

YAKEEN NEET 2.0

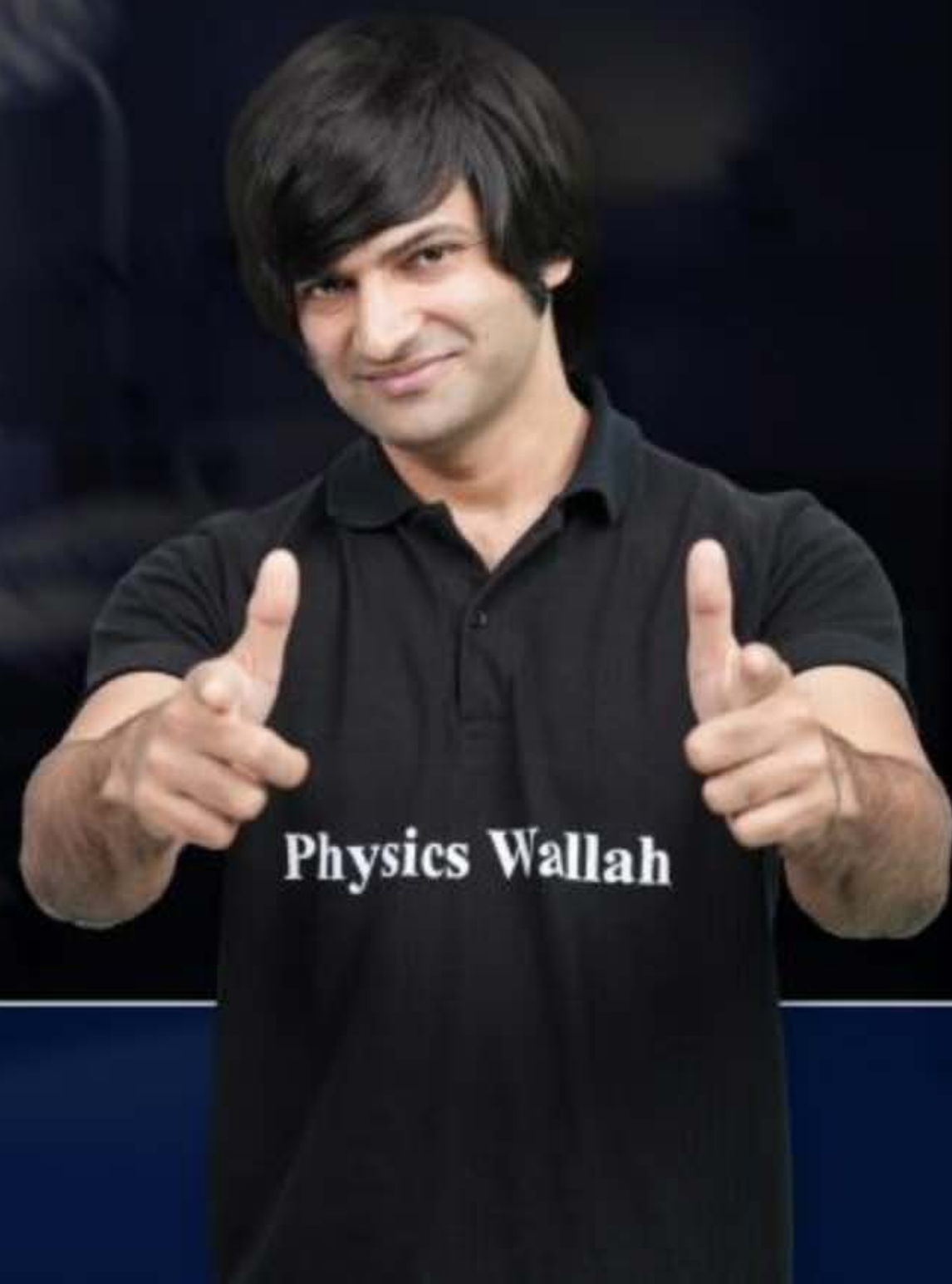
2026

Biological Classification

Botany

Lecture – 02

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Topics to be covered

1

MONERA

2

3

4

MONERA

- ★ **SOLE MEMBER: BACTERIA**
- ★ **MOST ABUNDANT**
- ★ **EVERYWHERE**
- ★ **EXTREME HABITAT/ADVERSE CONDITION** (HOT SPRING: HIGH TEMP, SNOW, DESERT, DEEP OCEAN)
- ★ **SOIL: 100 BACTERIA**
- ★ **MOSTLY: HETEROTROPHS**
- ★ **BUT ALSO AUTOTROPHS.**
- ★ **FEED: LIVING ORGANISM (PARASITIC) / DEAD MATTER (SAPROPHYTIC)**

NOTE: MOST EXTENSIVE METABOLIC DIVERSITY
SIMPLE: STRUCTURE
COMPLEX: BEHAVIOUR.

NUTRITION

AUTOTROPHS

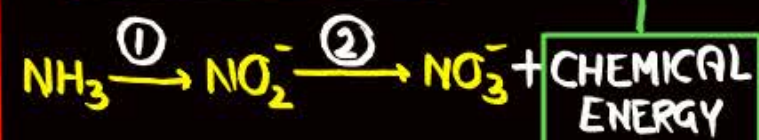
★ PHOTOAUTOTROPHS



INORGANIC COMPOUND:
NON-OXYGENIC: O_2 NOT PRODUCED

eg: PURPLE SULPHUR
GREEN SULPHUR

★ CHEMOAUTOTROPHS



USE IN
ATP SYNTHESIS

INORGANIC COMPOUND → OXIDATION

①: NITROSOMONAS

②: NITROBACTER

PROCESS: NITRIFICATION
RECYCLING OF NUTRIENTS.

HETEROTROPHS

SAPROPHYTIC, PARASITIC, SYMBIOTIC

HETEROTROPHS

- ★ **MOSTLY FEED ON DEAD MATTER (SAPROPHYTIC)**
- ★ **MOSTLY DECOMPOSER.**
- ★ **ANTIBIOTIC FORMATION**
- ★ **MILK → CURD (LACTOBACILLUS)**
- ★ **$\text{N}_2 \rightarrow 2\text{NH}_3$ (N_2 FIX^N)**

① **RHIZOBIUM: ROOT (LEGUMES)**

② **FRANKIA: ROOT (NON LEGUMES)**

eg: ALNUS, CASUARINA PLANT

★ **ORGANIC $\xrightarrow{\text{CONVERTS}}$ INORGANIC COMPOUND (ENERGY SOURCE)**

★ **TYPHOID: SALMONELLA TYPHI**

★ **TETANUS: CLOSTRIDIUM TETANI**

★ **CHOLERA: VIBRIO**

★ **CITRUS CANCER: XANTHOMONAS CITRI**

★ **INFECTION: CROPS, HUMAN, PETS, FARMS ANIMAL.**

HUMAN AFFAIR
SYMBIOTIC

REPRODUCTION

★ ONLY ASEXUAL

① BINARY FISSION:

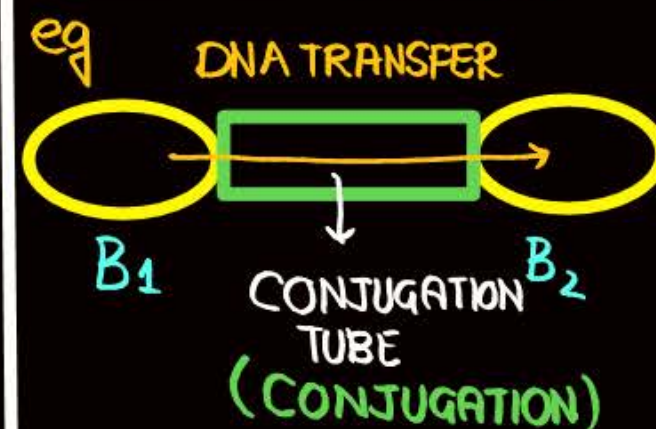
- COMMON MODE
- FAVOURABLE CONDITION
- AMITOSIS

② SPORE FORMATION

- UNFAVOURABLE CONDITION
- ENDOSPORE

NOTE: SEXUAL ABSENT
BUT

SORT OF SEXUAL REPRODUCTION
(PRIMITIVE METHOD OF DNA TRANSFER). **PRESENT**



ARCHAEBACTERIA: ANCIENT BACTERIA

★ CELL WALL: PSEUDOMUREIN
STRUCTURE



★ SURVIVE: ADVERSE/HARSH CONDITION

① HALOPHILES: SALINE CONDITION

② THERMOACIDOPHILES: HIGH TEMP,
ACIDIC (LOW PH) eg HOT SPRING

③ METHANOGENS: (PART)

★ RUMINANT ANIMAL (STOMACH → RUMEN)

★ COW, BUFFALO, SYMBIOTIC

★ CELLULOSE DIGESTION

★ DUNG/GOBAR ⇒ CELLULOSE + METHANOGEN

↓
BIOGAS PRODUCED

MYCOPLASMA

★ CELL WALL ABSENT / NO DEFINITE SHAPE
PLEOMORPHIC

★ SMALLEST LIVING ORGANISM

★ CAN PASS THROUGH BACTERIAL FILTER
SO SMALLER THAN BACTERIA

★ HETROTROPHS.

★ INFECTION: PLANTS & ANIMAL (HUMAN)

★ CAN LIVE IN ABSENCE OF O_2 .

BLUE GREEN ALGAE / CYNOBACTERIA

★ FRESH H_2O / MARINE / TERRESTIAL.

★ UNICELLULAR ○
COLONIAL ○○

FILAMENTOUS:

(NOSTOC, ANABENA,
OSCILLATORIA)

★ CHL A, CAROTENE, XANTHOPHYLL

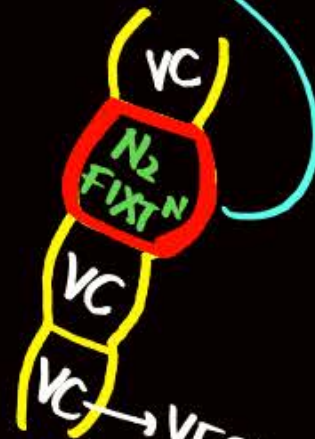
SIMILAR TO HIGHER PLANT

★ PHOTOAUTOTROPHS

★ NO CHEMOAUTOTROPHS.

★ EXCESSIVE GROWTH OF BGA
IN POLLUTED H_2O : WATER BLOOM.

HETEROCYST



★ LARGE, THICK
WALL, SPECIAL

★ IMPERMEABLE TO
 O_2

★ ANAEROBIC CON^N ✓

★ N_2 FIXATION
eg: SOME
FILAMENTOUS
BGA.

VEGETATIVE CELL
NOSTOC (PHOTOSYNTHESIS)

TO BE
CONTINUE.

2.1 KINGDOM MONERA

Bacteria are the sole members of the Kingdom Monera. They are the most abundant micro-organisms. Bacteria occur almost everywhere. Hundreds of bacteria are present in a handful of soil. They also live in extreme habitats such as hot springs, deserts, snow and deep oceans where very few other life forms can survive. Many of them live in or on other organisms as parasites.

Bacteria are grouped under four categories based on their shape: the spherical Coccus (pl.: cocci), the rod-shaped Bacillus (pl.: bacilli), the comma-shaped Vibrium (pl.: vibrio) and the spiral Spirillum (pl.: spirilla) (Figure 2.1).

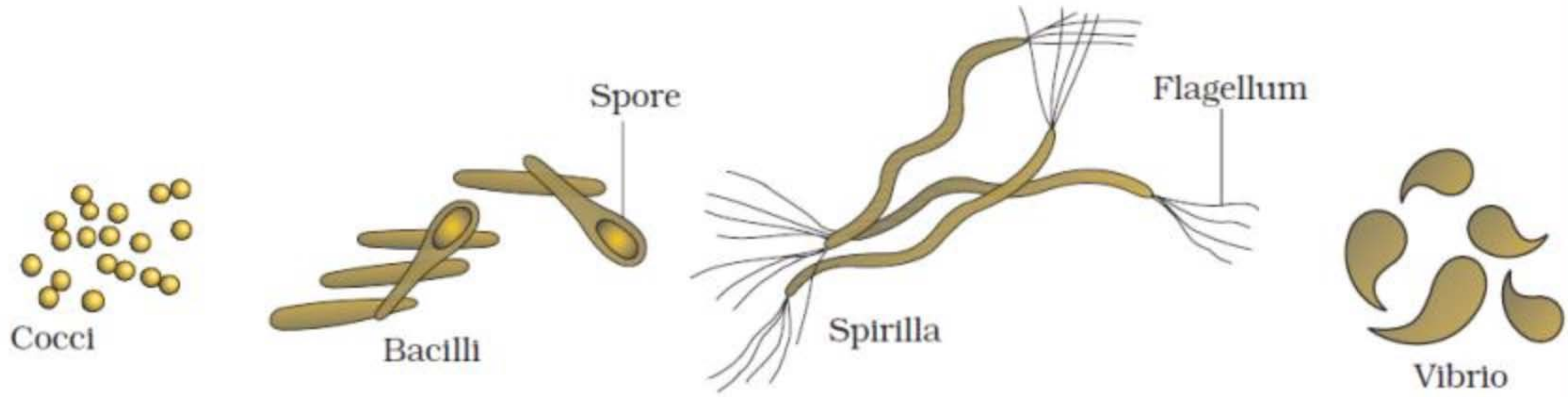


Figure 2.1 Bacteria of different shapes

Though the bacterial structure is very simple, they are very complex in behaviour. Compared to many other organisms, bacteria as a group show the most extensive metabolic diversity. Some of the bacteria are autotrophic, i.e., they synthesise their own food from inorganic substrates. They may be photosynthetic autotrophic or chemosynthetic autotrophic. The vast majority of bacteria are heterotrophs, i.e., they depend on other organisms or on dead organic matter for food.



2.1.1 Archaeobacteria

These bacteria are special since they live in some of the most harsh habitats such as extreme salty areas (halophiles), hot springs (thermoacidophiles) and marshy areas (methanogens). Archaeobacteria differ from other bacteria in having a different cell wall structure and this feature is responsible for their survival in extreme conditions. Methanogens are present in the gut of several ruminant animals such as cows and buffaloes and they are responsible for the production of methane (biogas) from the dung of these animals.

2.1.2 Eubacteria

There are thousands of different **eubacteria** or 'true bacteria'. They are characterised by the presence of a rigid cell wall, and if motile, a flagellum. The **cyanobacteria** (also referred to as blue-green algae) have chlorophyll *a* similar to green plants and are **photosynthetic autotrophs** (Figure 2.2).

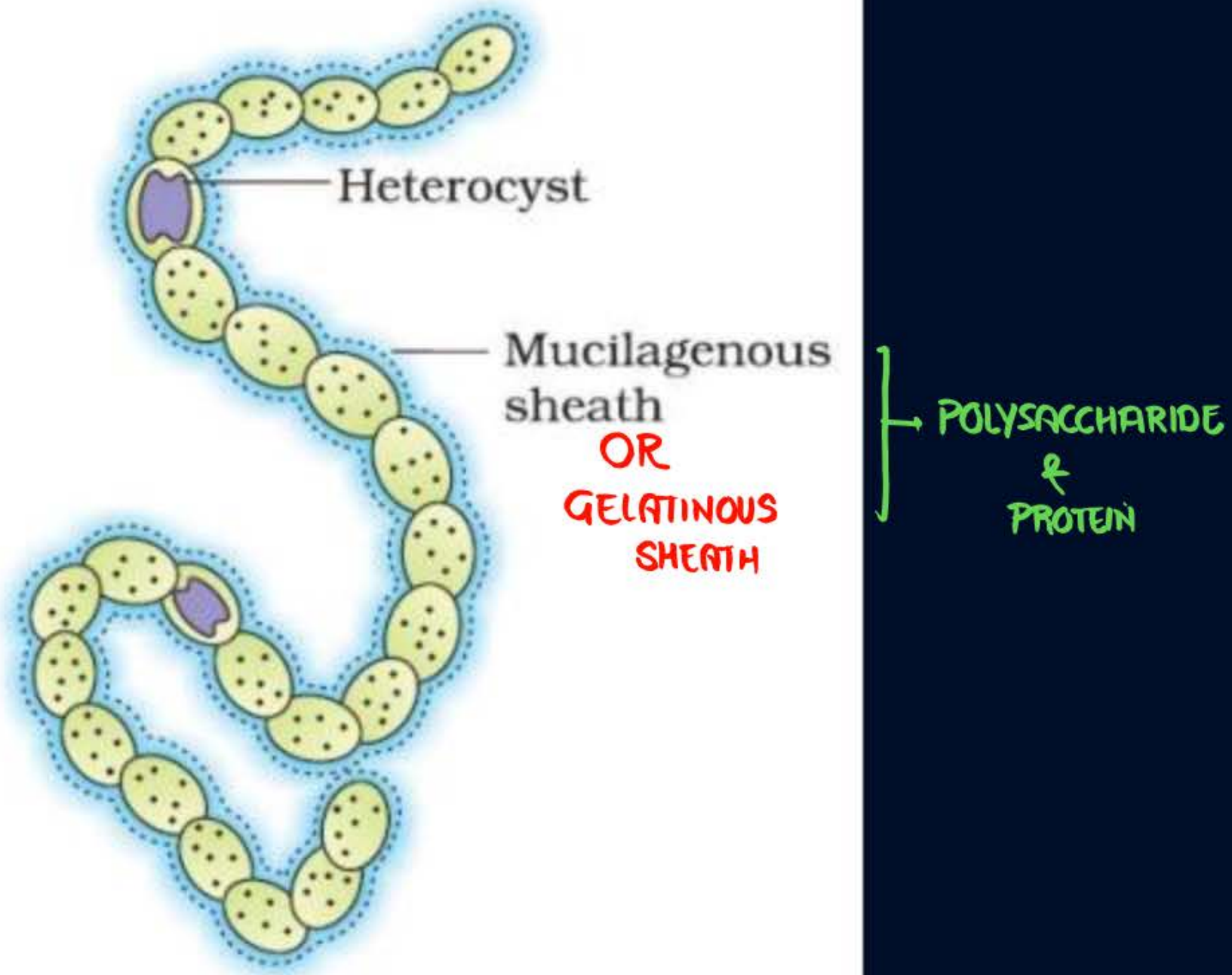


Figure 2.2 A filamentous blue-green algae – *Nostoc*

The cyanobacteria are unicellular, colonial or filamentous, freshwater/marine or terrestrial algae. The colonies are generally surrounded by gelatinous sheath. They often form blooms in polluted water bodies. Some of these organisms can fix atmospheric nitrogen in specialised cells called **heterocysts**, e.g., *Nostoc* and *Anabaena*. **Chemosynthetic autotrophic** bacteria oxidise various inorganic substances such as nitrates, nitrites and ammonia and use the released energy for their ATP production. They play a great role in recycling nutrients like nitrogen, phosphorous, iron and sulphur.

BGA

BACTERIA

Heterotrophic bacteria are most abundant in nature. The majority are important decomposers. Many of them have a significant impact on human affairs. They are helpful in making curd from milk, production of antibiotics, fixing nitrogen in legume roots, etc. Some are pathogens causing damage to human beings, crops, farm animals and pets. Cholera, typhoid, tetanus, citrus canker are well known diseases caused by different bacteria.

→ BACTERIA

Bacteria reproduce mainly by fission (Figure 2.3). Sometimes, under unfavourable conditions, they produce spores. They also reproduce by a sort of sexual reproduction by adopting a primitive type of DNA transfer from one bacterium to the other.

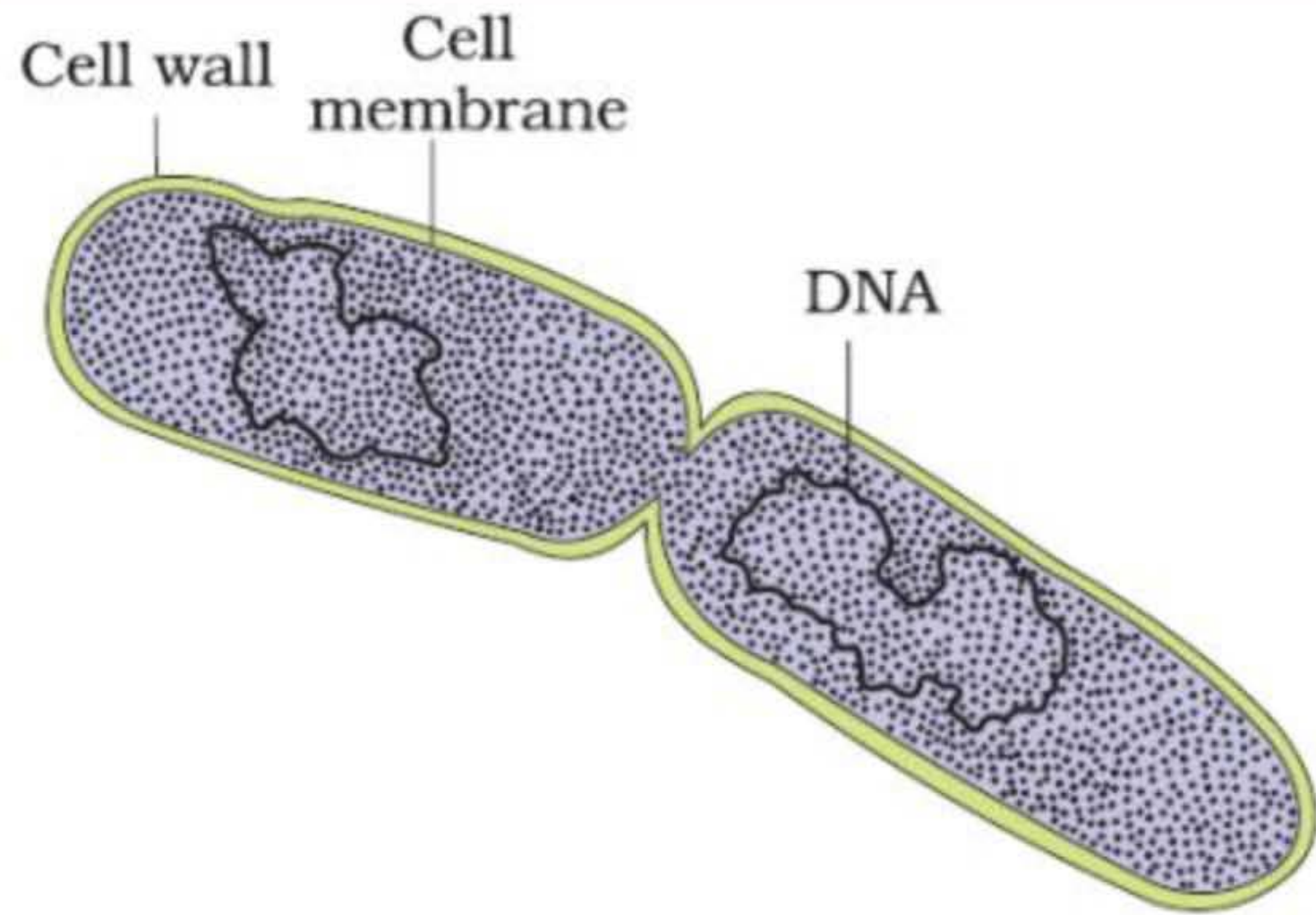


Figure 2.3 A dividing bacterium

The **Mycoplasma** are organisms that completely lack a cell wall. They are the smallest living cells known and can survive without oxygen. Many mycoplasma are pathogenic in animals and plants.

Correct (Bacteria)

- A. sole member of ~~Protista~~
- B. abundant, found ~~limited~~ area
- ☒ C. hundreds of bacteria in soil
- D. ~~cannot~~ live in hot spring, deep ocean
- E. parasite mode ~~absent~~
- F. ~~3~~⁴ common shapes present

Options

- ☒ (A) ~~2~~¹
- (B) 3
- (C) 4
- (D) 5

Correct

- A. ~~simple~~ in behaviours & ~~complex~~ in structure
- B. ~~least~~ extensive metabolic diversity
- C. ~~mostly~~^{SOME} autotrophs
- D. ~~some~~^{MOST} heterotrophs
- E. mostly feed on dead matter (~~parasitic~~)^{SAPROPHYTIC}

Options

- (A) 2
- (B) 3
- (C) 4
- ☒ (D) 0

Archaeobacteria

- ✓ A. most harsh condition : present due to cell wall structure
- ✓ B. differ in cell wall structure with others
- ✓ C. Methanogens present in guts of ruminant animal
- D. methanogens do ~~not~~ produce biogas
- ✓ E. methanogens present in dung
- F. thermophilic acidophile : ~~low~~ temperature & ~~high~~ PH
- ✓ G. Saline condition: Halophile

Options

- (A) 3 (B) 4 ✓ (C) 5 (D) 6

Eubacteria

- (A) ~~False~~ bacteria
- (B) ~~not~~ have rigid cell wall
- ✓ (C) flagella not present in all bacteria
- (D) Cyanobacteria : Chl a present, ~~chemoautotrophs~~

Cyanobacteria

- (A) unicellular, colonial ~~not~~ filamentous
- (B) freshwater /marine but ~~not~~ terrestrial
- ✓ (C) colonies surrounded by gelatinous /mucilage sheath
- (D) ~~All~~ have heterocyst for N₂ fixation
some.

Chemosynthesis autotrophs

- (A) Oxidise various ~~organic~~ substance such as nitrate, nitrite, Ammonia
- ✓ (B) energy released due to oxidation of inorganic compound utilised in ATP synthesis
- (C) ~~no~~ role in recycling of nutrient
- (D) None

Heteotrophs (Incorrect)

- (A) most abundant
- (B) Majority are decomposer
- (C) no impact on human affairs
- (D) curd formation from milk



Hetroteophs (Incorrect)

- (A) antibiotic formation
- (B) N-2 fixation by rhizobium in non legumes and frankia in legumes
- (C) some are pathogen infect human, crops, farm animal
- (D) Cholera, tetanus, typhoid, citrus canker : bacteria disease

Mycoplasma

- (A) Cell wall present
- (B) definite shape
- (C) smallest non living cell
- (D) pathogenic to only animals
- (E) Can survive without oxygen

Bacteria (Correct)

- (A) reproduce mainly by binary fission (sexual)
- (B) some time spore formation (favourable conditions)
- (C) sort of sexual reproduction by adoption primitive method of DNA transfer
- (D) None



Homework from **YAKEEN NEET 2.0 2026** Module



MODULE : MONERA
QUESTION
(NCERT BASED)



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