

A NUCLEUS

26

- Double membrane Bound Structure.
- one or more Nucleoli/Nucleolus present in matrix of nucleus.
- Nucleolus - single membranous.
- Perinuclear Space - nucleus की दोनों membrane के बीच का space.

(Help in - RNA, protein के cytoplasm से Nucleoplasm में आना)

- Normally $\left\{ \begin{array}{l} \text{Only one Nucleus per cell} \\ \text{but} \end{array} \right.$

- Liquid Endosperm of coconut

(more than one nucleus)

- *** - RBC & Sieve tube cell - Nucleus ab[⊖]

Nucleolus - r-RNA formation.

During Cell Division

Interphase में Nucleus में - Chromatin p[⊕]

Chromatin में - DNA, Histone & Non-Histone protein

In Chromosome - Primary constriction (Centromere)

Kinetochores $\left\{ \begin{array}{l} \text{Disc like structure} \\ \text{present on Centromere} \end{array} \right.$

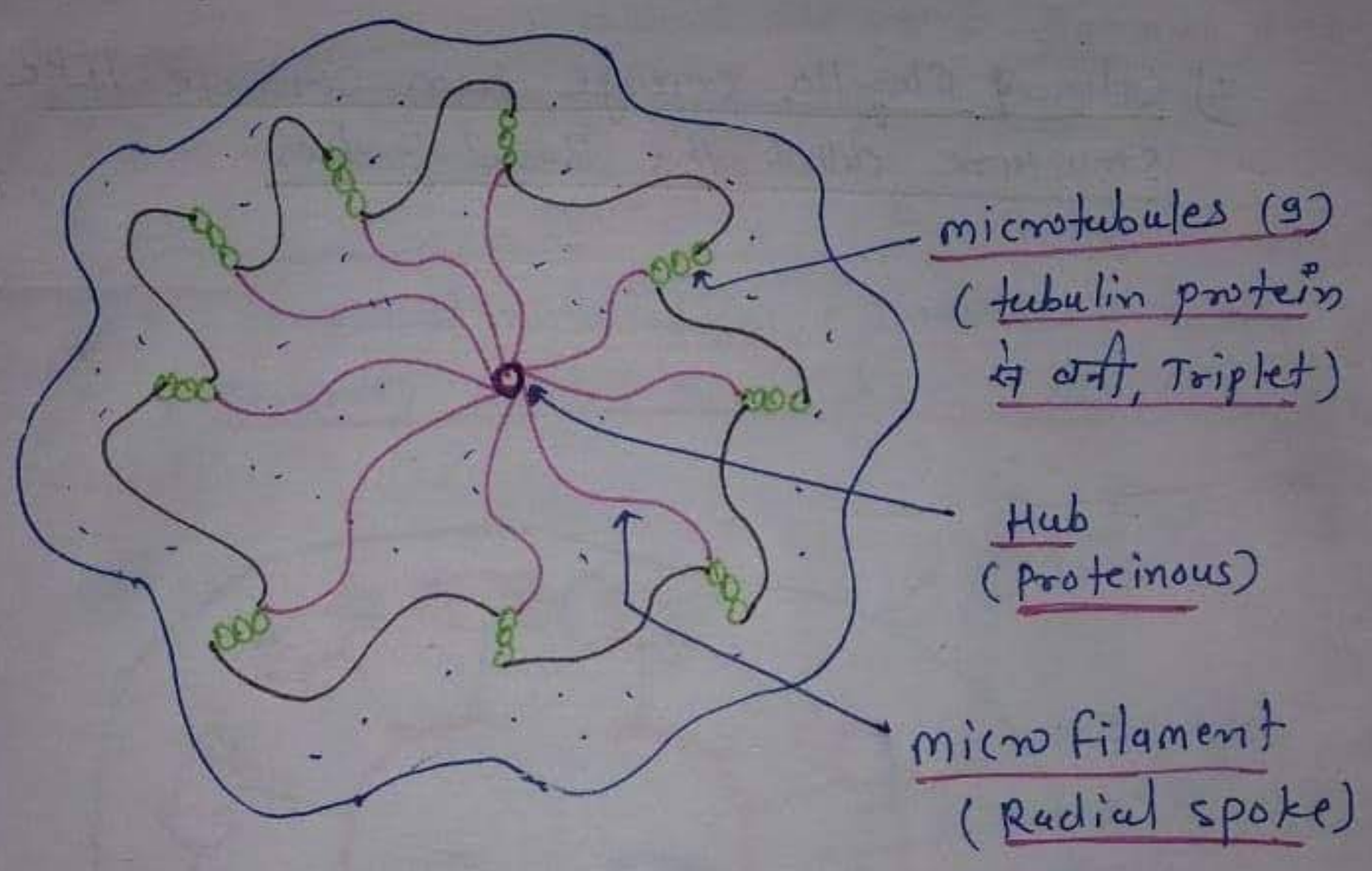
present on Centromere

Centrosome & Centrioles :-

Cart wheel like structure.

Centrosome -

contain = two cylindrical structures called centrioles. (Peripheral to each other)



- Centriole - Cilia & Flagella are Basal Body.

- Spindle fibres that give rise to spindle apparatus during cell Division in animal cells.

* Cilia & Flagella :-

Hair-like outgrowths of the cell membrane.

Cilia - small, Flagella - longer

*** Responsible for cell movement.

Covered with plasma membrane.

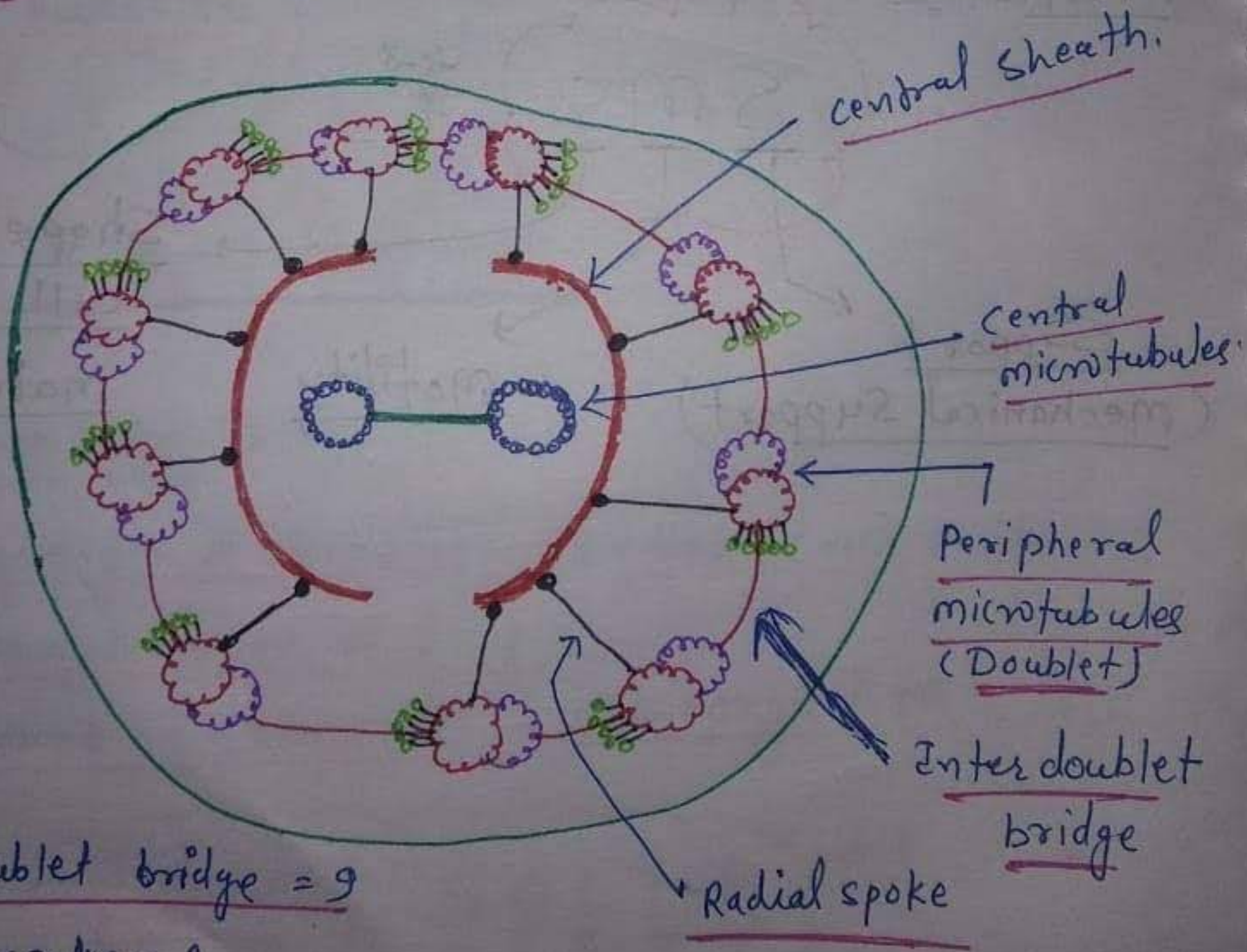
core - Axoneme. ***

↳ microtubules से बना होता है - Parallel to long axis.

*** 9 + 2 arrangement Imp

9 = peripheral microtubules (Doublet)

2 = centrally located microtubules (Paired)



Inter doublet bridge = 9

Radial spoke = 9

Inter singlet bridge = 1

Ribosome :-

(22)

RNA + Protein = Ribosome

Function = Site of Protein Synthesis

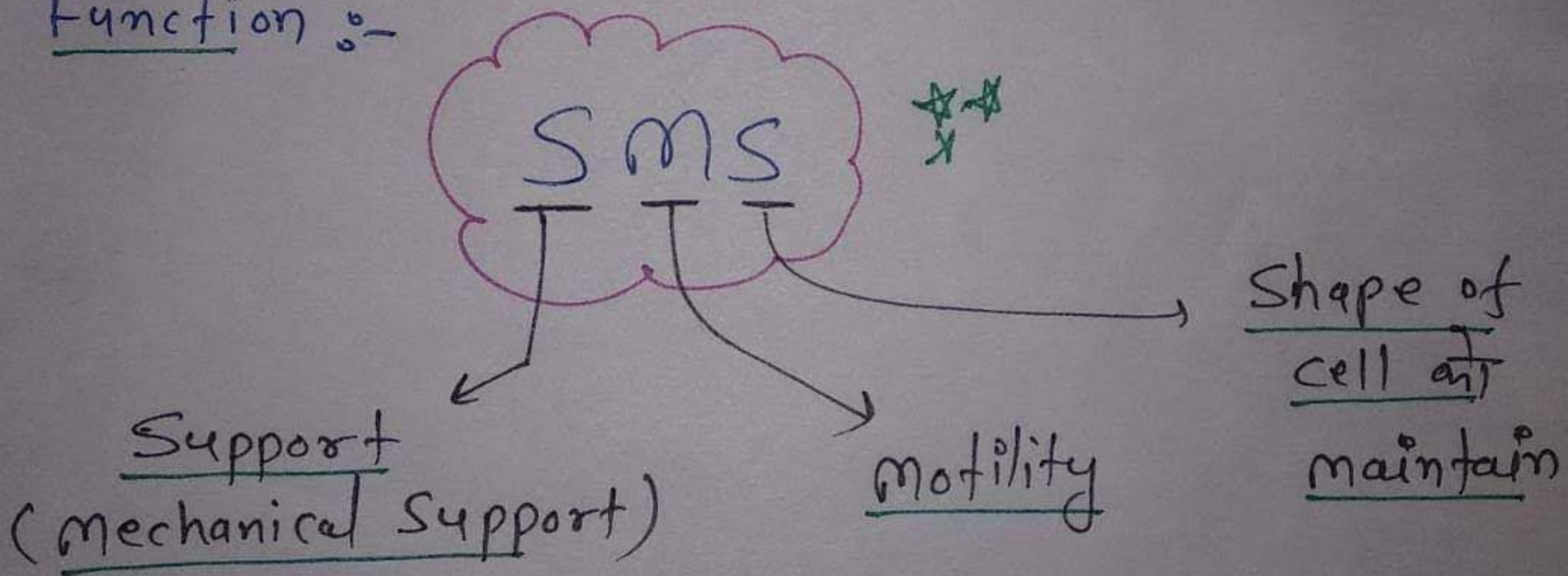
Eukaryotic Ribosome = 80S $\xrightarrow{\text{Subunit}}$ 60S + 40S

Cytoskeleton :-

Network of filament

microtubules & microfilament present in cytoplasm.
- Sm. (proteomaceous) ✨

Function :-



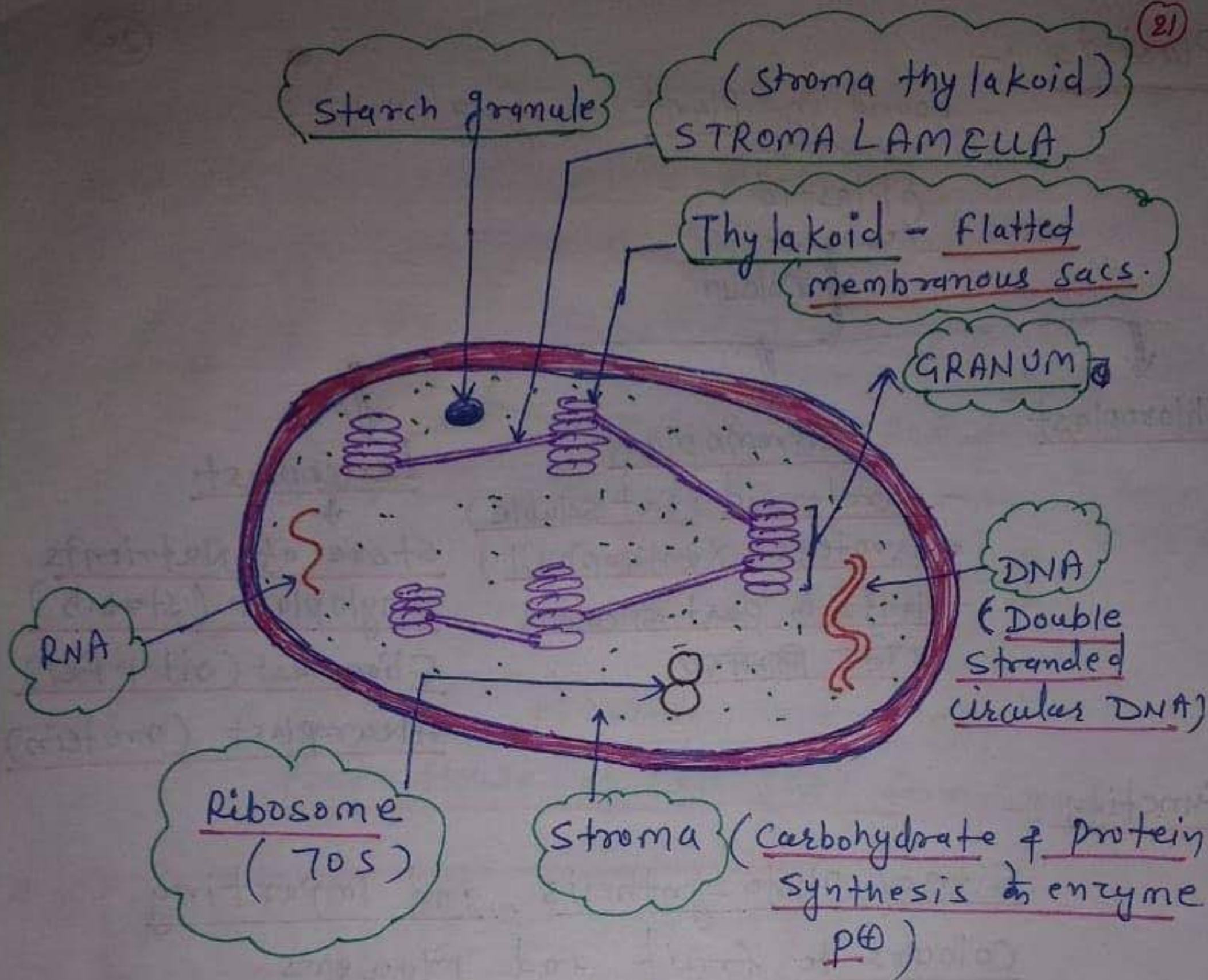
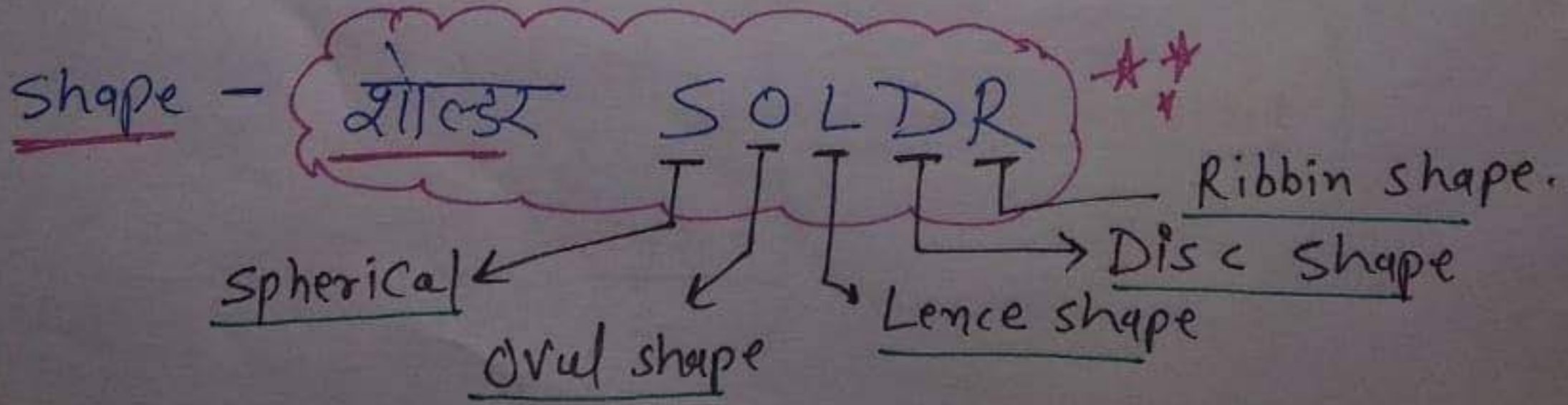


Figure - Chloroplast

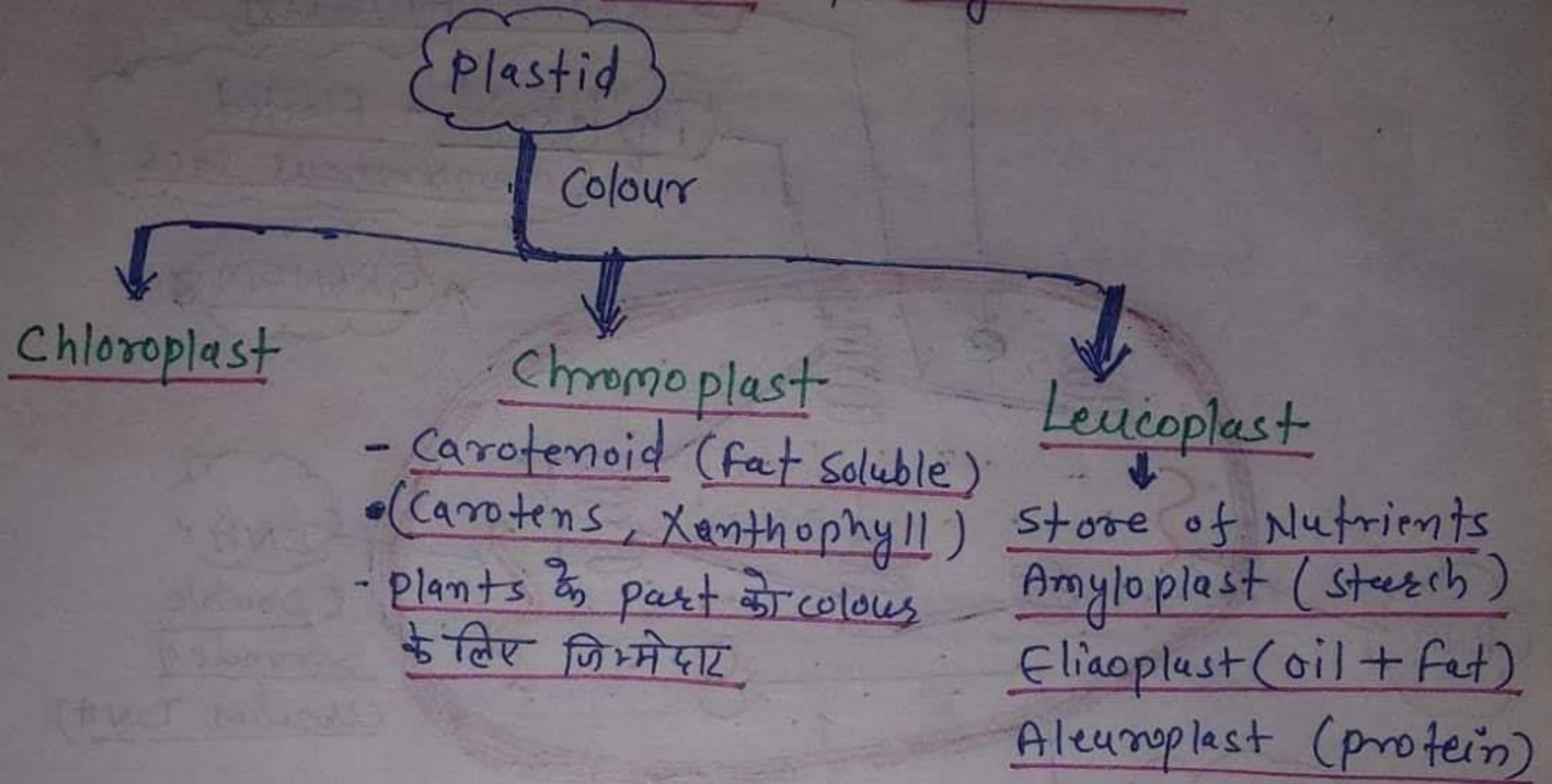
important point :-

- mesophyll में present (20-40 / cell) + mostly
- chlamydomonas में - 1
- Pigment of chloroplast - chlorophyll (p^+ in thylakoid)



Plastids :-

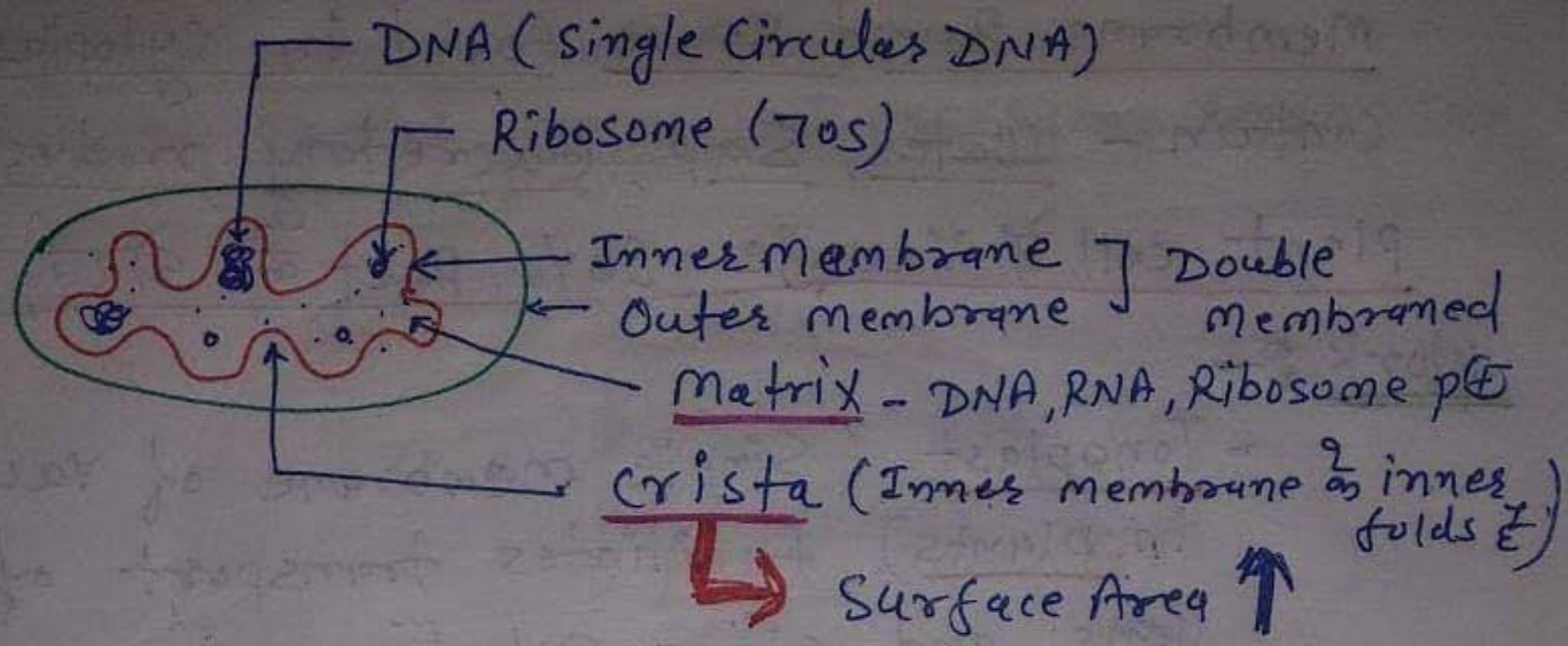
Found in Plant & Euglenoides.



Function :-

Site of photosynthesis, and imparting colours to fruit and flowers.

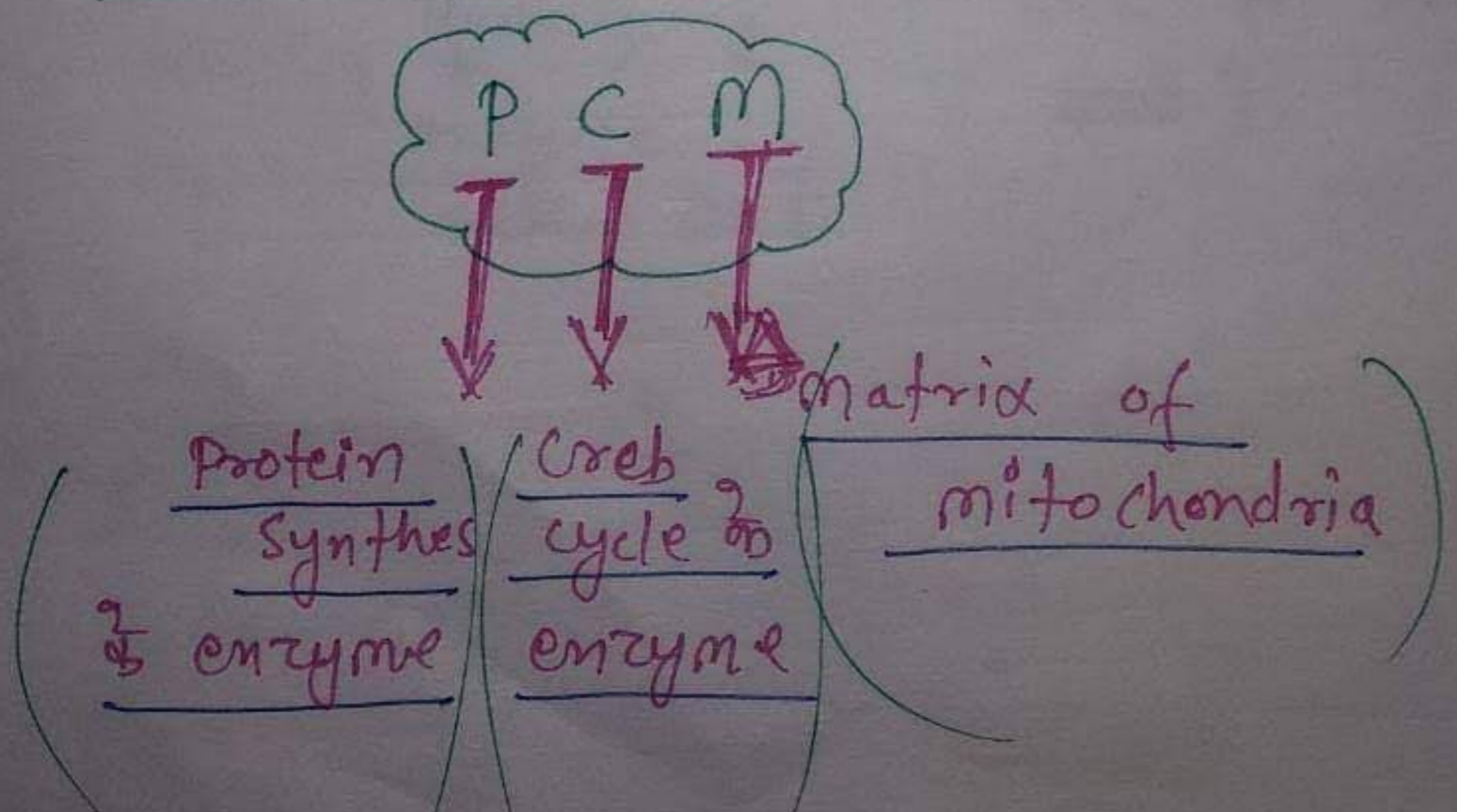
Mitochondria :- (Power House of cell)



- Function -
- Site of "Aerobic Respiration"
 - Power House of Cell (atp formation)

*** Divides by Binary fission

- Creb cycle & Protein Synthesis as enzyme matrix में present.



Vacuole :-

Membrane Bound Space found in cytoplasm.

Contain - Water, Sap, Excretory product.

Plant cell में Vacuole 90% part को घेरती है

Work :-

- Tonoplast (Single membrane of vacuole in plants) facilitates transport of ions and other substances.

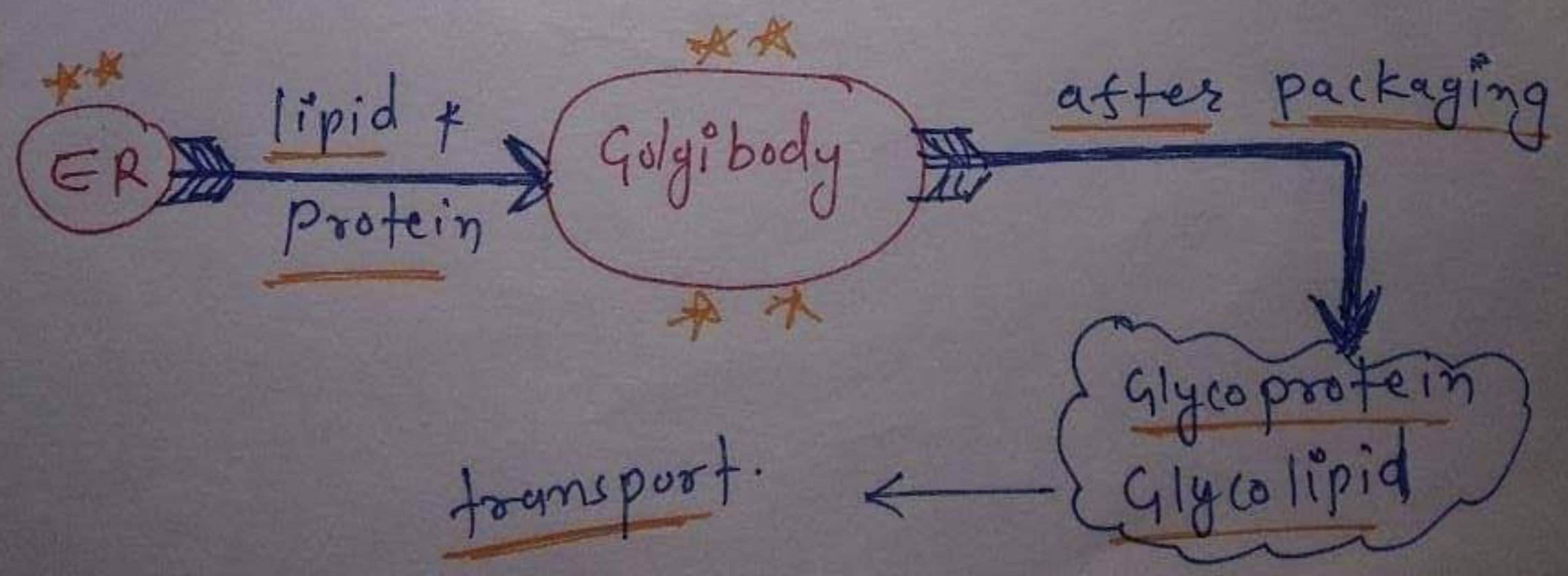
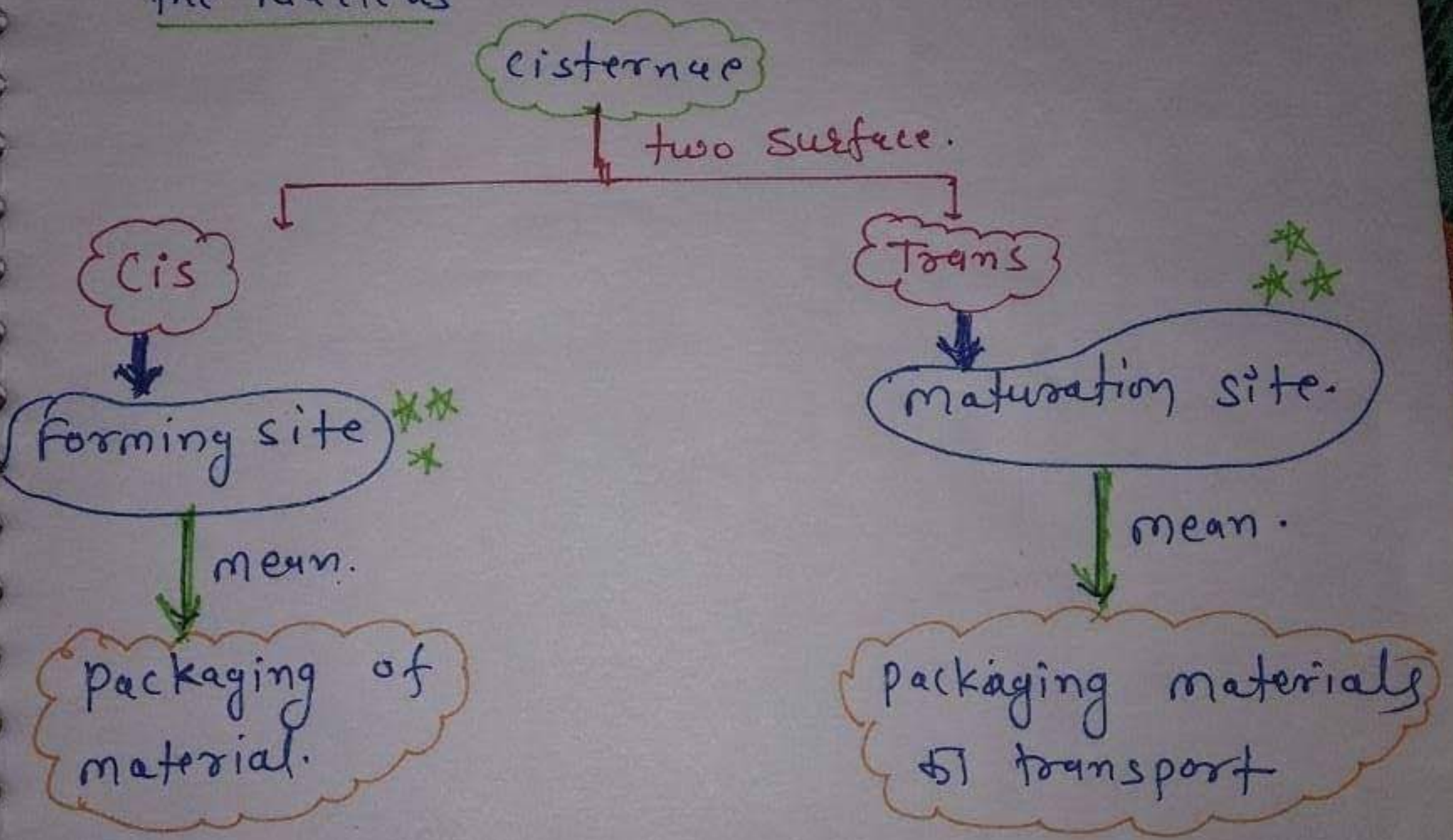
- Contractile Vacuole for excretion in Amoeba

- Food vacuoles formed in protists for digestion of food.

Golgi Apparatus / Golgi Body :-

"Camillo Golgi first observed densely stained Reticular structures near the nucleus in Nervous cell."

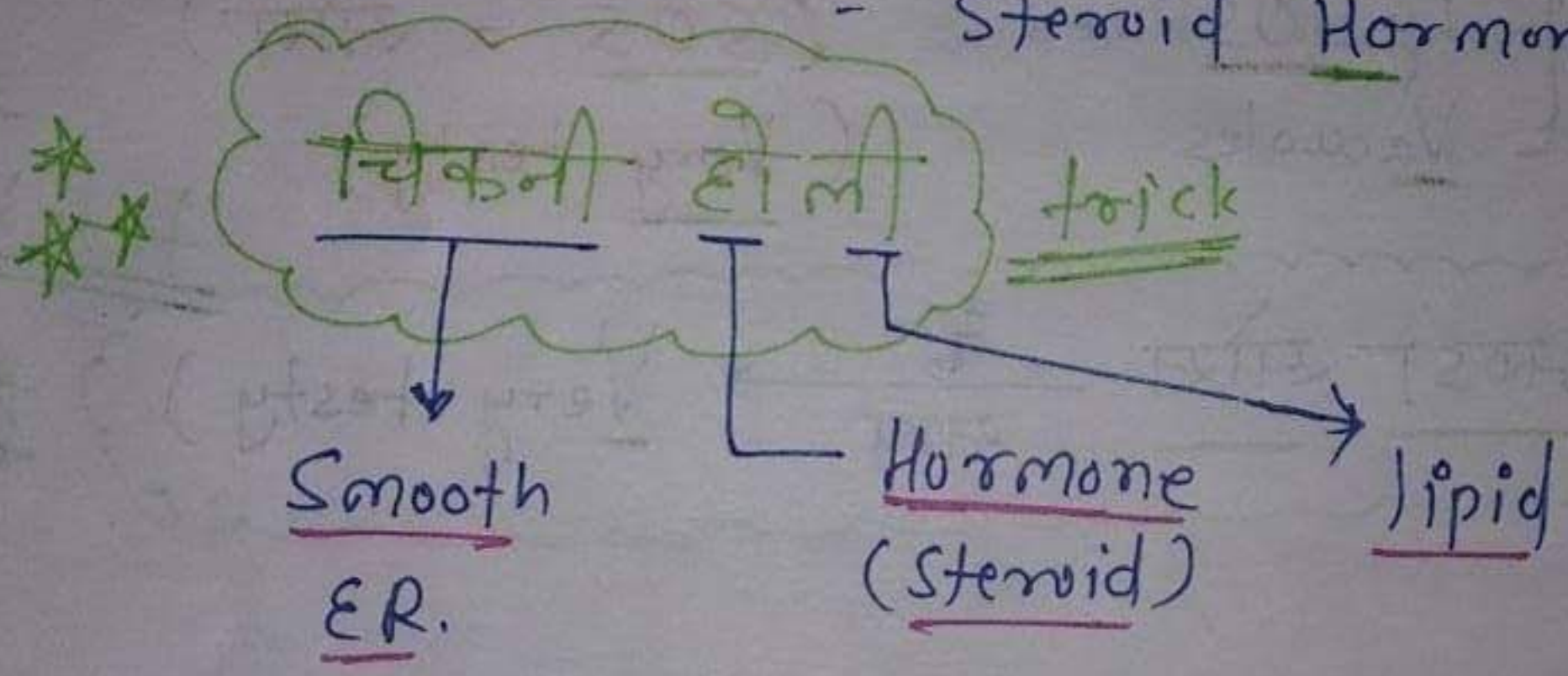
- Consist of many Cisternae
- Cisternae stacked parallel to each other.
- Cisternae are concentrically arranged near the nucleus



Endoplasmic Reticulum (ER) :-

- Network or Reticulum of tiny tubular structures scattered in the cytoplasm.

- ER
 - Rough Endoplasmic Reticulum (RER)
 - Ribosome $p(+)$
 - work - protein synthesis & secretion
 - Smooth Endoplasmic Reticulum (SER)
 - Ribosome $ab(-)$
 - work :- lipid synthesis
 - Steroid Hormone synthesis.



RER - extensive and continuous with the Outer membrane of the nucleus.

important point for cell wall :-

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The cell wall of a young plant cell, the primary wall is capable of growth, which gradually diminishes as the cell matures and the secondary wall is formed on the inner (towards membrane) side of the cell.

The middle lamella is a layer mainly of calcium pectate which holds or glues the different neighbouring cells together. The cell wall and middle lamellae may be traversed by plasmodesmata which connect the cytoplasm of neighbouring cells.

Endomembrane System :-

include -

- functions are coordinated
- Golgi - Complex (Gol = गोल)
 - Endoplasmic Reticulum (Endo = अण्डा)
 - Lysosomes (SOS = सोस)
 - Vacuoles (Very testy)

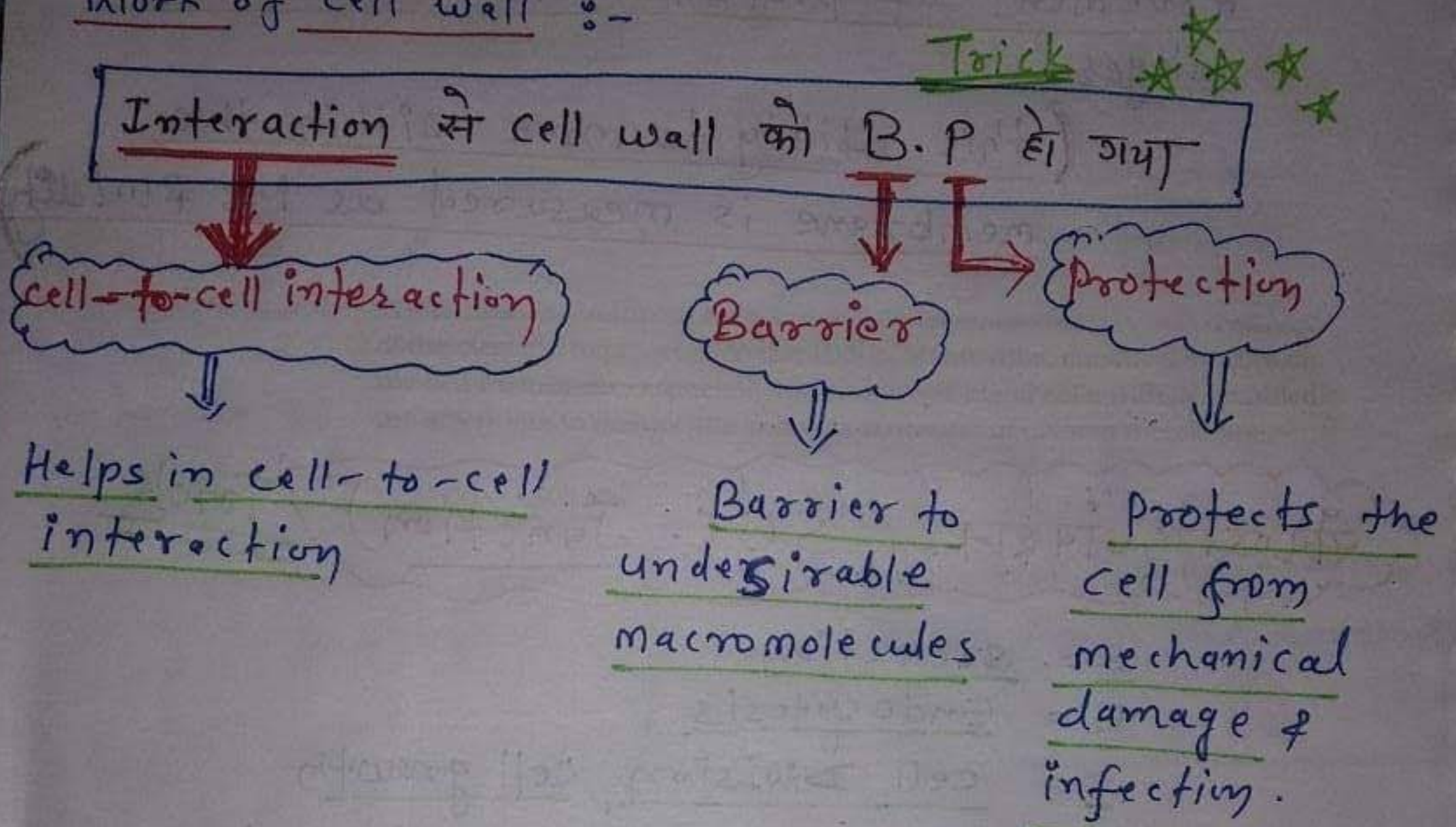
trick ★★

गोल अण्डा सोस $\xrightarrow{\text{साथ}}$ Very testy ★★

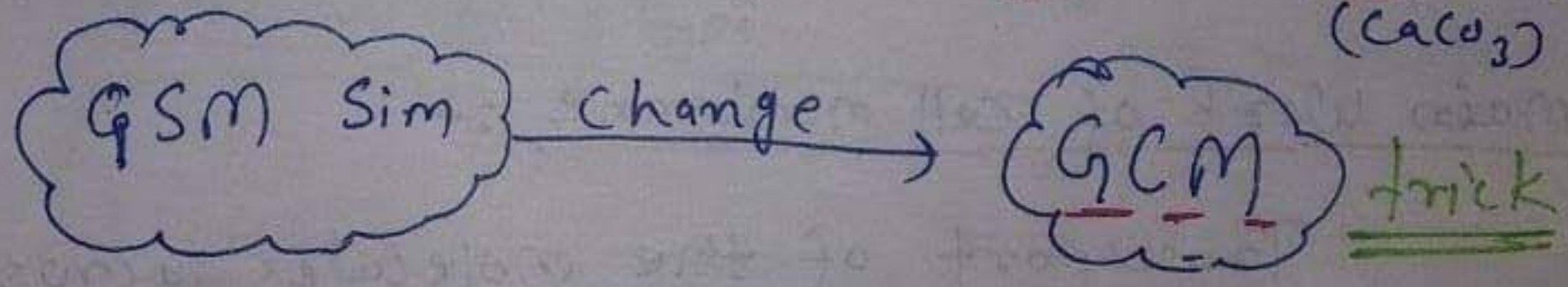
Cell wall :-

- Non-living Rigid structure
- Outer covering for the plasma membrane of fungi & plant

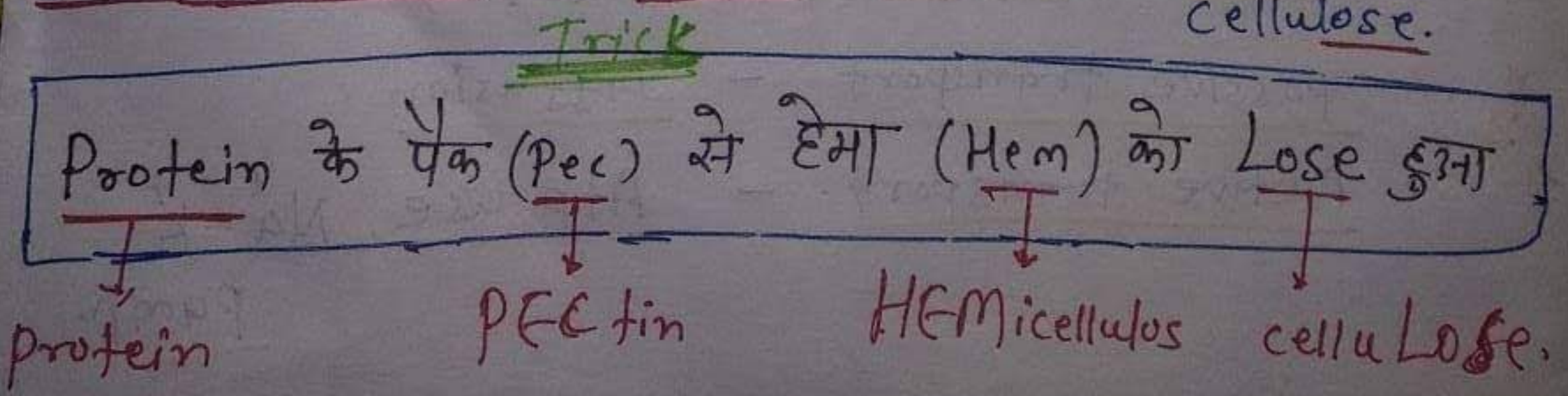
Work of cell wall :-



Algae cell wall :- Galactans, cellulose, mannans, minerals (CaCO₃)



plant cell wall :- Protein, Pectin, Hemicellulose, cellulose.



Fluid mosaic model :-

- Given by "Singer & Nicolson" (1972)
- "Quasi-fluid nature of lipid enables lateral movement of proteins within the overall bilayer".

(this ability to move within the membrane is measured as its fluidity)

The fluid nature of the membrane is also important from the point of view of functions like cell growth, formation of intercellular junctions, secretion, endocytosis, cell division etc.

सैकंडरी जंक्शन (SEC Junction)

Toick

S = Secretion

E = Endocytosis

C = cell Division, cell growth

Junction = Junction between two cells (intercellular Junction)

main work of cell membrane :-

Transport of the molecules across it.

(∴ selectively permeable to some molecules present on either side of it.)

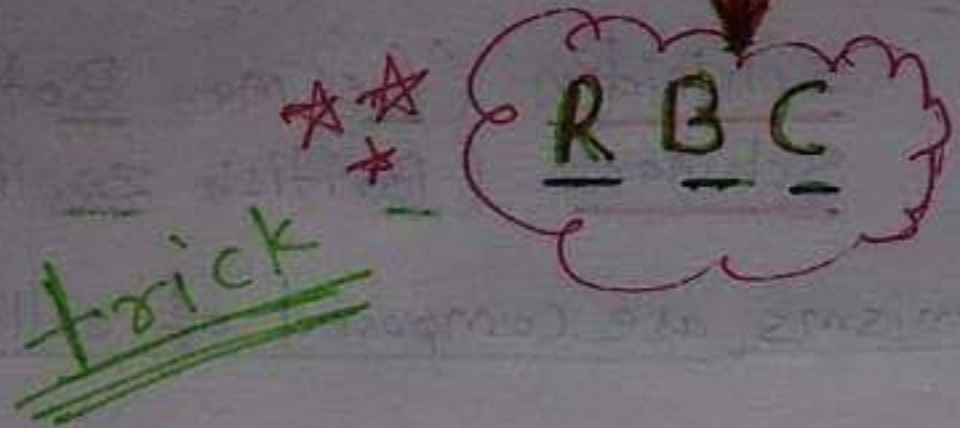
passive transport - Diffusion

Active transport - Atp use, Na⁺ - k⁺ pump.



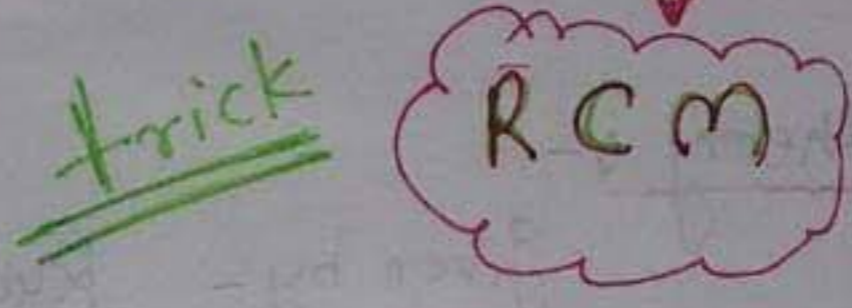
Virus - Cell theory Not apply.

Ribosome
Basal Body
Centriole } → cell membrane absent



R = Ribosome
B = Basal Body
C = centriole.

Rough Endoplasmic Reticulum
Chloroplast
Cytoplasm
mitochondria } → Ribosome present



RCM india
की एक famous
कम्पनी है

- ⑤ Smallest cell - Mycoplasma (M)
- ⑥ Biggest Cell - Ostrich (O)
- ④ Longest cell - Neuron (N)

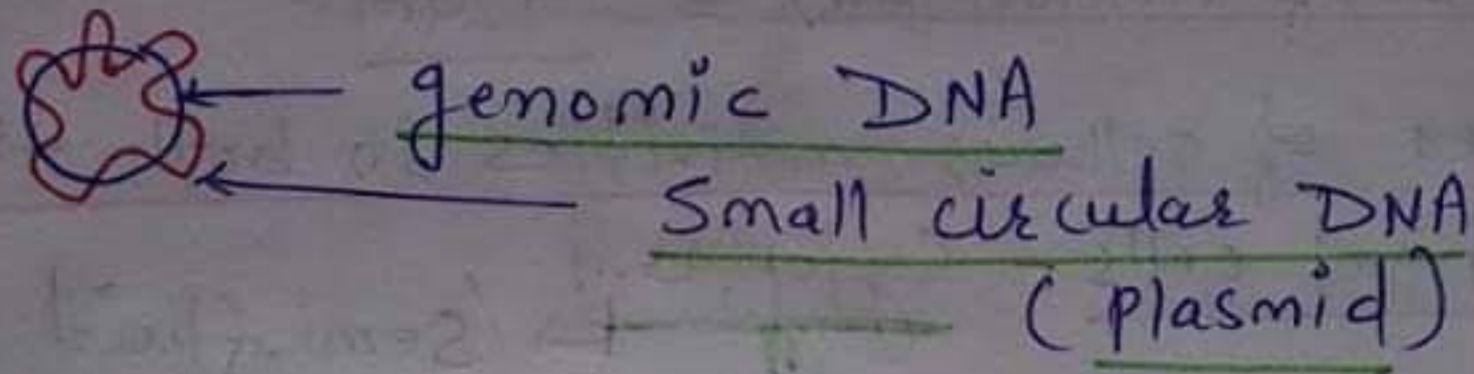
*** trick

लाल बहादुर शास्त्री (LBS) को Big Bass से NOMinate किया गया

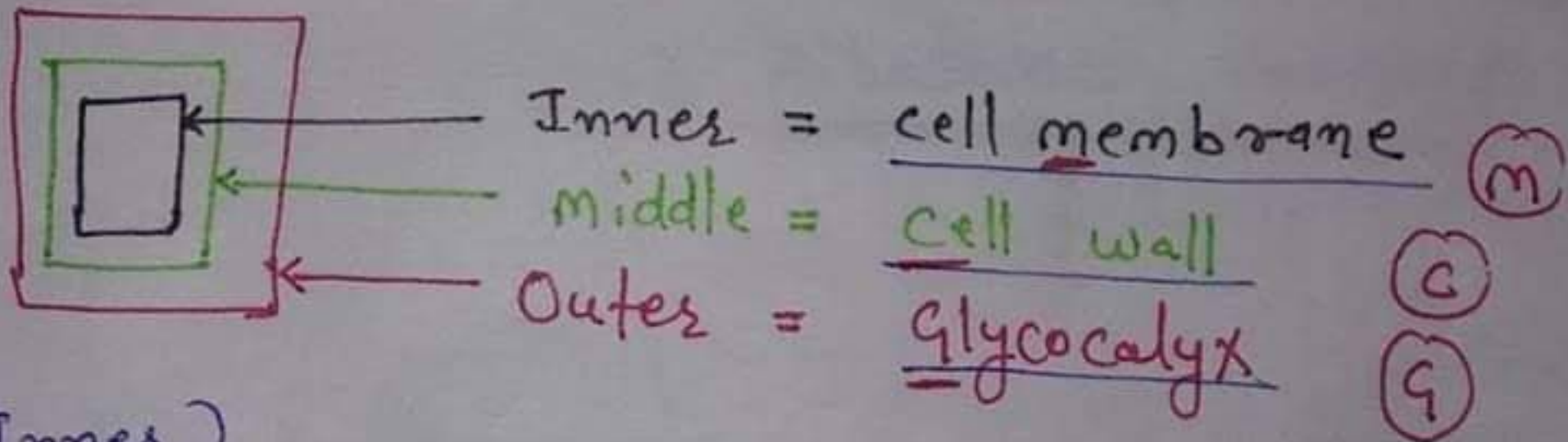
- L = Neuron (N)
- B = Ostrich (O)
- S = Mycoplasma (M)

④
Prokaryotic cell :-

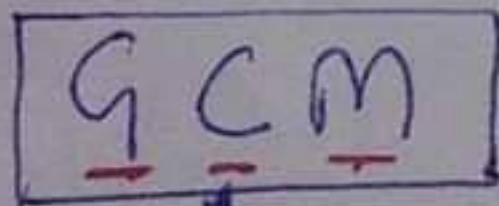
in Bacteria - 2 type DNA



cell Envelope of prokaryotic cell :-



(outer → Inner)



(GSM sim an modification)

trick

(Protective Unit)

modifications of cell envelopes :-

① Glycocalyx

Slime Layers
(loose sheath)

Capsule
(Thick & tough)

② cell wall

- Determines the cell-shape
- Provides a strong structural support.

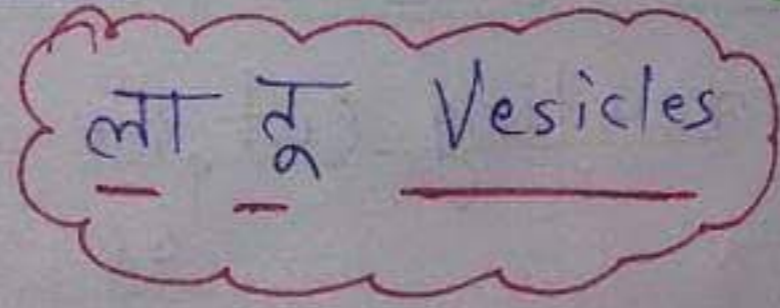
③ plasma membrane / cell membrane

MESOSOME :-

- Extensions of plasma membrane into the cell.

Extensions form → Lamellae, Tubules, Vesicles

trick



Lamellae (mT = L_a)
Tubules (a = T_u)

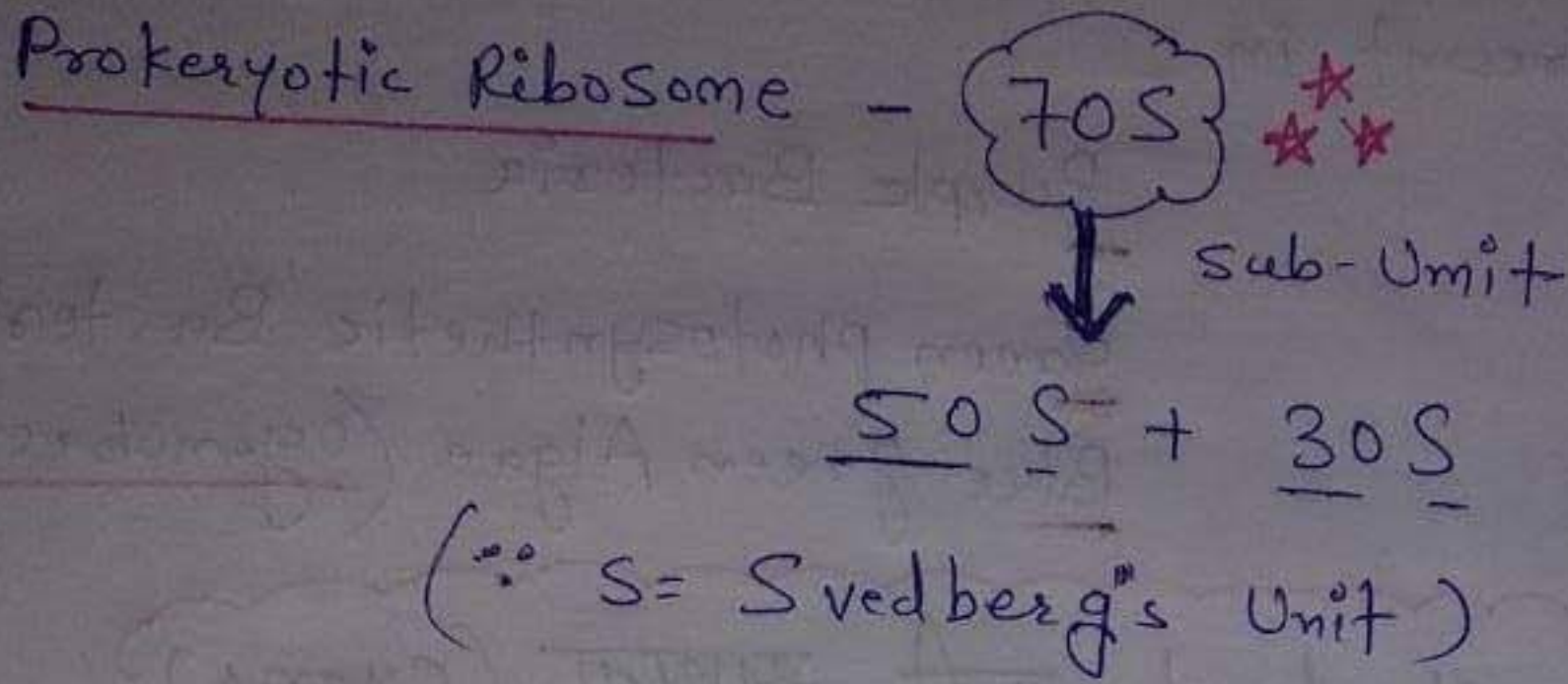
work of mesosomes :-

- DNA Replication & Distribution to daughter cells
- Respiration, Secretion process, Surface Area ↑ (P. membrane)
- Enzymatic Content, Cell wall formation

DR. SEC.

D, R, S, E, C trick

Ribosome (Prokaryotic Ribosome) :-

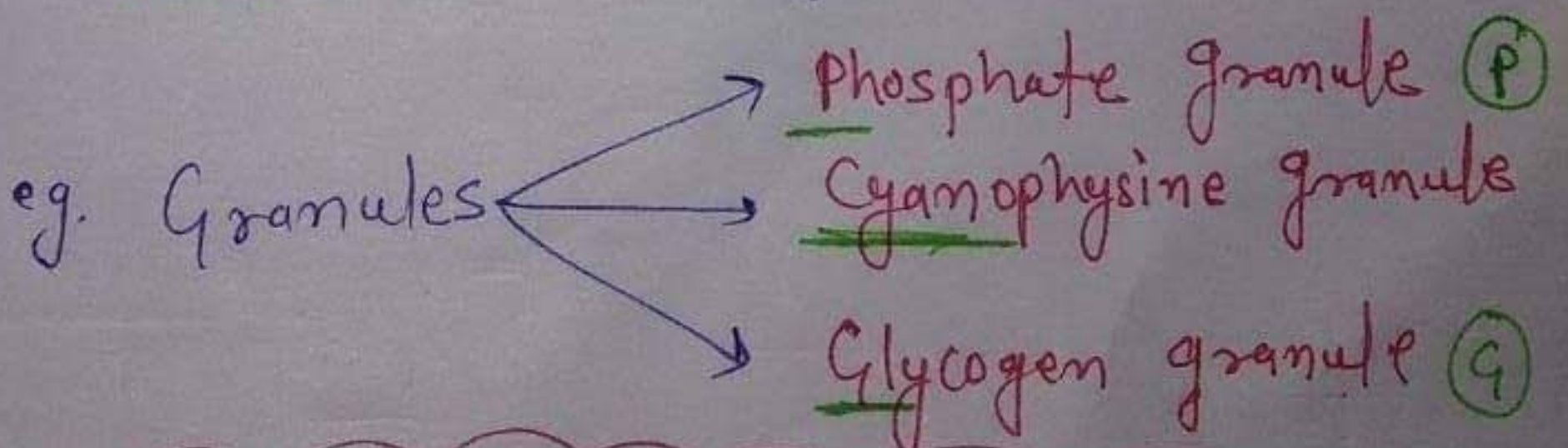


Polysome :-

Polysome / Polyribosome = m-RNA + Ribosome

Inclusion Bodies :-

- Reserve material in prokaryotic cells are stored in the cytoplasm in the form of inclusion bodies.
- Not Bound by any Membrane
- Lie free in the cytoplasm.



Trick ***

PG standered वाली सायना (Cyanob)

Gas Vacuoles :-

present in -

Purple Bacteria

Green photosynthetic Bacteria

Blue green Algae (Cyanobacteria)

trick

PG Standard वाली सायना (Cyano)

purple bacteria

green photosynthetic Bacteria

Cyanobacteria
(Blue green Algae)

9

★ Eukaryotic Cell :-

- All Eukaryotic cells are not identical.

cell wall

plastid

Central Vacuole

present - in Plant

Absent - in Animal

centriole

- Present in Animal, absent in Plant.

In Eukaryotic cells ↓

"Extensive Compartmentalisation of cytoplasm"

(∴ Presence of membrane Bound Organelles)

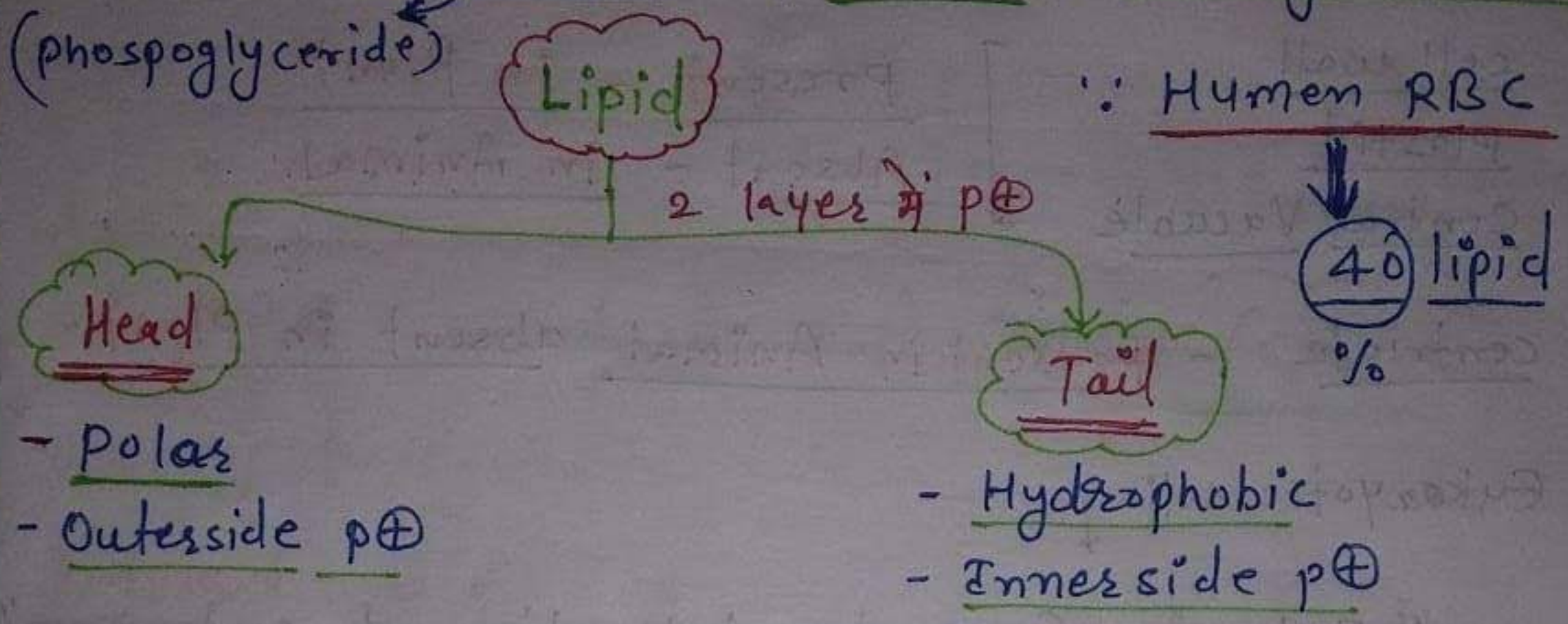
locomotory & cytoskeletal structures ↓

(Genetic material is organised

into Chromosomes.)

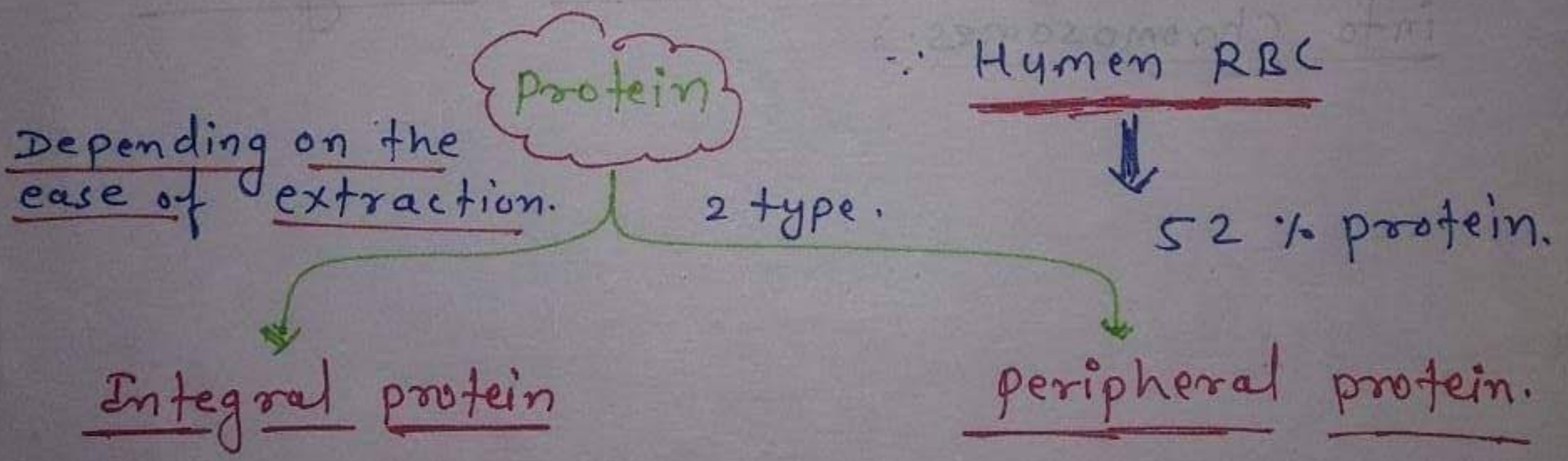
Cell membrane :-

- cell membrane की structure - RBC की help से.
- Lipid (phospholipid) , protein , Carbohydrate से बनी।



important

∴ Saturated Hydrocarbons is protected from the aqueous environment.



(∴ Partially or totally Buried in the membrane.)

(∴ at surface of membrane.)

Chromatophores -

Extension of membrane (cell membrane)
in cytoplasm with pigments.

eg. in Cyanobacteria.

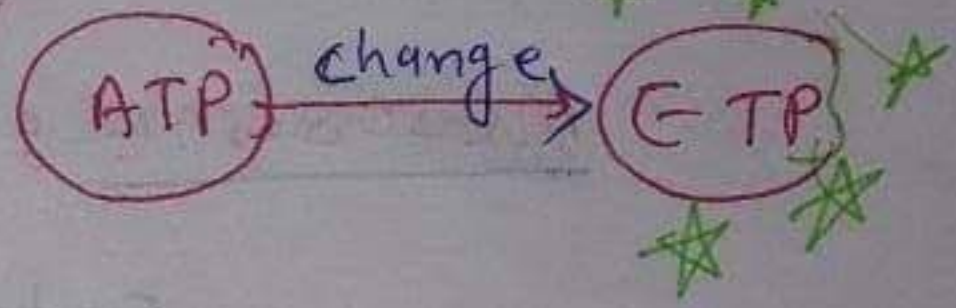
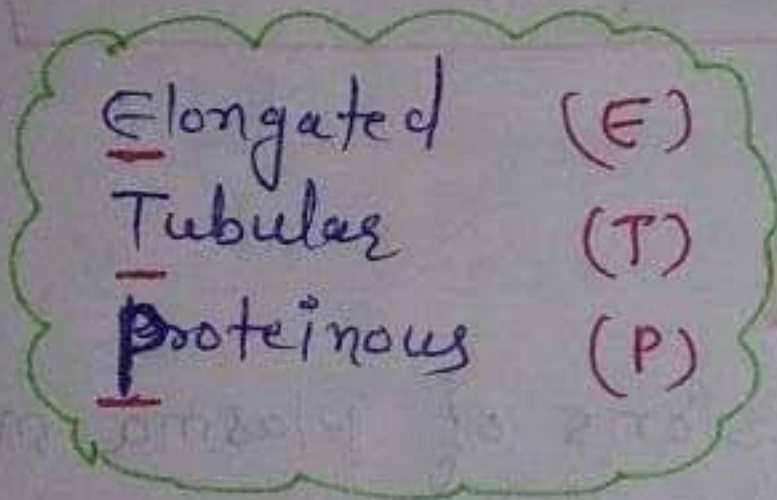
Bacterial cell → if motile

↳ flagella present

Pilli & fimbriae - Surface structure of Bacteria

↳ Do not play a role in motility

Pilli :-



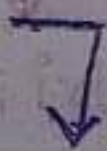
trick

fimbriae :-

Small Bristle like fibres

sprouting out the cell
↑
of

Work of pilli & fimbriae



Help attach the Bacteria to
rocks in streams and also to
the host tissues.

Cell - The Unit of life

(1)

Discovered by - Leeuwenhoek (living cell)

Cell theory given by -

Schleiden (German Botanist)

Schwann (British zoologist)

GB

" Bodies of living organisms are composed of cells and products of cell "

जीव
(B Zoo)

Drawback :-

Did not explain as to how new cells were formed.

Modern Cell theory :-

given by - Rudolf Virchow (1855)

" Omnis cellula - e - cellula "

(Cells Divided and new cells are formed from pre-existing cells)

means -

i) All living organisms are composed of cells and products of cells.

ii) All cells arise from pre-existing cells.

★ Male Reproductive System -

NSWS

⇒ location - Pelvis region.

- ⇒ Includes - Testis (T)
- Accessory ducts (A)
- Glands (G)
- External Genitalia (E)

Trick

TAGE ⇒ Facebook at Tag.

4-digit means 4 c.m length (Testis as)
 (4-5 c.m)
2-3 c.m width. (Testis) as

T in Scrotum :-

(T = Testis)

↳ (maintaining temp 2-2.5°C lower than the Normal internal body temp.)

↳ (Necessary for Spermatogenesis)

NSWS

Testis :-

- 1- Pair
- 250 Testicular lobules in One Testis
- 1-3 Seminiferous tubules in One T. lobules.

Total Seminiferous tubules in Both testis (One Man) :-

$S. \text{ Tubules} = 2 \times 250 \times (1-3)$ $S. \text{ Tubules} = 500 \rightarrow 1500$	<u>(In Both testis)</u> <u>or One Man</u>
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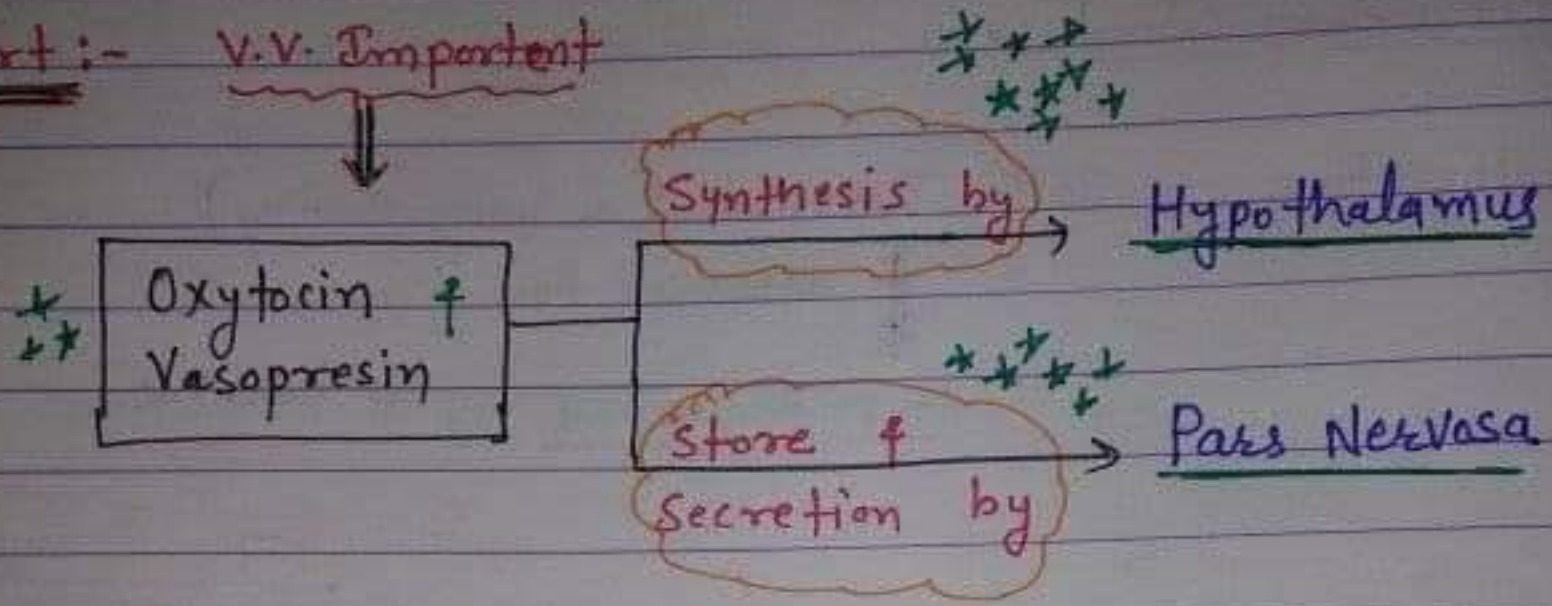
<u>In One testis</u> ⇒ <u>250 → 750</u>

ALERT
ASK
QUESTION

ALERT

NSWS

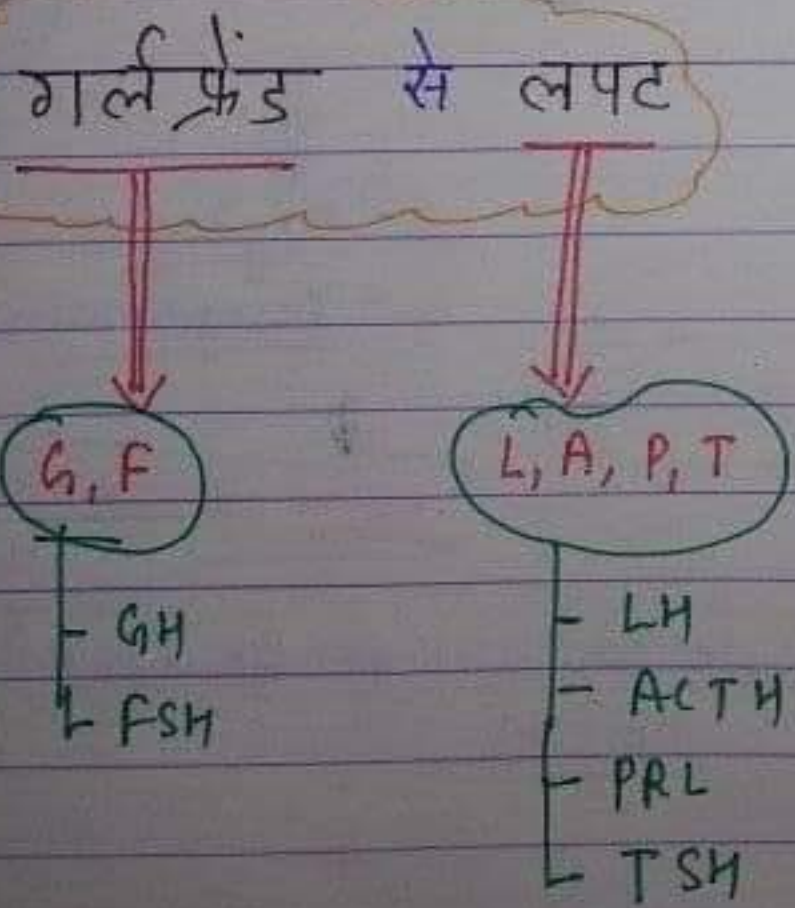
Allert :- V.V. Important



(Question को Allert होकर पढ़ना है।)

Trick ↓

Pars Distalis के Hormones को याद रखने का Trick



(c) Chemical Methods :-

→ These chemical contains spermicidal agents which destroy sperm.

spermicidal agents contains :-
Kamla, Boric acid, ZnSO₄,
lactic acid.
↓
sperm.

→ They are available in the form of Jelly, foam, Tablet, cream.

∴ Today Tablet → contains Non-oxynonyl-9 chemicals

Nim-76 -

(d) Surgical Method / sterilisation :-

→ Highly effective, but Reversibility is very low.

∴ it block the gamete transport and prevent fertilization.

Vasectomy (male)

↓
To cut vas-deferens

Tubectomy (female)

↓
To cut fallopian tube

(e) Hormonal Method :-

→ In this either progesterone or combination of Estrogen or Progesterone is used by female as contraceptive method.

This method is used as Oral pills, injections, implants.

→ Oral pills made up of hormones and have to be taken daily for period of 21 days.

They are very effective with lesser side effects.

∴ Oral pills prevent ovulation (mainly) + make uterus unsuitable for implantation + changes in survival which prevent transport of sperm.

and Implantation.

→ In this, Ova from Donor transferred into fallopian tube and after this sperm transfer so, fertilization occurs in fallopian tube (In-vivo)

M.T.P. (Medical Termination of Pregnancy)

→ Intentionally / voluntary Termination of pregnancy 'called M.T.P / Induced Abortion'

→ Nearly 45-50 million M.T.P. performed in a year in the world.

→ In India, it is legalised in 1971.

→ MTP are relatively safe during 1st Trimester of pregnancy. (up to 12 weeks) but 2nd Trimester MTP are much more risky.

STD's (Sexually Transmitted Disease)

→ These disease are transmitted through sexual intercourse - also called Venereal disease.

egs. - Syphilis.

- ~~Chy~~ Chlamydia.

- Gonorrhoea

- Genital Herpes

- Genital warts

AIDS
Hepatitis-B

→ All STD's are completely curable, except Hepatitis-B + AIDS + Genital Herpes.

→ Hepatitis-B and HIV also transmitted by Blood transfusion,

Sharing of needles + from infected mother to foetus.

→ Complication of STD's = Abortion, sterility, cancer in Reproductive tract, PID (Pelvic Inflammatory disease)
Ectopic Pregnancies.

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(Help in - RNA, Protein के cytoplasm से Nucleoplasm में आना)

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 - Liquid Endosperm of coconut
(more than one nucleus)

*** - RBC & Sieve tube cell - Nucleus ab[⊖]

Nucleolus - r-RNA formation.

During Cell Division

Interphase में Nucleus में - Chromatin p[⊕]
Chromatin में - DNA, Histone & Non-Histone protein

In Chromosome - Primary constriction (Centromere)
Kinetochores $\left\{ \begin{array}{l} \text{Disc like structure} \\ \text{present on Centromere} \end{array} \right.$