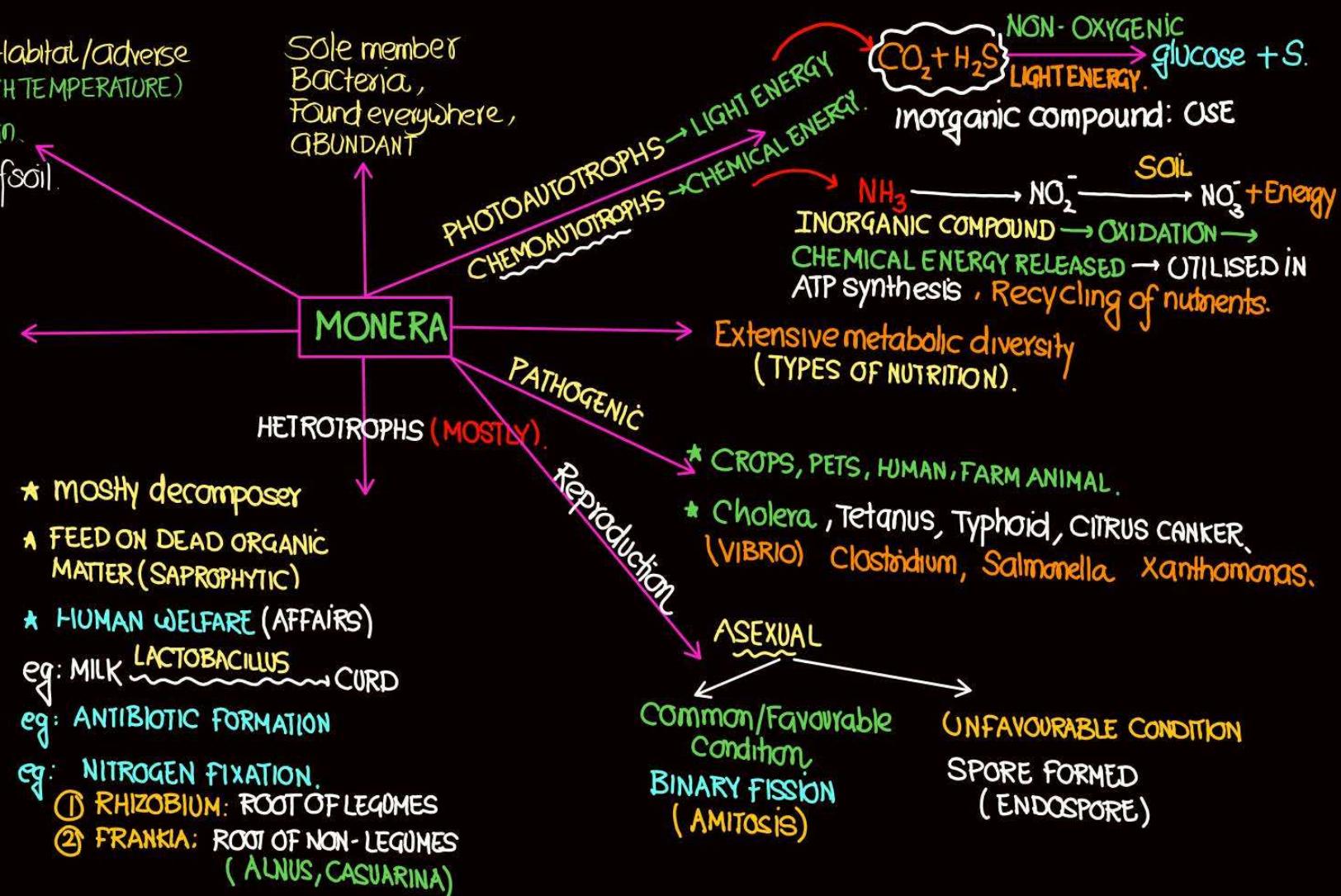


- Also Found in extreme Habitat/Adverse Condition (HOT SPRING, HIGH TEMPERATURE) Snow, desert, deep ocean.
- 100 Bacteria: 1 Handful of soil.
- Parasite

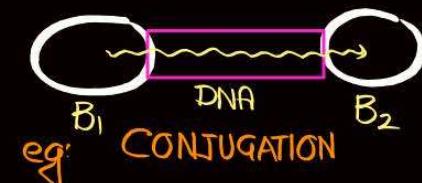
Shape

COCCUS: SPHERICAL
BACILLUS: ROD
VIBRIO: COMMA
SPIRAL: SPIRILLUM.

STRUCTURE: SIMPLE
BEHAVIOR: COMPLEX.



→ SORT OF SEXUAL REPRODUCTION
(PRIMITIVE METHOD OF DNA TRANSFER)



MYCOPLASMA

- * SMALLEST LIVING CELL
- * CELL WALL ABSENT, NO DEFINITE SHAPE (PLEOMORPHIC)
- * CAN SURVIVE WITHOUT O₂.
- * INFECTION IN PLANT & ANIMAL.
- * CAN PASS THROUGH BACTERIAL FILTERS.

ARCHAEBACTERIA

MONERA

- EUBACTERIA: BACTERIA (TRUE BACTERIA)
- ARCHAEBACTERIA (PRIMITIVE / ANCIENT BACTERIA)

★ CELL WALL DIFFERENT (PSEUDOMUREIN). → SURVIVE IN ADVERSE/HARSH/UNFAVOURABLE CONDITION.

HALOPHILES
(EXTREME SALT/
SALINE CONDITION).

THERMOACIDOPHILES (HOT SPRING)
→ HIGH TEMP,
→ ACIDIC CONDITION

METHANOGENS.
→ MARSHY AREA.
→ CATTLE → STOMACH → RUMEN.
→ GOBAR/DUNG → BIOGAS PRODUCED
(CELLULOSE, CH₄ PRODUCING BACTERIA)

Oxygenic
photosynthesis

UNICELLULAR,
COLONIAL
FILAMENTOUS.

FRESH H₂O
MARINE H₂O
TERRESTRIAL.

CO₂ + H₂O → glucose
Chla, carotene + xanthophyll
CAROTENOIDS

Excessive growth of BGA IN
POLUTED H₂O: WATER BLOOM.

SPIRULINA: FILAMENTOUS,
BGA,
RICHEST SOURCE OF PROTEIN,
SPACE FOOD.

NOSTOC

SPECIAL, LARGE, THICK
CELL WALL, ANAEROBIC
CONDITION, N₂ FIXⁿ

PHOTOSYNTHESIS (VEGETATIVE
CELL)

NOSTOC,
ANABAENA
(FILAMENTOUS BGA)

SPECIAL CELL
(NITROGEN FIXATION)
HETROCYST

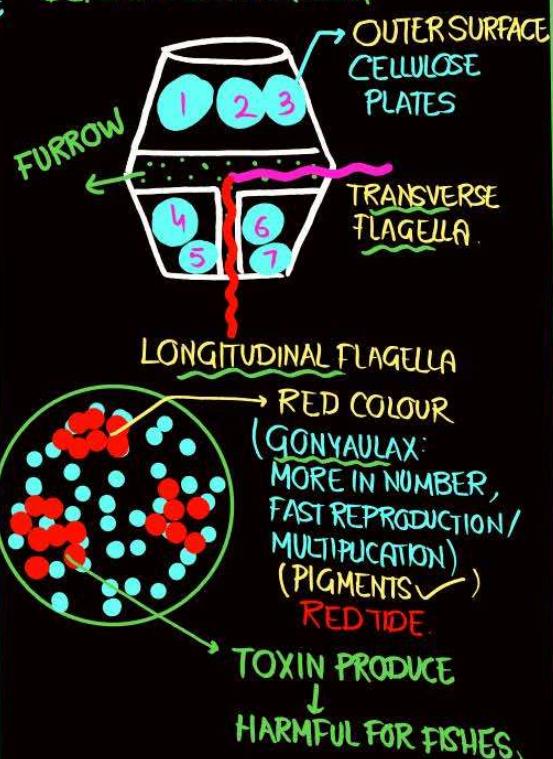


PROTISTA

- * UNICELLULAR EUKARYOTES.
- * MEMBERS: MOSTLY AQUATIC
- * MEMBRANE BOUND ORGANELLE PRESENT
- * NUCLEUS PRESENT
- * SHOW CHARACTER OF PLANT, ANIMAL, FUNGI
- * BOUNDARIES NOT WELL DEFINED
- * **SOME BIOLOGIST**
 - PLANTS
 - PHOTOSYNTHETIC PROTISTAN
- * ASEXUAL (BINARY FISSION)
- * GAMETE/CELL FUSION (FERTILISATION)
 - ↓ ZYGOTE FORMATION
- * SOME HAVE Cilia / FLAGELLA.

DINOFLAGELLAES

- * MOSTLY MARINE, PHOTOSYNTHETIC,
- * BLUE, BROWN, RED, GREEN, YELLOW DEPENDS UPON PIGMENT



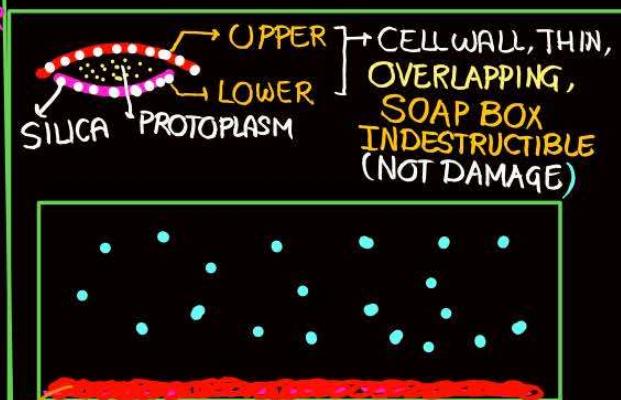
EUGLENIDS



- * CELL WALL ABSENT
- * BODY FLEXIBLE
- * FRESH H₂O (STAGNANT H₂O)
- * Chl a, b (Pigments Similar to HIGHER PLANT)
- * LIGHT PRESENT: AUTOTROPHS PHOTOSYNTHESIS
- * LIGHT ABSENT: FEED ON SMALL ANIMALS, HETROTROPHS.
- * TWO MODES OF NUTRITION.

CHRYSOPOHYTES

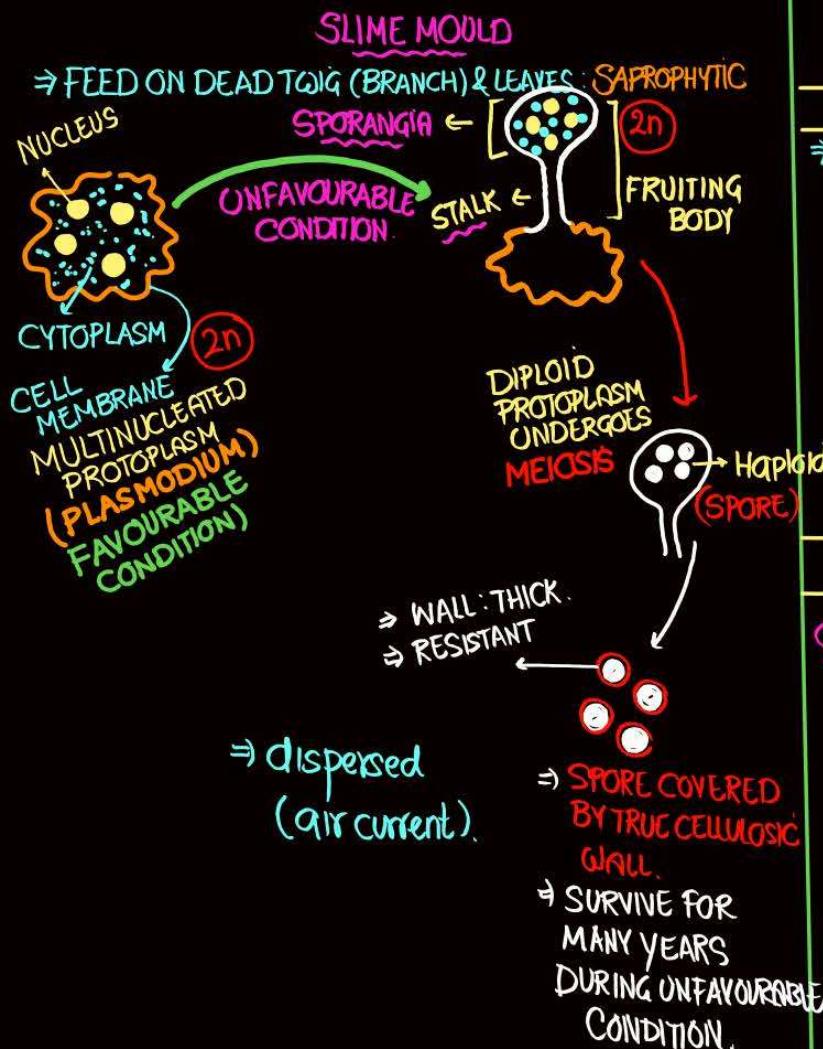
- * DIATOMS & DESMIDS (GOLDEN ALGAE)
- * FRESH H₂O, MARINE H₂O, MOSTLY PHOTOSYNTH.
- * MOVEMENT: ROLE: H₂O CURRENT (PLANKTON) (PASSIVE).
- * MAIN PRODUCER IN OCEAN. (DIATOMS)



CELL WALL OF DIATOM DEPOSITED AT BOTTOM OF OCEAN, BILLIONS OF YEAR.

DIATOMACEOUS EARTH / DIATOMITE

- FILTERATION OF OIL & SYRUPS.
- POLISHING OF METAL.
- GRITTY



PROTOZOA: PRIMITIVE RELATIVE OF ANIMAL, ALL HETROTROPHS (PREDATOR & PARASITE), CELL WALL ABSENT

AMOEBOID

→ FRESH H_2O , SEA H_2O , MOIST SOIL.

Cell membrane
PROTOPLASMA PUSH
CELL MEMBRANE

→ TEMPORARY/FALSE FEET: LOCOMOTION, FOOD CAPTURE

→ MARINE FORMS COVERED BY SILICA SHELL.

ENTAMOEBA: DYSENTERY (PARASITE) (CONTAMINATED H_2O & FOOD)

FLAGELLATED

→ FREE LIVING / PARASITE, FLAGELLA ✓

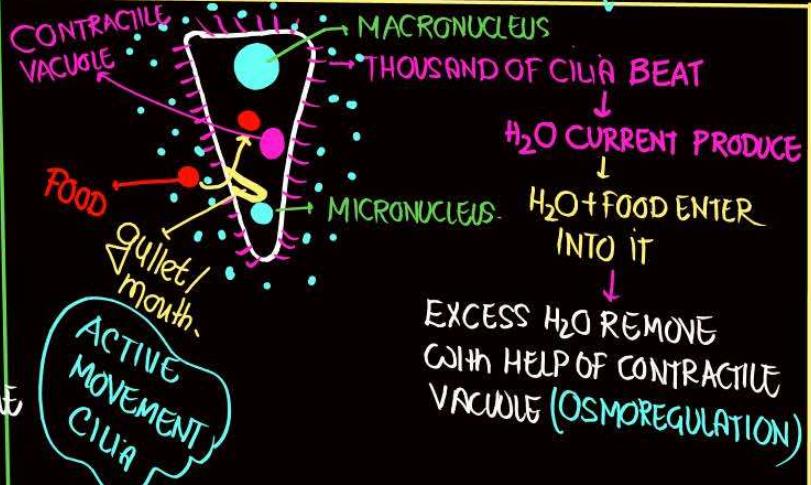
→ TRYPANOSOMA (Tse-tse fly)

BITE HUMAN

RELEASE TRYpanosoma

SLEEPING SICKNESS

CILIATED (PARAMECIUM), aquatic

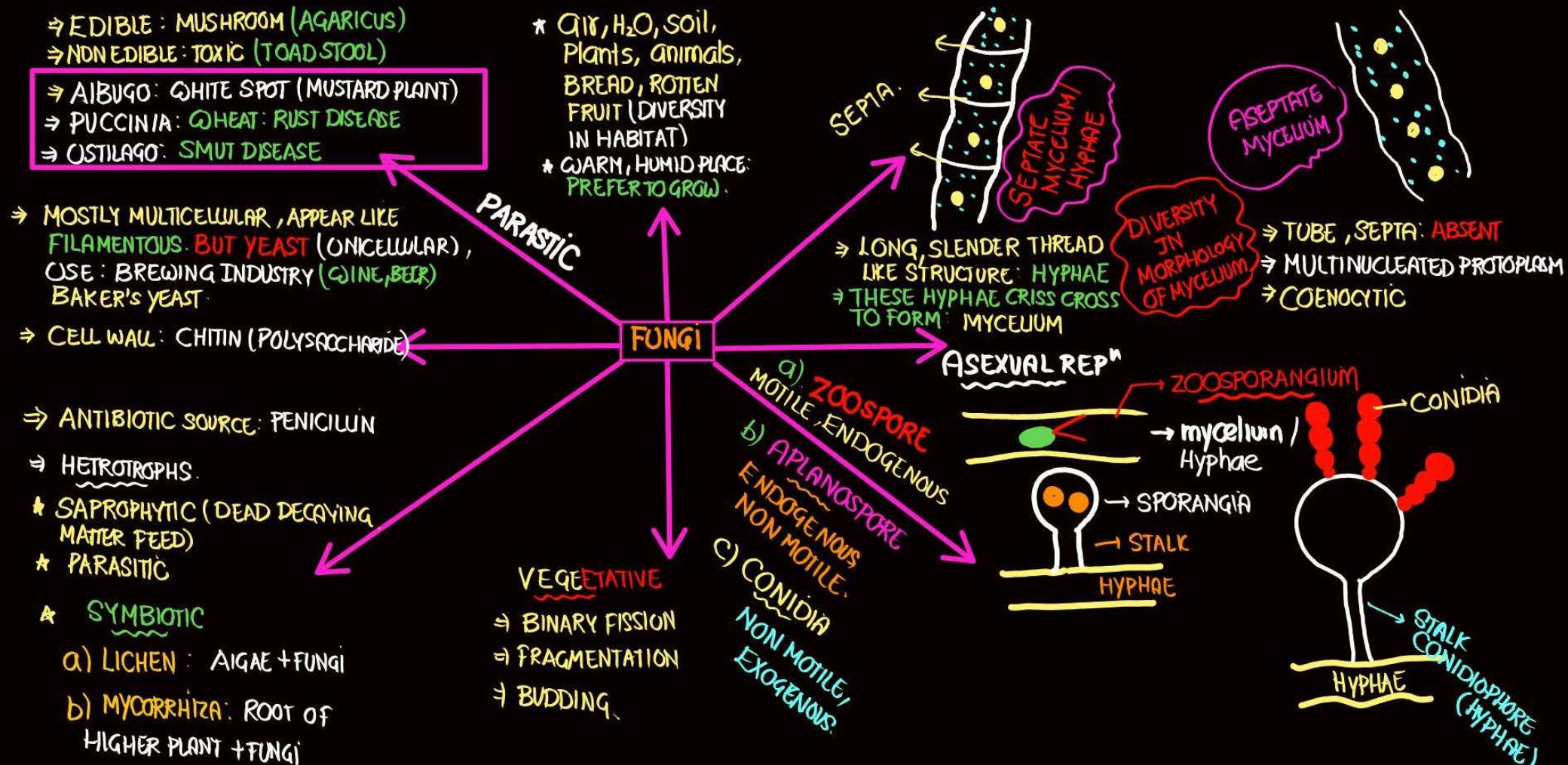


SPOZOAN

* PLASMODIUM (NOTORIOUS) → Malaria

LIFE CYCLE (Infectious spore)

Staggering (Harmful effect on human)



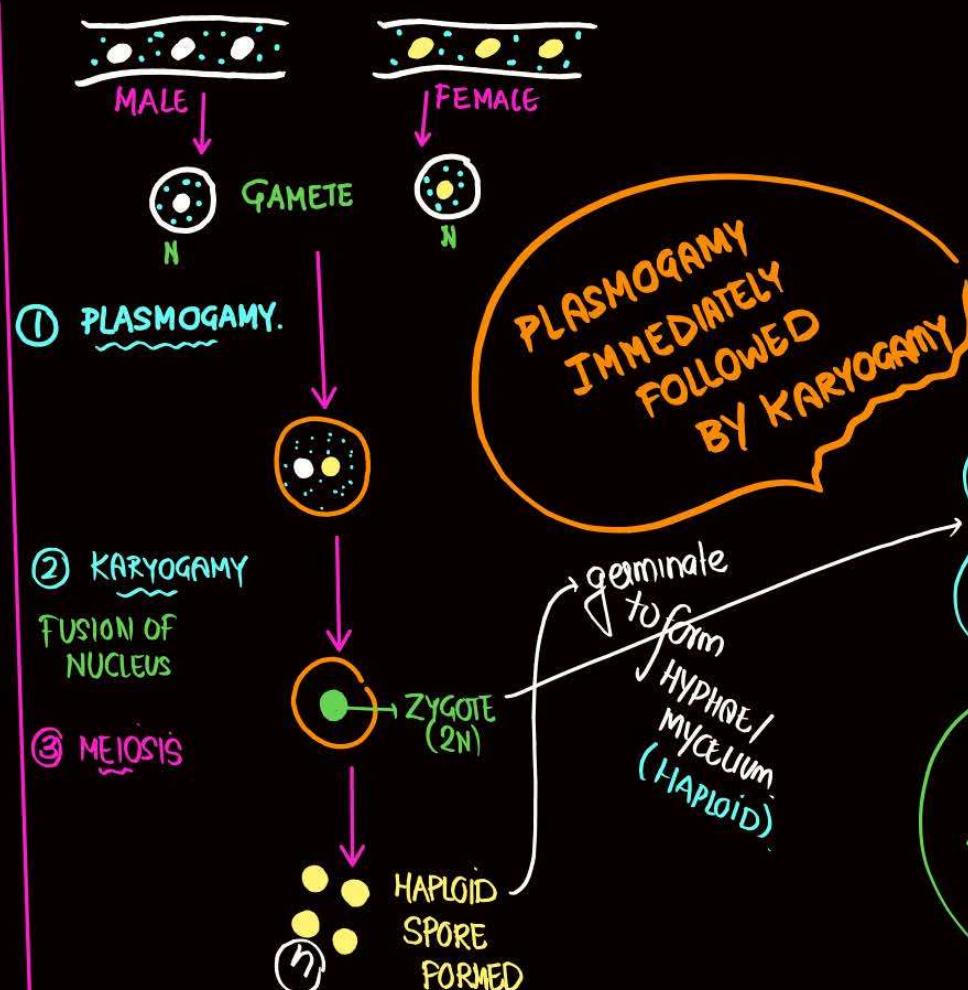
PHYCOMYCETES

- ⇒ AQUATIC, FEED ON DEAD DECAYING (MOIST, DAMP PLACED, PARASITE OBLIGATE) (ALBUGO IN MUSTARD).
- ⇒ ASEPTATE, COENOCYTIC, MYCELIUM.
- ⇒ ASEXUAL: ZOOSPORE, APLANOSPORE (MOTILE) (NON MOTILE)
- ⇒ ISOGAMOUS, ANISOGAMOUS & OOGAMOUS: (BOTH MALE & FEMALE GAMETE MORPHOLOGICAL SIMILAR). (DISSIMILAR)

SEXUAL REPⁿ (3 STEPS)

- a) PLASMOGAMY: MIXING OF PROTOPLASM OF TWO CELLS, BUT NOT FUSED NUCLEUS.
- b) KARYOGAMY
- c) MEIOSIS

CLASSIFICATION: FRUITING BODY, SPORE FORMATION, MORPHOLOGY OF MYCELIUM.



Rhizopus (BREAD MOULD)

MUCOR
ALBUGO

sexual spore

zygospore (2n)
or
oospore (2n)

Zoospore
Asexual spore

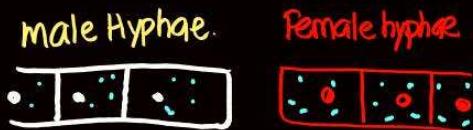
ASCOMYCETES

SAC FUNGI

- ⇒ SAPROPHYtic, PARASitic, DECOMPOSER, COPROPHILous (grow in DUNG).
- ⇒ SEPTATE BRANCHED MYCELIUM.
- ⇒ MOSTLY MULTICELLULAR, BUT YEAST (UNICELLULAR)
- ⇒ ASEXUAL: CONIDIA

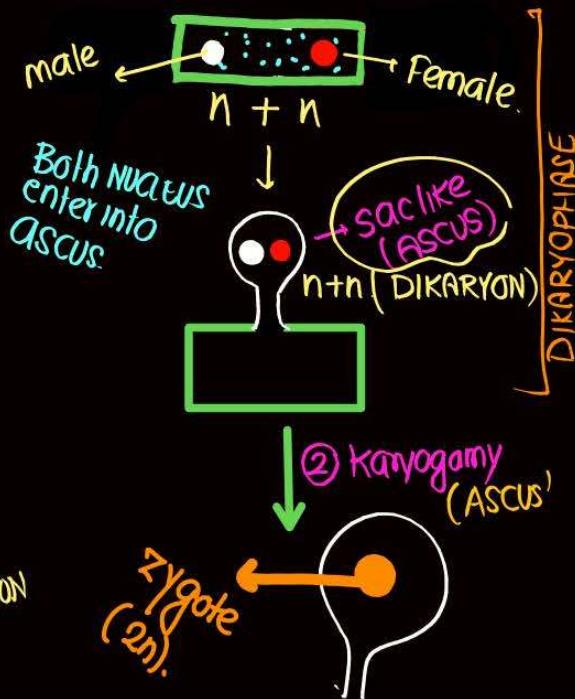
Plasmogamy
not immediately followed by karyogamy.

⇒ Male & female nucleus stay together BUT NOT FUSED: DIKARYON



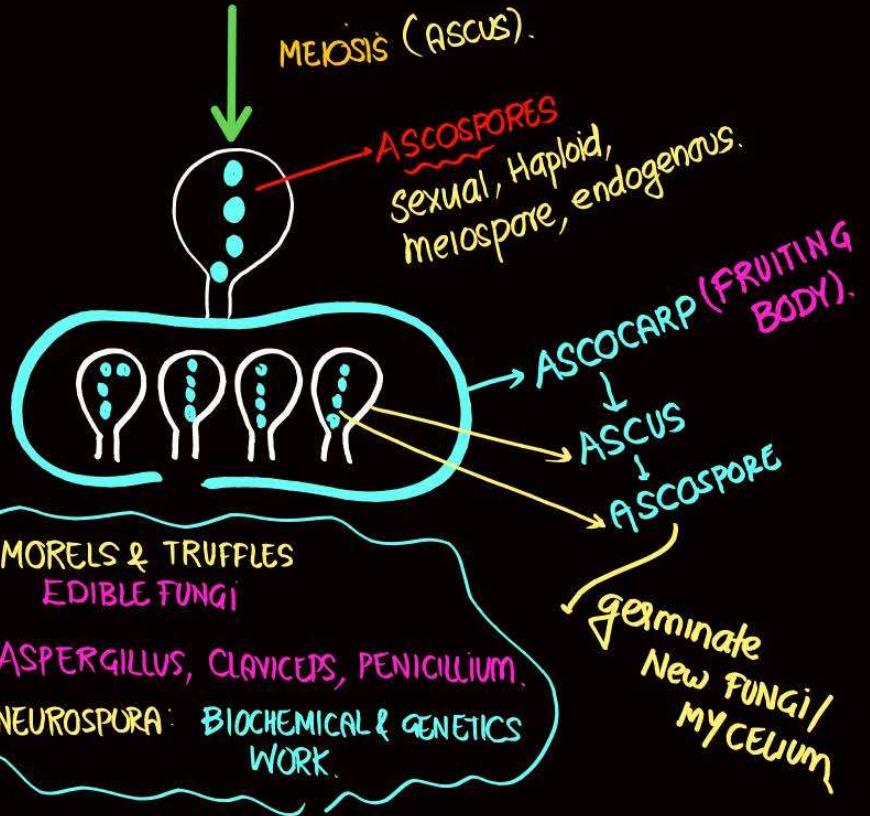
① PLASMOGAMY. (PROTOPLASM mix)

MALE & FEMALE HYPHAE: FUSED.

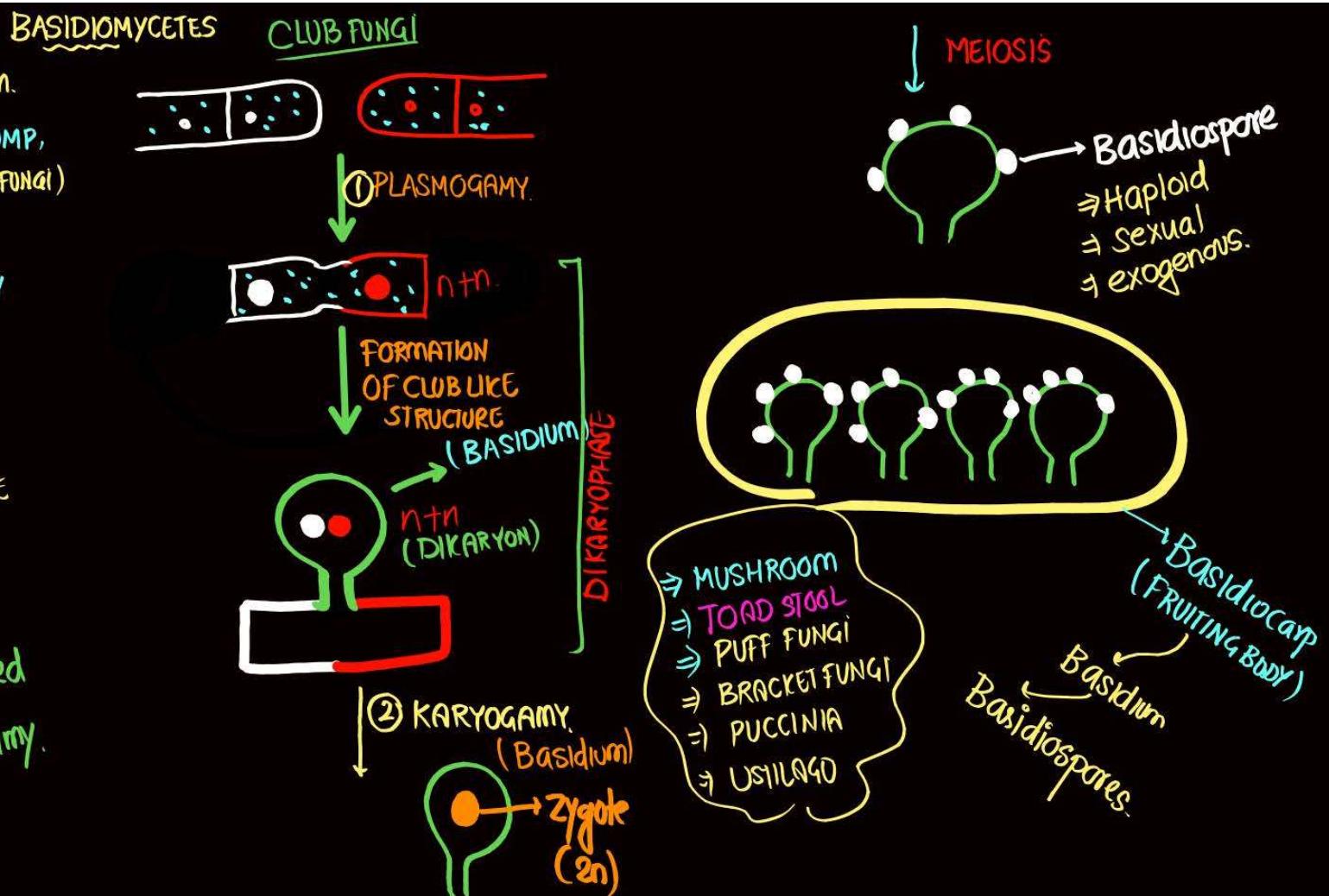


MEIOSIS (ASCUS).

ASCOSPORES
Sexual, Haploid,
meiospore, endogenous.



- * SEPTATE, BRANCHED MYCELIUM.
- * SOIL, LOGS OF WOOD, TREE STUMP, PARASITE (RUST FUNGI & SMUT FUNGI)
- * ASEXUAL SPORE: ABSENT
- * VEGETATIVE REPRODUCTION BY FRAGMENTATION IS MORE COMMON.
- * FUSION OF VEGETATIVE/ SOMATIC MYCELIUM/HYPHAE (PLASMOGAMY)
- * SEX ORGAN: ABSENT
Plasmogamy not immediately followed by Karyogamy.

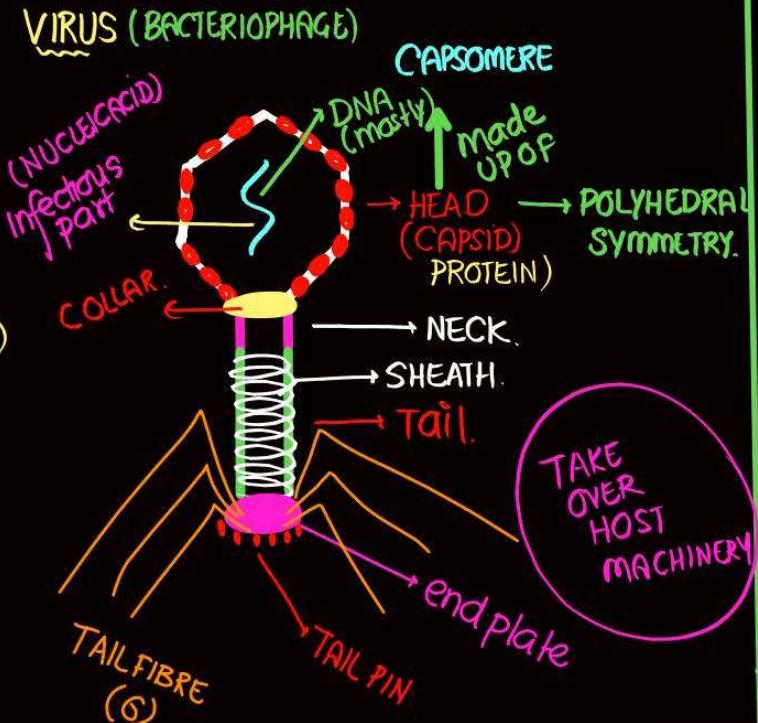


DEUTROMYCETES

- ⇒ Imperfect fungi
- ⇒ Sexual stage (perfect stage): ABSENT
- ⇒ Vegetative / Asexual Repⁿ: given one name
- ⇒ If sexual Repⁿ: Reported, that FUNGI
SHIFTED TO ASCOMYCETES / BASIDIOMYCETES
- ⇒ Mycelium: BRANCHED, SEPTATE
- ⇒ ASEXUAL: CONIDIA
- ⇒ Parasitic, saprophytic BUT
mostly decomposer of LITER. (FRESH
UNDECOMPOSED
PART)
Recycling of NUTRIENT

eg: *Alternaria*
Colletotrichum
Tochiderma

- ⇒ NON-CELLULAR
- ⇒ LINK B/W LIVING & NON LIVING
- ⇒ OBLIGATE INTRACELLULAR PARASITE (NEED HOST)
- ⇒ VENOM / POISONOUS FLUID.
- ⇒ genetic material / NUCLEIC ACID (either DNA/RNA)
- ⇒ BUT NEVER BOTH.
- ⇒ BACTERIOPHAGE: VIRUS INFECT BACTERIA, DS DNA (mostly)
- ⇒ NUCLEOPROTEIN: VIRUS.
- ⇒ Small pox, mumps, herpes, influenza, AIDS, etc.
- ⇒ CAPSID: HELIX: ARRANGE HELICAL SYMMETRY (TOBACCO MOSAIC VIRUS).

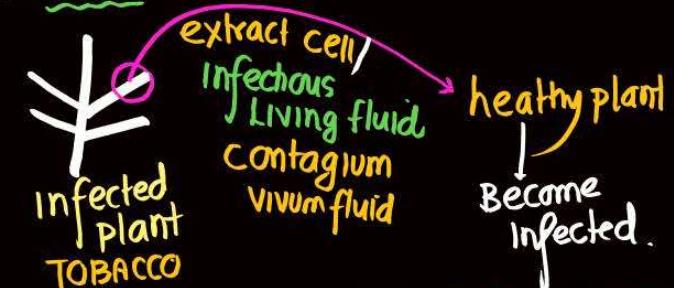


Plant virus: ssRNA
Animal virus: ssRNA/dsRNA / dsDNA
Bacteriophage: mostly dsDNA

VIRUS: OUTSIDE THE CELL: INERT / INACTIVE.

⇒ Ivanowsky: Term VIRUS / POISONOUS FLUID.
TOBACCO MOSAIC DISEASE CAUSED BY TOBACCO MOSAIC VIRUS.
VIRUS CAN CROSS BACTERIAL FILTER.
VIRUS SMALLER THAN BACTERIA.

⇒ BEIJERNEK.

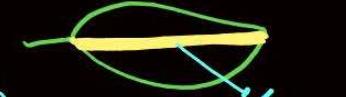


⇒ STANLEY: TMV: CRYSTALIZED: PROTEIN PRESENT

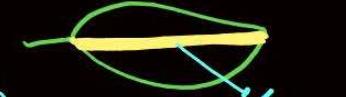
a) MOSAIC FORMATION:



b) vein clearing & yellowing



c) dwarfing & stunted growth

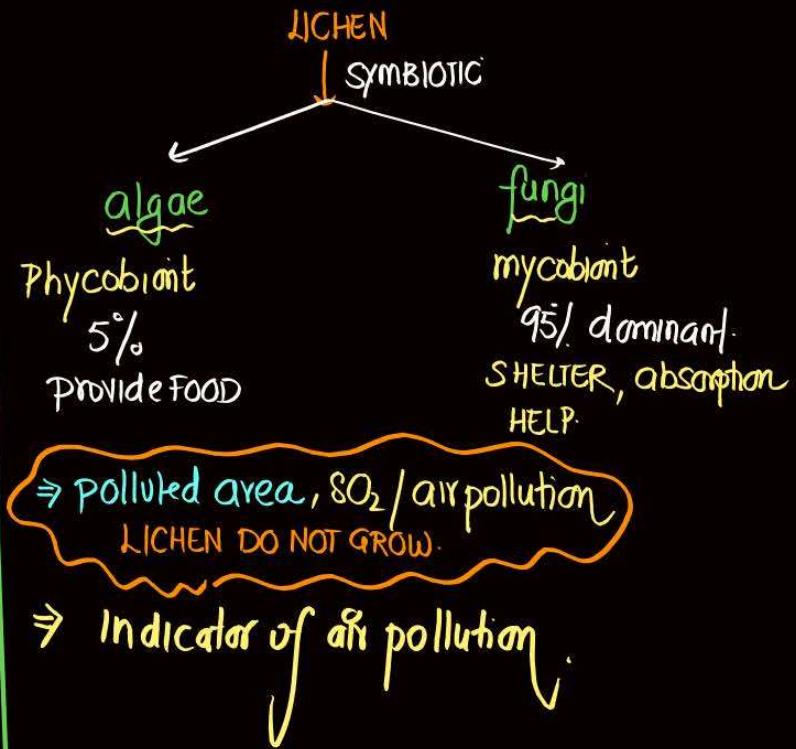


d) CURLING & ROLLING OF LEAF

⇒ NO PLACE FOR VIRUS, VIROID, PRIONS
↳ LICHEN IN FIVE KINGDOM CLASSIFICATION
(WHITTAKER)

VIROID → Infectious free RNA without PROTEIN COAT
⇒ DISEASE.
⇒ Smaller than virus
⇒ POTATO SPINDLE TUBER DISEASE IN PLANTS.

PRIONS
⇒ Abnormal FOLDED PROTEIN (INFECTIOUS)
⇒ SIZE SIMILAR TO VIRUS
⇒ NEURODEGENERATIVE DISORDER.
⇒ MAD COW DISEASE / Bovine Spongiform ENCEPHALOPATHY (BSE)
⇒ CREUTZ JACOB DISEASE (HUMAN)



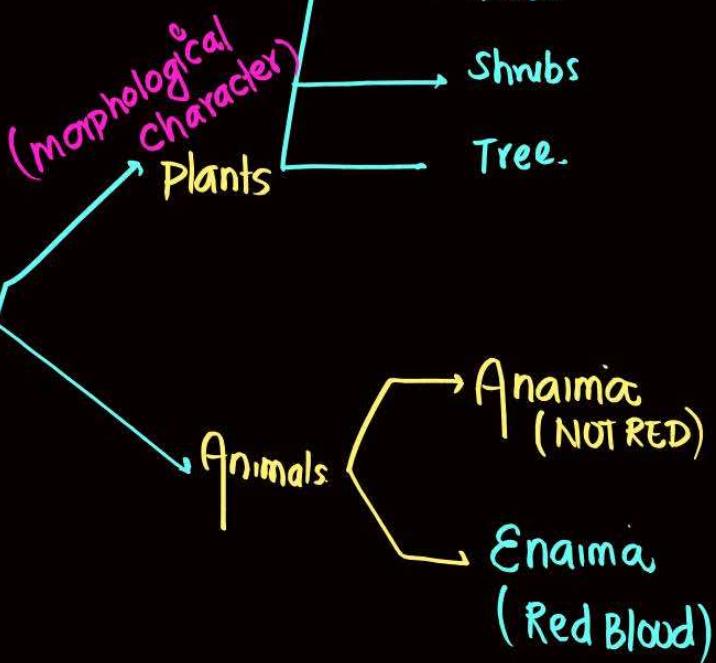
Classification

- ⇒ NEED: FOOD, SHELTER, CLOTHES
- ⇒ EARLIEST: BASED ON ECONOMIC IMPORTANCE.

BUT

1st classification: Scientific approach
(Aristotle)

Living organism



✓ PLANTAE : CELL WALL ✓

(SPIROGYRA).

- PLANTS:
- ⇒ ALGAE : EU, AUTO, MULTICELLULAR BUT
 - ⇒ BRYO/MOSS : E, AUTO, MULTI.
 - ⇒ PTER/FERN : E, AUTO, MULT
 - ⇒ GYMMNO : E, AUTO, MULTI
 - ⇒ ANGIO : E, AUTO, MULT
 - ⇒ BACTERIA : Pro, Hetero(mostly), Unicell
 - ⇒ FUNGI : EU, Hetero, Mostly multi.

(2K) : LINNAEUS.

PRESENCE /
ABSENCE
OF CELL
WALL.

CHLORELLA &
CHLAMYDOMONAS
(UNICELLULAR)

CHITIN

Not sufficient
(inadequate)

easy to
classify

DRAWBACK

- * Placed protk eukaryote in same kingdom.
→ CELLULOSE
- * AUTOTROPHS (PLANT) & HETROTROPHS (Fungi) → SAME KINGDOM: PLANTAE
ALTHOUGH DIFFER IN CELL WALL COMPOSITION.
- * PLACED MULTICELLULAR (SPIROGYRA) & UNICELLULAR (Chlorella & Chlamydomonas)
- * Few can fit either of two categories:
 - Euglena
 - Cell wall absent (animal character)
 - Photosynthesis (Plant character)

As time pass: REALIST
CRITERIA INCREASE

- ✓ Cell structure
- ✓ Cell wall composition
- ✓ Habitat
- ✓ Reproduction
- ✓ Evolutionary HISTORY / Phylogeny
- ⇒ NUTRITION

3K
Haeckel.

PLANTAE

ANIMALIA

PROTISTA:

Chlorella,
Chlamydomonas
2 protozoa
(Amoeba,
paramecium)

Placed Together.
UNICELLULAR
EUKARYOTES

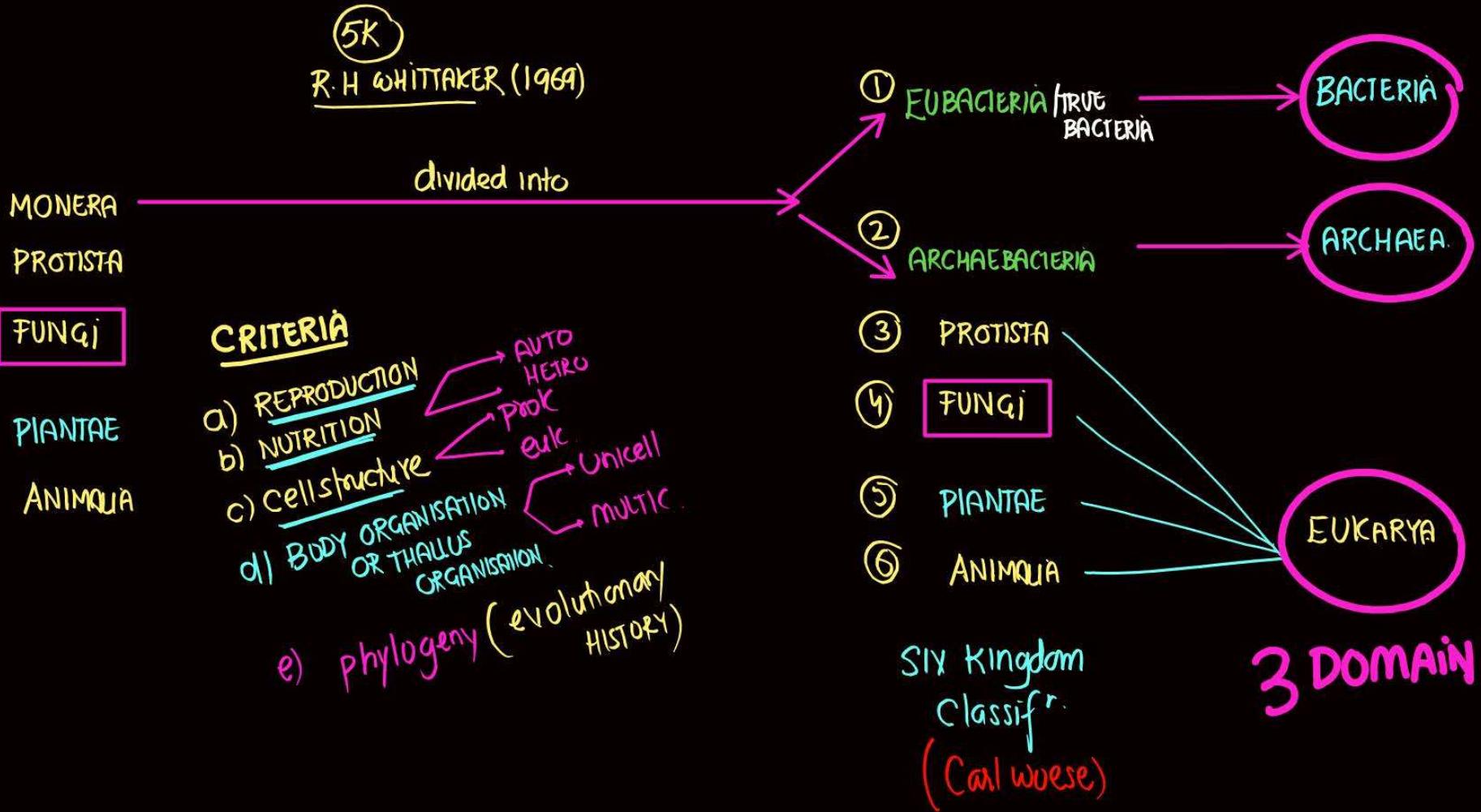
4K
Copeland.

PLANTAE

ANIMALIA

PROTISTA:

MONERA:
Bacteria, BGA,
Archaeabacteria
etc.



QUESTION



Which one of the following is not a criterion for classification of fungi?

(2024)

- 1 Mode of spore formation C
- 2 Fruiting body C
- 3 Morphology of mycelium C
- 4 Mode of nutrition

4

QUESTION

(2024)

Match List-I with List-II.

Choose the correct answer from the options given below:

- 1** A-(III), B-(II), C-(I), D-(IV)
- 2** A-(IV), B-(III), C-(II), D-(I)
- 3** A-(III), B-(II), C-(IV), D-(I)
- 4** A-(I), B-(III), C-(II), D-(IV)

	List-I		List-II
(A)	<i>Rhizopus</i>	(I)	Mushroom
(B)	<i>Ustilago</i>	(II)	Smut fungus
(C)	<i>Puccinia</i>	(III)	Bread mould
(D)	<i>Agaricus</i>	(IV)	Rust fungus

QUESTION

Match List-I with List-II.

(2022)

Choose the correct answer from the option given below:

- 1** A-III; B-II; C-IV; D-I
- 2** A-III; B-IV; C-II D-I
- 3** A-I; B-II; C-III; D-IV
- 4** A-IV; B-II; C-I; D-III

List-I	List-II
(A) <i>Puccinia</i>	(I) Parasitic fungus on mustard
(B) <i>Neurospora</i>	(II) Dead substrates
(C) Saprophytes	(III) Wheat rust
(D) <i>Albugo</i>	(IV) Biochemical and Genetic Work

QUESTION



Given below are two statements:

Statement-I: Mycoplasma can pass through less than 1 micron filter size. C

Statement-II: Mycoplasma are bacteria with cell wall. without. X

In the light of the above statements, choose the most appropriate answer from the options given below (2022)

- 1 Statement-I is incorrect but Statement-II are correct
- 2 Both Statement-I and Statement-II are correct
- 3 Both Statement-I and Statement-II are incorrect
- 4 Statement-I is correct but Statement-II is incorrect

QUESTION



(2022)

Which of the following is a correct statement?

- 1 Mycoplasma have DNA, ribosome and cell wall.
- 2 Cyanobacteria are a group of autotrophic organisms classified under kingdom Monera
- 3 Bacteria are ~~exclusively~~ mostly heterotrophic organisms , ~~AHL~~
- 4 Slime moulds are saprophytic organisms classified under Kingdom ~~Monera~~ PROTISTA.

QUESTION



(2022)

Identify the asexual reproductive structure associated with *Penicillium*:

- 1 Gemmules
- 2 Buds
- 3 Zoospores
- 4 Conidia

ascomycetes.

asexual

QUESTION



Mad cow disease in cattle and Cr Jacob disease in humans are due to infection by:

(2022 phase -2)

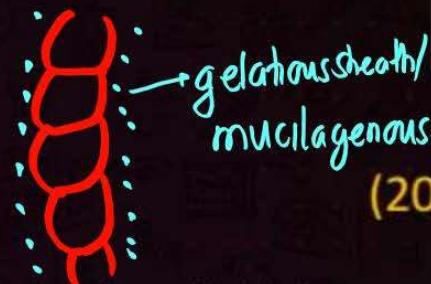
- 1** Prion ✓
- 2** Bacterium
- 3** Virus
- 4** Viroid

QUESTION

Which of the following statements is correct?



(2021)



- 1 Fusion of protoplasms between two motile or non-motile gametes is called plasmogamy.
- 2 Organisms that depend on ~~living plants~~ ^{dead.} are called saprophytes.
- 3 Some of the organisms can fix atmospheric nitrogen in specialized cells called ~~sheath~~ ^{Heterocyst} cells.
- 4 Fusion of two ~~cells~~ ^{NUCLEUS.} is called Karyogamy.

QUESTION



(2020)

Which of the following is correct about viroids?

- 1** They have free RNA without protein coat.
- 2** They have DNA with protein coat.
- 3** They have free DNA without protein coat.
- 4** They have RNA with protein coat.

QUESTION



Which of the following is incorrect about Cyanobacteria?

(2020 Covid)

- 1 They lack heterocysts *have*
- 2 They often form blooms in polluted water bodies C
- 3 They have chlorophyll 'a' similar to green plants C
- 4 They are photoautotrophs C

QUESTION



Which of the following statements is incorrect?

(2019)

- 1 Viroids lack a protein coat. C

- 2 Viruses are obligate parasites. C

- 3 Infective constituent in viruses is the ~~protein coat~~ nucleic acid. ✓

- 4 Prions consist of abnormally folded proteins. C

QUESTION



(2019)

Which of the following statements is incorrect?

- 1 Morels and truffles are edible delicacies. C
- 2 *Claviceps* is a source of many alkaloids and LSD. C
- 3 Conidia are produced exogenously and ascospores endogenously. C
- 4 Yeasts have filamentous bodies with long thread-like hyphae.
(Unicellular)

QUESTION



Mad cow disease in cattle is caused by an organism which has:

(2019 odisha)

- 1** inert crystalline.
- 2** abnormally folded protein.
- 3** free RNA without protein coat.
- 4** free DNA without protein coat.

PRIONS

QUESTION



Which of the following statements is correct? ~~not grow in polluted areas.~~ (2019 odisha)

- 1 Lichens do not grow in polluted areas.
- 2 Algal component of lichens is called ~~mycobiont~~ ^{Phycobiont}
- 3 Fungal component of lichens is called ~~phycobiont~~ ^{Mycobiont}
- 4 Lichens are ~~not~~ good pollution indicators.

QUESTION

Match the organisms in List-I with habitats in List-II.

(2019 odisha)

Select the correct answer from the options given below:

- 1** A-S, B-P, C-R, D-Q
- 2** A-P, B-Q, C-R, D-S
- 3** A-R, B-S, C-P, D-P
- 4** A-Q, B-S, C-R, D-P

	List-I		List-II
A.	Halophiles	P.	Hot springs
B.	Thermoacidophiles	Q.	Aquatic environment
C.	Methanogens	R.	Guts of ruminants
D.	Cyanobacteria	S.	Salty areas

QUESTION



Which of the following statements about methanogens is not correct? (2019 odisha)

- 1 They can be used to produce biogas. C

- 2 They are found in the rumen of cattle and their excreta. C

- 3 They grow ~~aerobically~~^{anaerobically} and breakdown cellulose-rich food.

- 4 They produce methane gas. C

QUESTION



(2018)

Select the wrong statement.

- 1 Cell wall is present in members of Fungi and Plantae C
- 2 Mushrooms belong to Basidiomycetes C
- 3 Pseudopodia are locomotory and feeding structures in Sporozoans *ameeboid protozoan.*
- 4 Mitochondria are the powerhouse of the cell in all kingdoms except Monera

QUESTION



After karyogamy followed by meiosis, spores are produced exogenously in; (2018)

- 1 *Neurospora* (Ascosp.)
- 2 *Alternaria* (D)
- 3 *Agaricus*
- 4 *Saccharomyces* (ascospores)
yeast

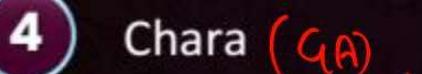
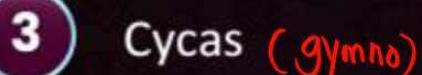
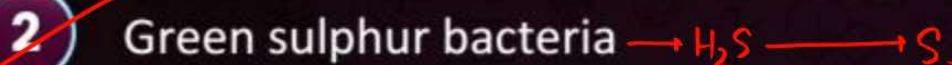
Basidiospores

QUESTION



(2018)

Oxygen is not produced during photosynthesis by;



QUESTION



Which of the following organisms are known as chief producers in the oceans? (2018)

- 1** Dinoflagellates
- 2** Diatoms
- 3** Cyanobacteria
- 4** Euglenoids

QUESTION



(2018)

Ciliates differ from all other protozoans in;
Paramecium

- 1 Using flagella for locomotion
- 2 Having a contractile vacuole for removing excess water
- 3 Using pseudopodia for capturing prey
- 4 Having two types of nuclei

*DIMORPHIC
NUCLEUS*

QUESTION



Which of the following are found in extreme saline conditions?

(2017-Delhi)

- 1** Archaeabacteria
- 2** Eubacteria
- 3** Cyanobacteria
- 4** Mycobacteria

QUESTION



Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen? (2017-Delhi)

- 1 *Bacillus*
- 2 *Pseudomonas*
- 3 *Mycoplasma*
- 4 *Nostoc*

QUESTION



Viroids differ from viruses in having:

(2017-Delhi)

- 1** DNA molecules with protein coat
- 2** DNA molecules without protein coat
- 3** RNA molecules with protein coat
- 4** RNA molecules without protein coat

QUESTION



An example of flagellate protozoan is:

(2017-Gujarat)

- 1** *Paramoecium*
- 2** *Trypanosoma*
- 3** *Entamoeba*
- 4** *Plasmodium*

QUESTION



Which of the following is not true of organisms in the kingdom Monera? (2017-Gujarat)

- 1 They originated at least 3.5 billion years ago
- 2 They have prokaryotic cellular organisation
- 3 They may be autotrophic or heterotrophic in nature
- 4 They reproduce by mitosis

mitosis

QUESTION



Select the sac fungus: (Ascomycetes)

(2017-Gujarat)

- 1** *Albugo* (P)
- 2** *Agaricus* (B)
- 3** *Neurospora* (R) ✓
- 4** *Mucor* (P)

QUESTION



The protein coat around a virus is called:

(2017-Gujarat)

- 1** Capsule
- 2** Core
- 3** Capsid ✓
- 4** Trichome

QUESTION



Select the wrong statement:

(2016-II)

- 1 *Diatoms* are chief producers in the oceans C
- 2 *Diatoms* are microscopic and float passively in water C
- 3 The walls of diatoms are easily ~~destructible~~^{Indestructible} ✓
- 4 'Diatomaceous earth' is formed by the cell wall of diatoms. C

QUESTION



(2016-II)

Methanogens belong to:

- 1** Dinoflagellates
- 2** Slime moulds
- 3** Eubacteria
- 4** Archaebacteria



QUESTION



Which one of the following is wrong for fungi?

(2016-II)

- 1 They are heterotrophic C
- 2 They are both unicellular and multicellular C
- 3 They are eukaryotic C
- 4 All fungi possess a purely ~~cellulosic~~ cell wall ✓

chitin

QUESTION

The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the: (2016-I)

- 1** Halophiles
- 2** Thermoacidophiles
- 3** Methanogens
- 4** Eubacteria

QUESTION



Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom:

(2016-I)

- 1** Animalia
- 2** Monera
- 3** Protista
- 4** Fungi

QUESTION



(2016-I)

Which one of the following statements is wrong?

- 1 Cyanobacteria are also called blue-green algae C
- 2 Golden algae are also called desmids C
- 3 Eubacteria are also called ~~false~~^{TRUE} bacteria
- 4 Phycomycetes are also called algal fungi C

QUESTION



One of the major components of cell wall of most fungi is:

(2016-I)

- 1** Chitin ✓
- 2** Peptidoglycan
- 3** Cellulose
- 4** Hemicellulose

QUESTION



Which of the following statements is wrong for viroids?

(2016-I)

- 1 They lack a protein coat C
- 2 They are smaller than viruses C
- 3 They causes infections C
- 4 Their RNA is of ~~high~~ low molecular weight ✓