Pakistan School
Kingdom of Bahrain

Pakistan School, Kingdom of Bahrain.

Welcome to new class

Grade 11

Rules of the class

1) Be on time for all your classes.
2) Respect all the participants of the class.
3) Do not create any disturbance.
4) Pay attention to your teacher.
5) Raise hand if you have a question.
6) Enter into the class with your actual name and CPR number.

Chapter 1

Cell Structure and Function

OBJECTIVES:

At the end of this lesson students will be able to:

- Analyze the structure of mitochondria, chloroplast and centrioles.
- Explain their respective functions.

Mitochondria (sing: mitochondrion)

- In eukaryotic cells
- Number varies (why ?)
- Self-replicating by fission
- Cylindrical or rod shaped
- Double membrane (Inner + outer) (chemical nature ?)

Structure:

A. Outer membrane :

- Smooth and Porous
- Protein-porins
- Function : Transfer of molecules across the membrane

B. Inner membrane :

- Selectively permeable
- Folded inwards , folds → *cristae* (why is it folded ?)
- Cristae have stalk particles or F0-F1 particles. (ATP synthase)
- Many proteins in membrane – serve as electron carriers in ETC.
- Makes two internal compartments

a. Intermembrane space (space between inner and outer membrane)

b. Mitochondrial matrix (enclosed by inner membrane only)

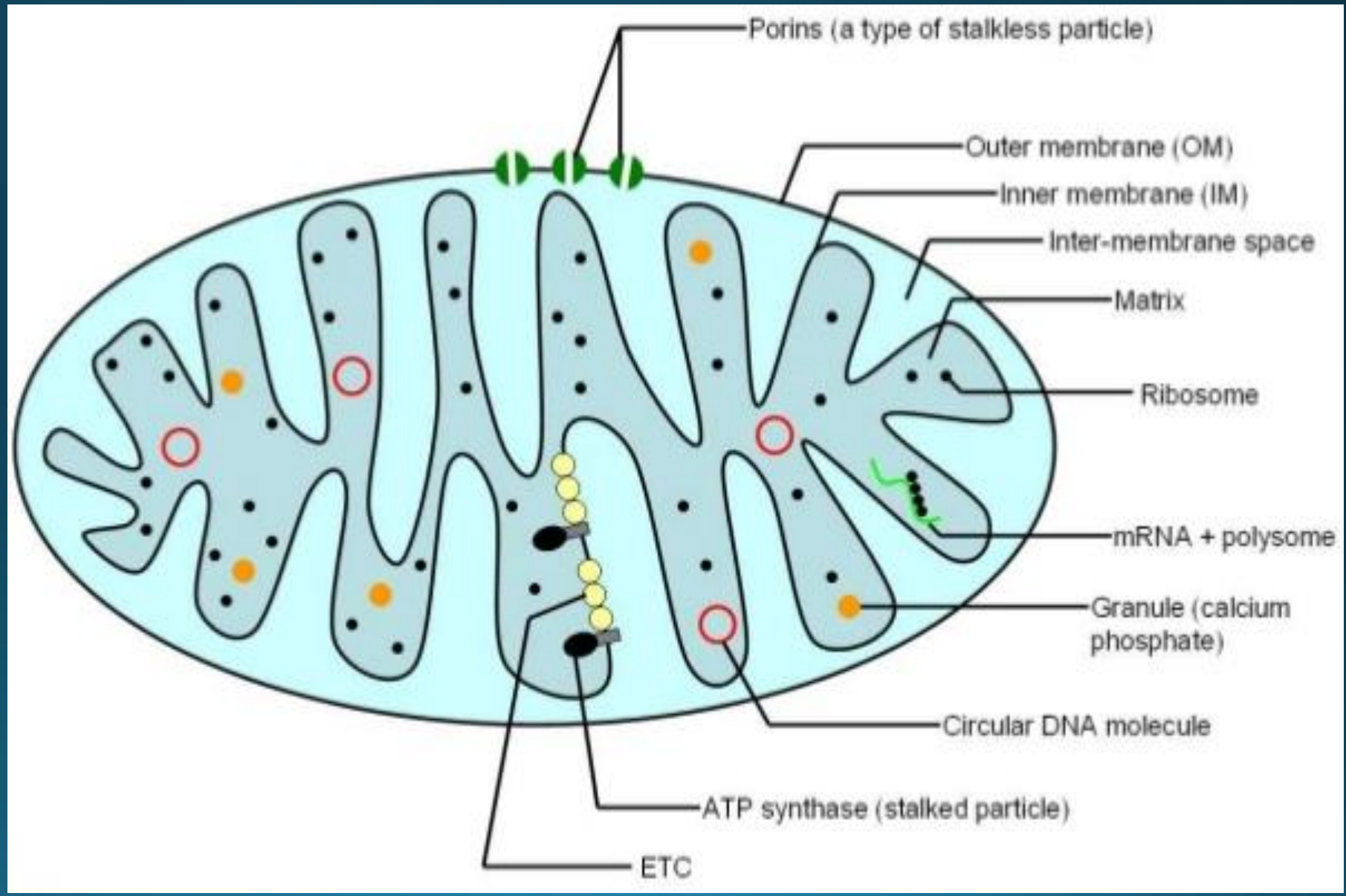
- Jelly – like
- Has circular DNA
- All kinds of RNAs
- Ribosomes (70S)

Guess their role

Mitochondrion

Function:

- Cellular respiration
  - Krebs cycle in matrix
  - ATP generation by protein in the inner membrane



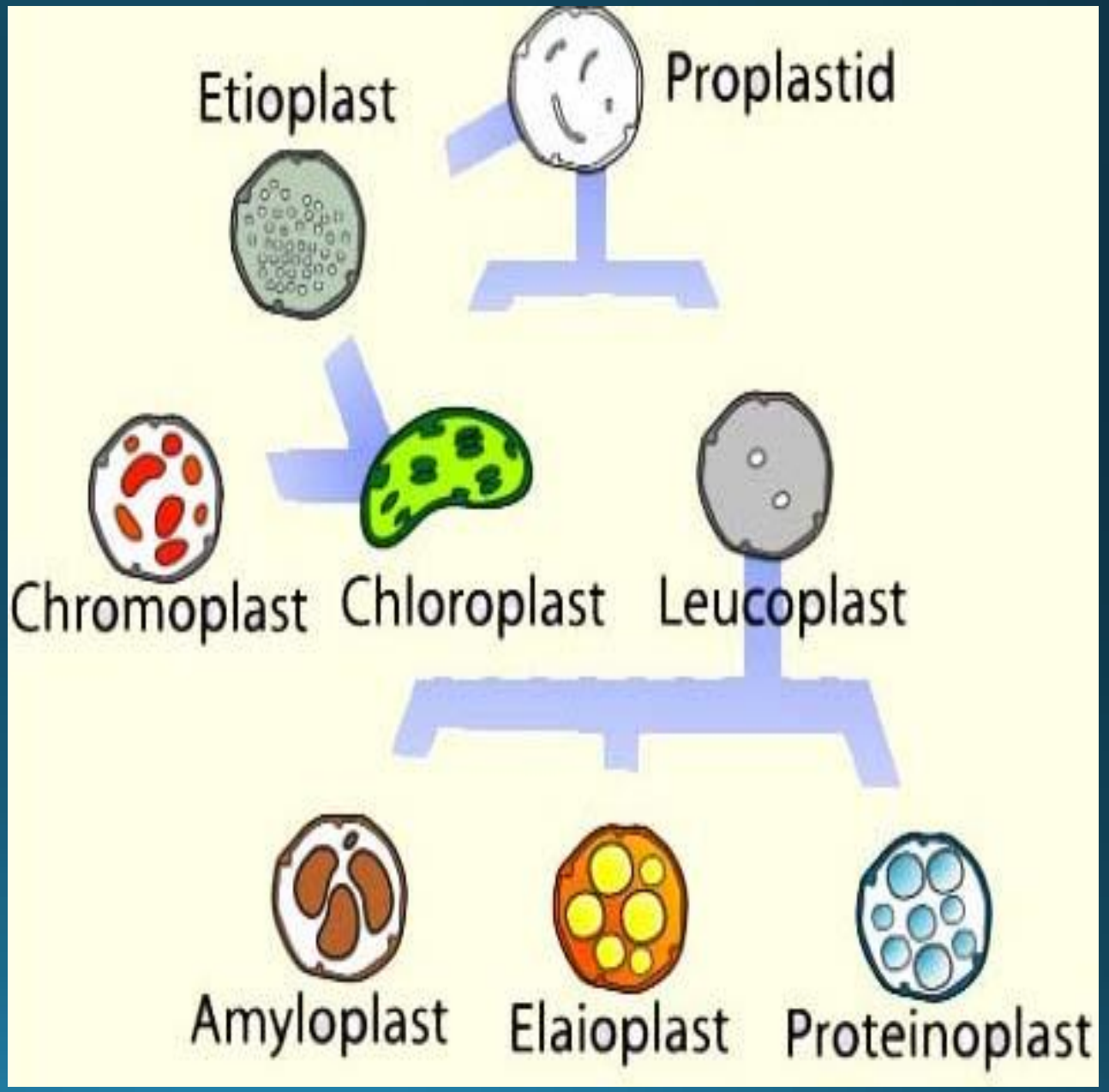
Plastids :

- Membrane-bound organelle found in the cells of plants, algae, and some other eukaryotic organisms containing pigments.

Proplastids → immature developing stage

- Self-replicating
- Divide in meristematic cells
- Distributed to different cell types
- Develop into variety of plastids depending upon :
  - Structure in which they are
  - Intracellular factors
  - Exposure to light

Types of Plastids



Plastid

types

Etioplast →  Crystalline prolamellar bodies, precursor of chlorophyll

Chromoplast →  Pigment synthesis and storage

Chloroplast →  Photosynthesis, lipid synthesis

Leucoplast →  Synthesis of fatty acids and amino acids

Amyloplast →  Storage of starch and sugars

Elaioplast →  Storage of lipids, oils

Proteinoplast →  Sites of enzyme (protein) activity

Chloroplasts :

- Plastids containing green pigment
- Present in green parts of plant

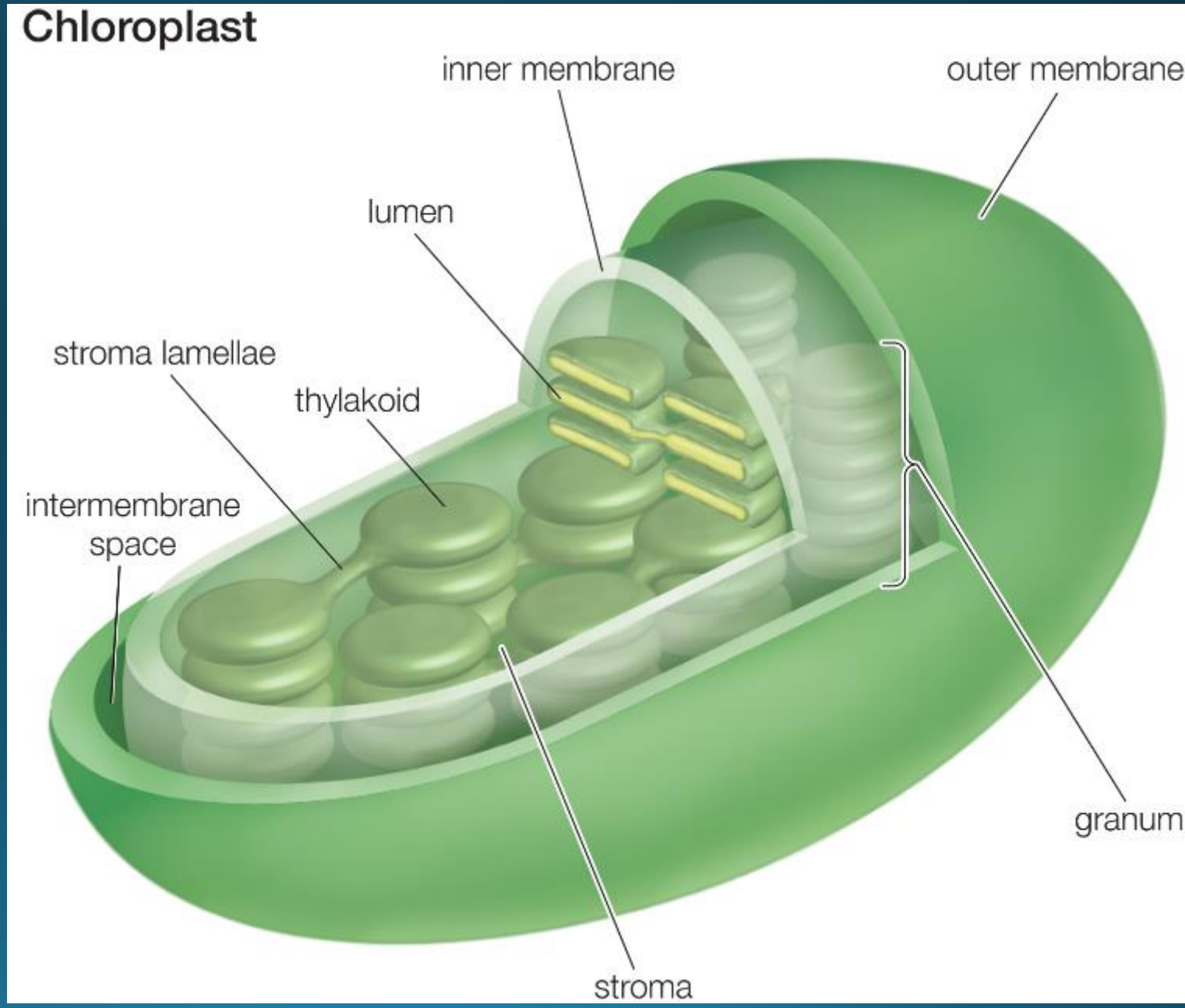
Structure:

- Discoid
- 3 parts :

1) Envelope

2) Stroma

3)Thylakoids



Envelope

- smooth double membrane → outer membrane with porins and freely permeable, inner is semi-permeable and rich in protein + inter membrane space

Stroma

- Colorless proteinaceous, circular DNA, all kinds of RNA, ribosomes, various enzymes
- Has system of lamellae (chlorophyll-bearing double membrane) that form thylakoids

Thylakoids

- 2 types : Smaller (Grana lamellae): Disc-like sacs, stack of smaller thylakoids – Granum (25-50 thylakoids with photosynthetic pigments in membranes)
- Larger (Stroma lamellae): Connect the grana → inter-grana, colorless i.e. no pigment

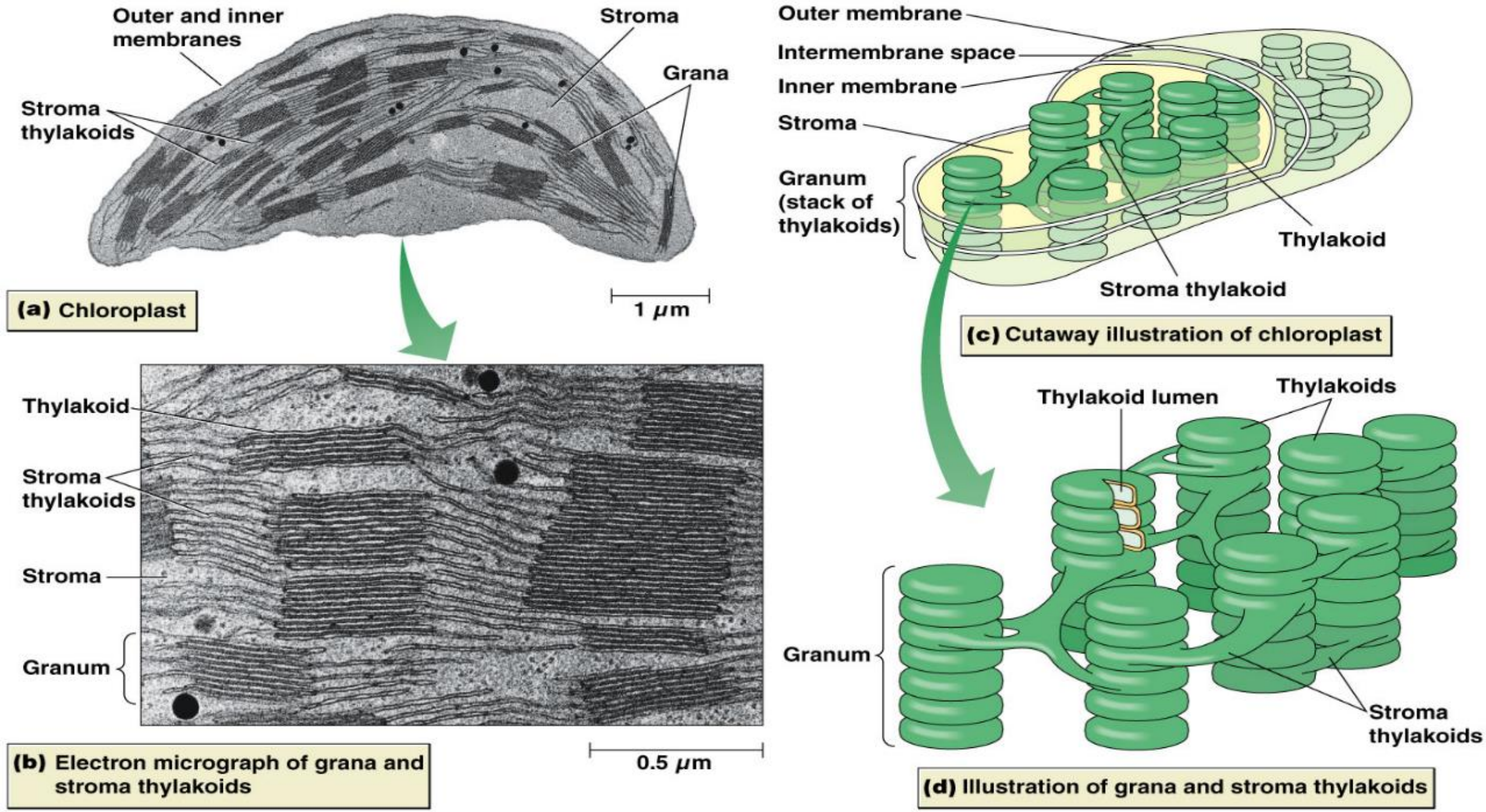
Function:

- Site for photosynthesis

1. First Phase → Light dependent Reactions in Grana
2. Second Phase → Light independent Reactions in Stroma

1. **Light dependent Reactions : Sunlight is captured and transformed into ATP**

2. **Light independent Reactions / Dark Reactions : CO_2 is reduced to make carbohydrates**



© 2012 Pearson Education, Inc.

Centrioles :

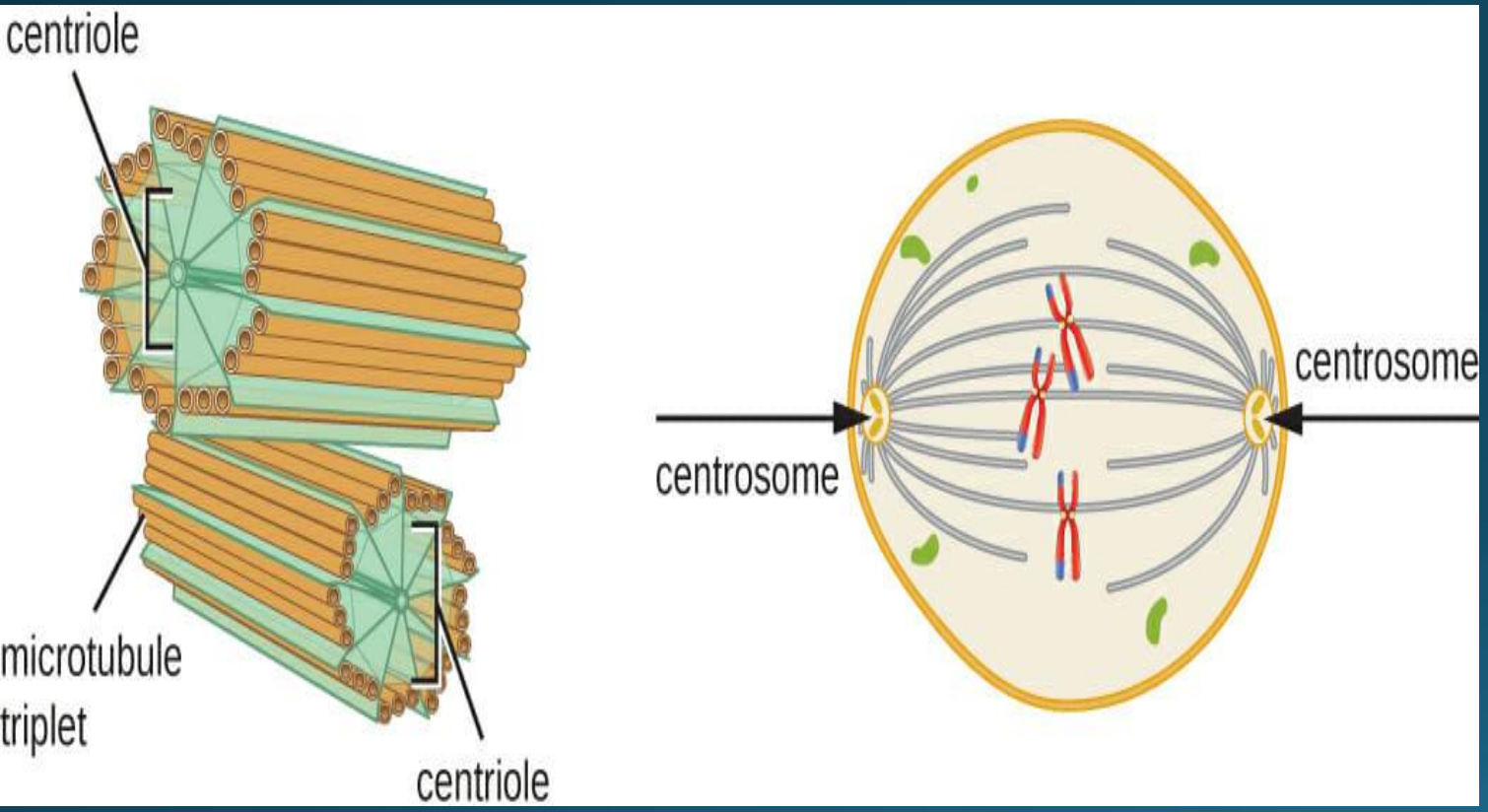
Structure:

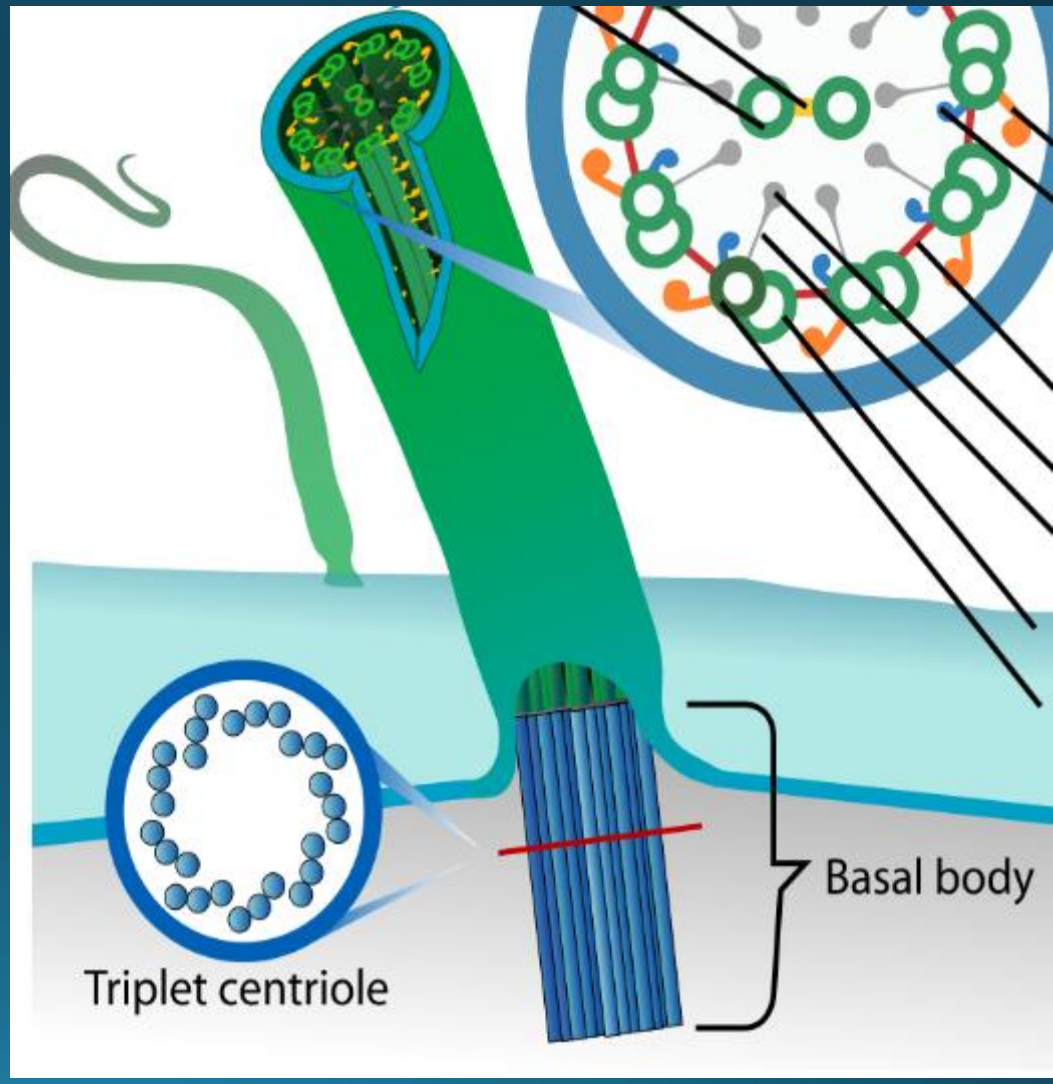
- Non-membranous
- Only in animal cells and fungi-like protists
- Rod-shaped
- Occur in pairs at right angle to each other
- Distinctly staining region – *Centrosphere*
- Centriole + Centrosphere → *Centrosome*
- *9* triplets of microtubules arranged in circle
- Duplicate just before division and each pair migrates to opposite sides

Function:

- Make spindle fibers of mitotic apparatus
- Help in distribution of chromosomes
- Give rise to basal bodies or kinetosomes of cilia and flagella

Centrioles :


centriole
microtubule triplet
centriole
centrosome
centrosome


Triplet centriole
Basal body

PLENARY:

1. What is common in mitochondria and chloroplast ?
2. State the function of chloroplast and mitochondria.
3. When does chloroplast change into etioplast?
4. What are F1 particles for?
5. Where are the chlorophyll molecules attached?
6. State the role of centrioles.


STAY
HOME
STAY SAFE

Allah Hafiz