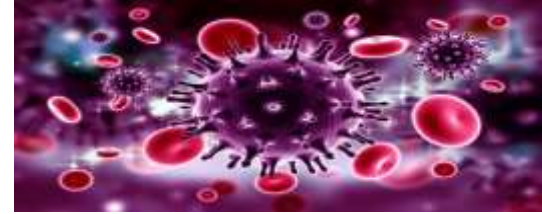
Viruses come in a variety of shapes



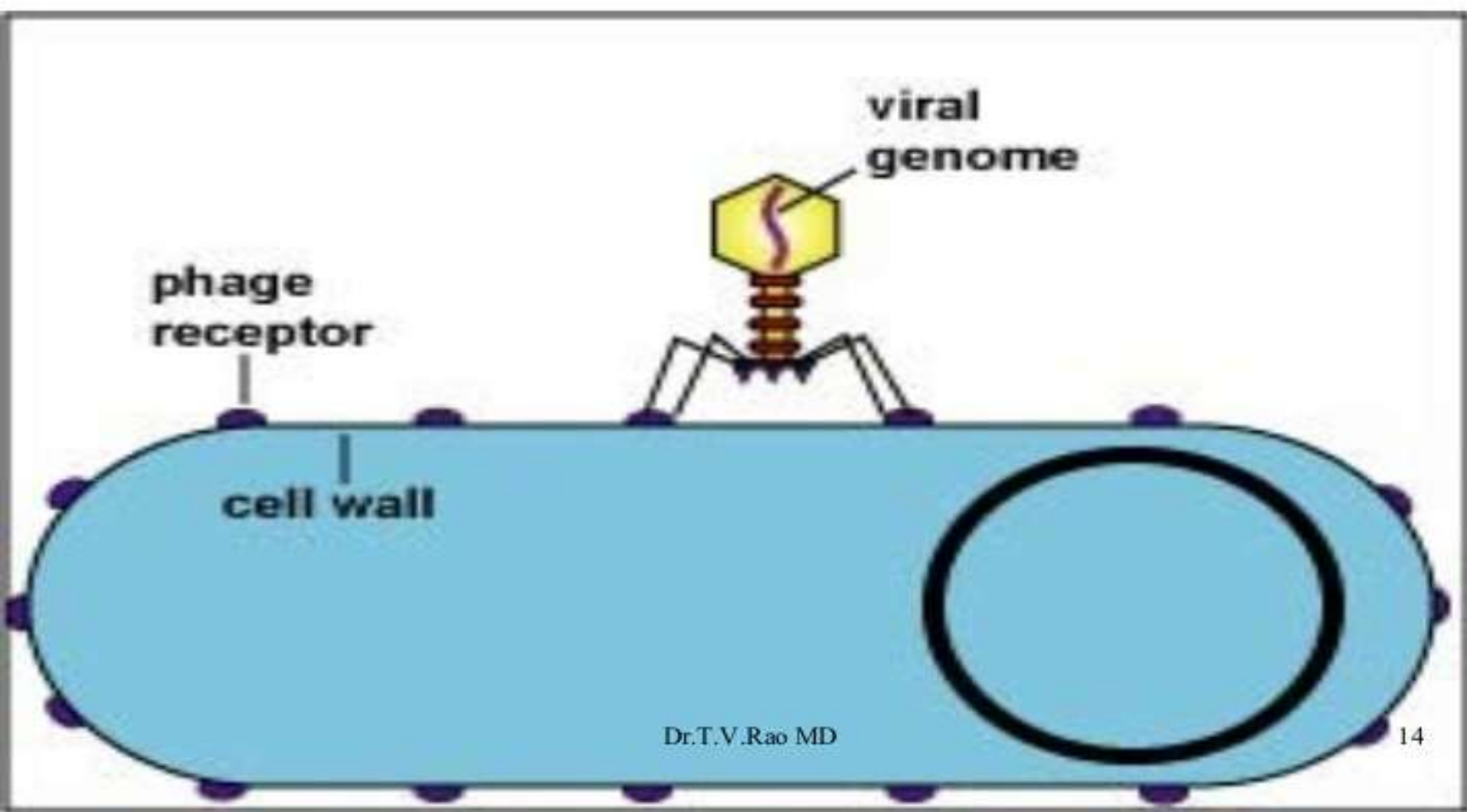
# VIRUS



# INTRODUCTION



- ***Viruses* are not really living** – they are **acellular**, so they have no organs. They do not eat, breathe, respire, or respond to stimuli.
- ***Viruses* are not really non-living** – they have *Nucleic Acids*: RNA (if they infect plants); they have DNA **or** RNA (if they infect animals).
- ***Viruses* can reproduce** - but only as **parasites**, at the expense of their (selected) host cell.
- At present, there is **no cure** for AIDS (with its *HIVirus*) or for Covid 19 (with its *Corona Virus*).



## **VIRUS ATTACKING ITS HOST CELL**

**Viral Nucleic Acid enters Host Cell & aggressively takes over its nucleus.**

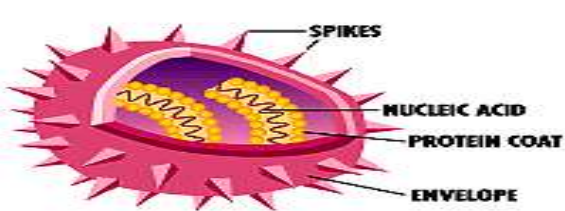
**From here, it instructs the cell to make more copies of itself.**

**At the expense of its Host, reproduction has occurred.**

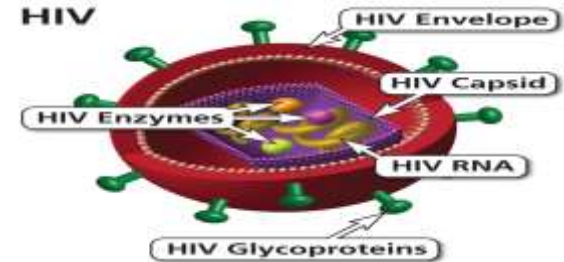
# CHARACTERISTICS of VIRUSES



- **Tiny** – can pass through micro-filters into *foetus*.
- **Acellular** – no organelles, no metabolism.
- **Obligate EndoParasites** – are pathogenic to hosts.
- **AntiBiotics** cannot kill **not-*really*-living** Viruses.
- **Reproduction** – Its base plate sticks to the host cell. Its nucleic acid (DNA or RNA) moves down its sheath into the host cell. This aggressively takes over the nucleus, and then orders the cell to stop doing its own job, and to make more copies of that Virus.



# DISEASES: AIDS



- **AIDS: Acquired Immune-Deficiency Syndrome.**
- **Virus: Human Immuno-deficiency Virus (HIV).**
- Attacks T4-lymphocytes (white blood cells).
- The infected human loses ability to fight diseases.
- Transmitted: sex, blood contact, mother-to-child.
- **Post-Exposure Prophylaxis (PEP)** – for those (nurses, rape victims) exposed to the virus, if treated within 24 hours.
- **Anti-Retroviral Therapy (ART)** – for sufferers of AIDS – it slows down the HIVirus in their body.

# BIOLOGICAL IMPORTANCE of VIRUS

- **They cause diseases:**
  - Cause illnesses and deaths.
  - Control overpopulation in their hosts.
  - Used for Biological Control of pests.
- **Gene therapy:** we can change *virus* genes to treat certain disorders (like *cystic fibrosis*). We call it ***Genetic Engineering*** when we change genetic plans of *micro-organisms* to suit us.
- **Vaccines:** we weaken the **plans** in a *virus* and then inject it into us. Our antibodies identify its genetic plan – this then gives us immunity to **that virus**.



# QUESTIONS Page 1

## Question 1



10 X [1] = [10]

1. Pathogens
2. MicroScopic
3. ViroLogy
4. Capsid
5. RNA
6. BacterioPhage
7. Virology
8. Acellular
9. Anti-Retroviral Therapy (ART)
10. AntiBodies

## Question 2

10 X [2] = [20]

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

## Question 3

[1] Heading      [1] Diagram      [1] Protein coat (capsid)  
[1] for protection      [1] nucleic acid      [1] RNA      [1]  
for parasitic reproduction      [1] ruler used      [8]

2. Have no organelles. No life functions. Need other cells to reproduce. [3]

3. Cause diseases. Used in gene therapy. Make vaccines to stimulate immunity. [3]

4. RNA – Is a virus that attacks plants. [3]

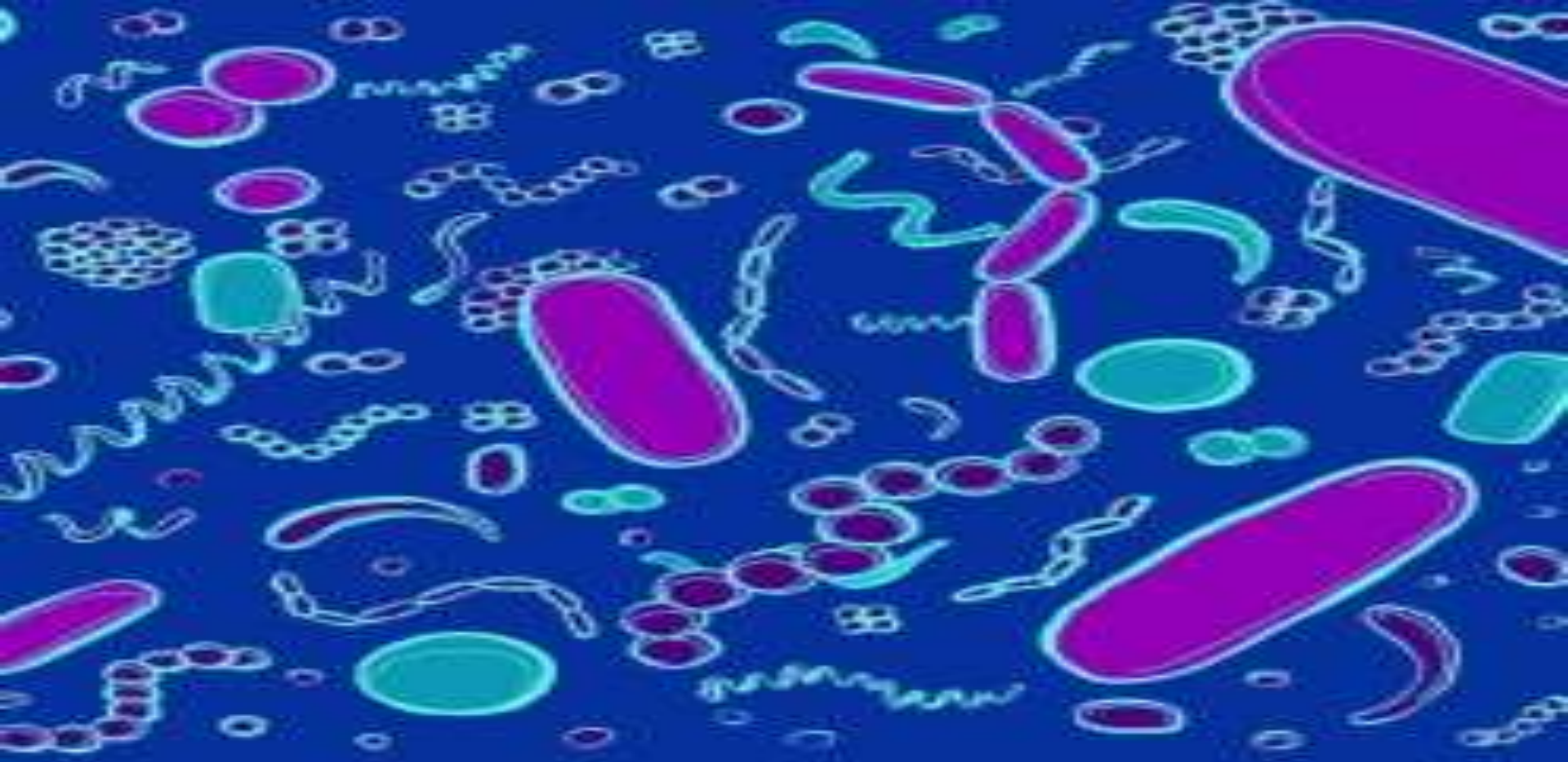




## Question 4



1. AIDS [1]
2. Weight loss. Sweating. Diarrhoea. [3]
3. Unprotected sex. Contact with infected blood. [2]
4. PEP = Post-Exposure Prophylaxis – taken within 24 hours of exposure to HIVirus.  
ART = Anti-RetroVirus – for people infected with HIV to slow down reproduction of the Virus. [2]
5. ART [1]
6. Take medication regularly. Provide medication for her child. To organise care for her child – in place should the mother die. [3]



# BACTERIA

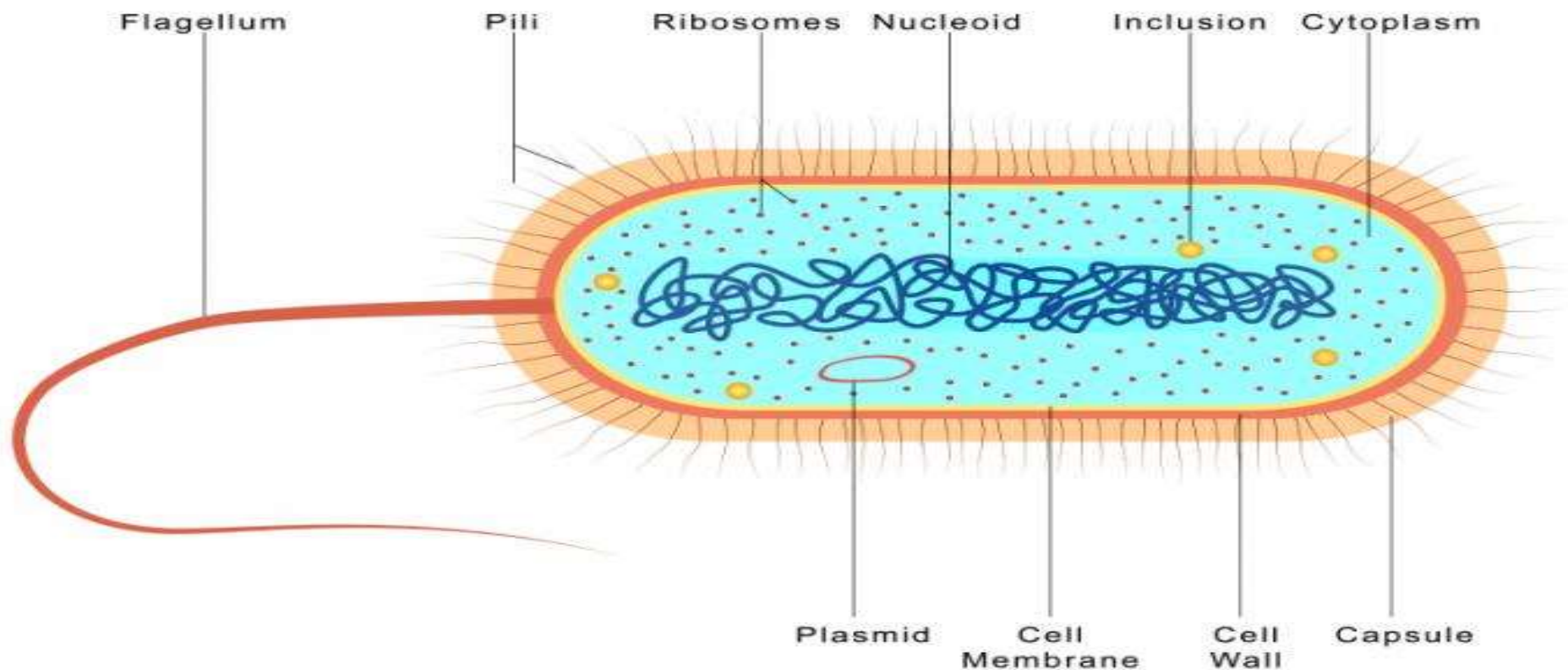
Kingdom: *Monera*

(Page 4)

# Introduction to *Bacteria*



- Microscopic.
- UniCellular.
- ProKaryotic = no membranes around organs.
- Some are pathogenic (cause diseases), but some are useful to humans.
- Some are PhotoSynthetic = Use **Sun's** energy.
- Some are ChemoSynthetic = Use **Chemical** breakdown to get energy.
- Most are **Hetero**Trophic = **Eat** Organic Matter.



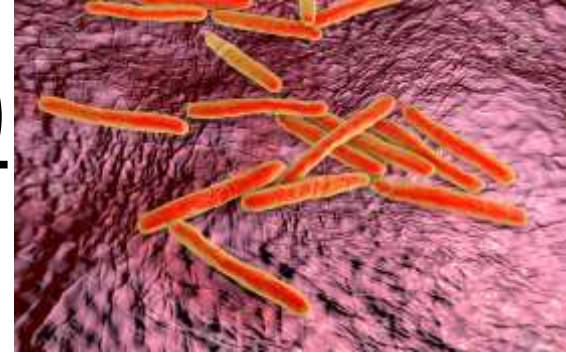


# CHARACTERISTICS



- Evolved into this present form **long** ago - 3 800 mya!
- They occur in every possible earthly habitat.
- Some have hair-like *pili* to help them attach onto things.
- Many have longer *cilia* or *flagella* (for movement).
- Reproduction is **Asexual** (in good conditions).
- It is simple Mitosis, and is called ***Binary Fission***.
- In bad conditions, they stay dormant (inactive) in Endospores, until conditions improve.

# DISEASES: TuBerculosis (TB)



- Cause: *MyoBacterium TuBerculosis*.
- Spread: Unprotected coughs, sneezes, spitting.
- Area: Lungs → Blood → Kidneys and Brain.
- Symptoms: sweating, bad cough, sore chest, fever, weight loss.
- Cure: AntiBiotics.
- Prevention: Vaccinate babies. Cough and sneeze properly, without spreading the germs. Do not spit!

# BIOLOGICAL IMPORTANCE of *Bacteria*

- Ecology – saprophytes digest **organic matter**.
- Food chains – the autotrophes provide **food**.
- Pathogens – cause **diseases**.
- Symbiosis – **Nitrogen-fixing *bacteria*** in Legume Plants. **Intestines** of Herbivores and in humans.
- Human use – **clean up** oil spills; **produce** wine, yoghurt, cheese, *mahewe*; **insulin** for diabetics.

# QUESTIONS Page 4

## Question 1

10 X [1] = [10]

1. UniCellular
2. ProKaryotic
3. PhotoSynthetic
4. ChemoSynthetic
5. Bacillus
6. Cillia/Flagella
7. Binary Fission
8. *MyoBacterium Tuberculosis*
9. *Monera*
10. DNA

## Question 2

5 X [2] = [10]

1. D
2. D
3. B
4. C
5. A

## Question 3

[10]

- [1] Heading    [1] Rod-shape    [1] Pencil    [1] For each label:  
Slime capsule. Cell wall. Cell membrane. Flagellum.  
Cytoplasm. Ribosomes. Nucleoid.



## Question 4

1. Tuberculosis [1]
2. Air (cough or sneeze) [1]
3. Lungs. Kidney. Brain. [3]
4. Fever. Night sweats. No appetite. Weight loss. Sore chest. Long lasting cough. Coughing up blood. [3]
5. Lung X-Ray. Skin test. Phlegm (Tissue) culture grown in laboratory. [3]
6. AntiBiotics [1]
7. Disease will come back. [1]
8. Multi Drug-Resistant TB. Extreme Drug-Resistant TB [2]
9. BCG [1]



## Question 5

1. (a) Are green (chlorophyll) = photosynthesis (to provide food) [3]  
(b) Eat producers. Can then be eaten by carnivores. [2]  
(c) Feed off dead plant and animal matter, and so decompose these bodies for recycling. [2]
2. Help us break down our food to release Vitamins B12, E and K from it. [3]
3. Help them break down cellulose in their foods to simpler sugars. [2]
4. We use them to clean up oil-spills. To make ethanol and acetone. To make yoghurts, cheese, wines, beer. To remove certain metals from rocks. To make insulin for diabetics. [5]
5. Make drinks like mahewe and maas. [3]



**VIRUS**

**BACTERIA**

Acellular

Cellular

Simple

More complex

Nucleic acid

Nucleoid

2. Salt sucks up the water, so bacteria lose their own water. They cannot survive to be able to break down the food. [5]