Plastids

- found in the living cell
- they multiply by division of pre-existing ones
- three types - leucoplast
  - chromoplast
  - chloroplast
- one form can change to another
- leucoplast change into chloroplast when exposed to light

Plastids are the site of manufacture and storage of important chemical compounds used by the cell

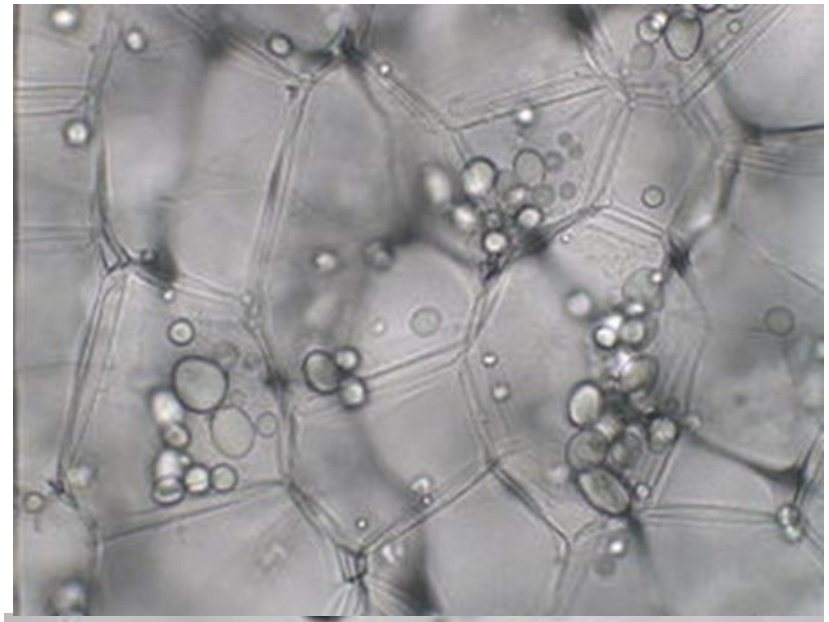
Plastids in Fruit Tissue

Chloroplasts
in Unripe Fruit

Chromoplasts
in Ripe Fruit

Leucoplast

- Colorless plastids
- widely distributed in
- colorless leaf cells,
- rapidly growing tissues,
- roots, stems, tubers & other storage organs
- leucoplasts are important they serve as centers of starch formation



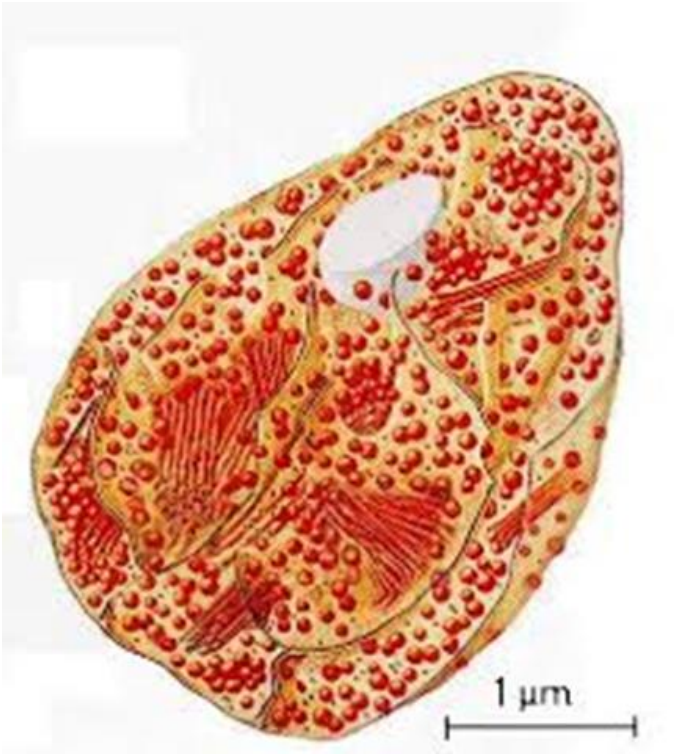
leucoplasts are not green and are located in non-photosynthetic tissues of plants, such as roots, bulbs and seeds

- starch is deposited as a grain within the leucoplast
- when the starch grain is fully developed, the leucoplast persists as a thin coating around it
- a leucoplast usually encloses only one grain in some plants
- several grains of starch are produced within a leucoplast
- Amyloplasts ---- starch storing leucoplasts (cotyledons, endosperms & storage organs)
- elaioplasts ------ fat-storing leucoplasts
- Aleuroplasts ----- protein-storing leucoplasts (castor seed)

leucoplast may also perform biosynthetic functions such as the synthesis of fatty acids, amino acids, and various other compounds.

Chromoplast

- Colored plastids
- their color being due to the presence of various red, yellow & orange pigments known as carotenoids
- they are mostly present in the petals of flower & in fruits
- make them showy & attractive
- they are also found in roots such as carrots and sweet potatoes.
- they appear as granules with the pigments
- their shapes are irregular, granular, angular, acicular & forked



- yellow pigment = xanthophyll
- orange -red = carotene
- chromoplasts of blue green algae or cyanobacteria contain various pigments:
- phycoerythrin (accessory to the main chlorophyll pigments responsible for photosynthesis)
- Phycocyanin (any of a group of blue photosynthetic pigments present in cyanobacteria)
- chlorophyll
- caretonoids
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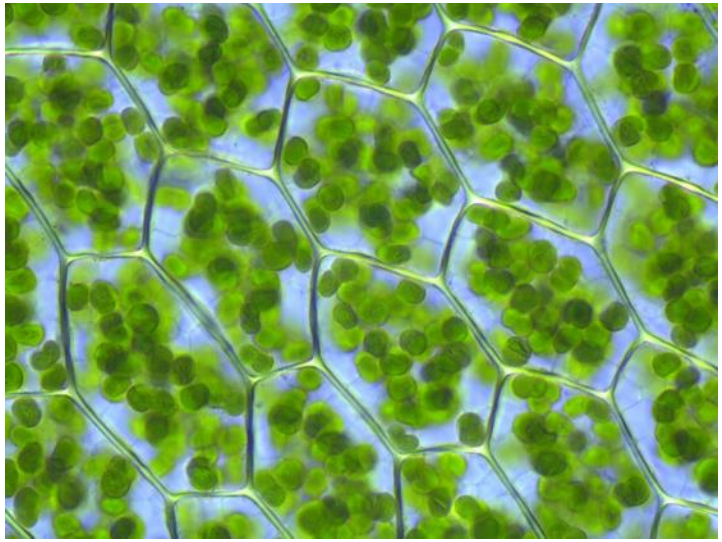
- chromoplasts are 2 types

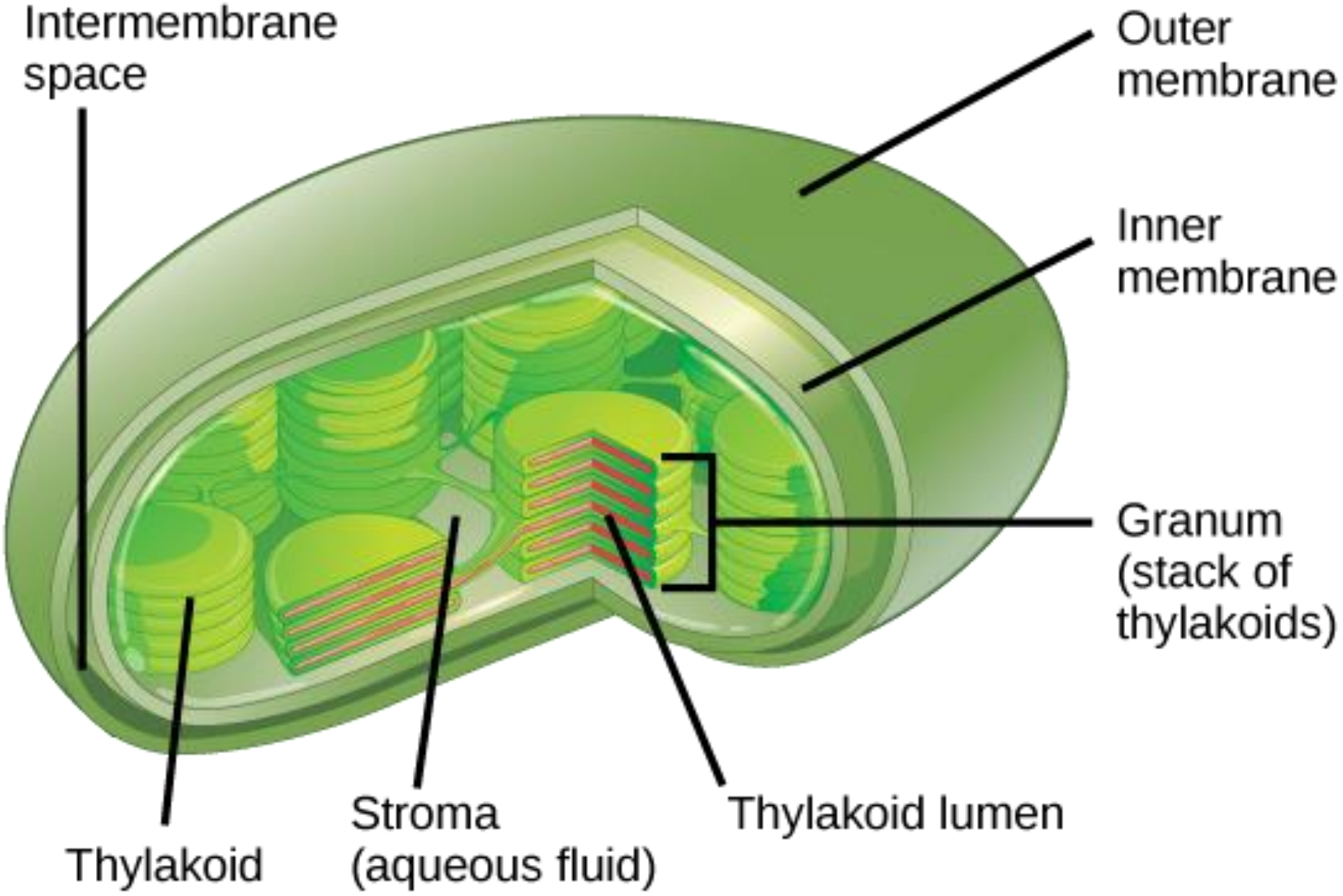
Phaeoplast: It is dark brown in color.
It contains fucoxanthin pigments.
It is found in brown algae & diatoms.

Rhodoplast: It is red in color.
It contains phycoerythrin.
It is found in red algae.

Chloroplast



- green plastids
- usually disc-shaped
- eukaryote chloroplasts are discoid or lens-shaped body 5-10 µm long
- the number may be vary from one (green algae) to several hundred (higher plants)
- they are covered by a double membrane
- the membrane encloses a semifluid material (stroma)
- the membranes are separated by an inter membrane compartment


Intermembrane space
Outer membrane
Inner membrane
Granum (stack of thylakoids)
Thylakoid
Stroma (aqueous fluid)
Thylakoid lumen

- embedded within the stroma are interconnected stacks of hollow disc-shaped sacs
- the individual sac is called thylakoid
- a stack of sacs is a granum (grana)
- the thylakoid membranes contain the green pigment (chlorophyll)
- the chloroplasts are composed of the carbohydrates, lipids, protein, chlorophyll, carotenoids, DNA, RNA & certain enzymes & coenzymes

- the chloroplast also contains Fe, Cu, Mn, Zn
- carotene & xanthophyll are related to vit: A

1) Chloroplast membrane

two continuous boundary membranes, separated by intermembrane compartment, lipoproteinaceous in nature (double membrane)

II) Stroma matrix

- it is proteinaceous in nature

it contains a small circular double helical DNA, ribosome, sugar, organic acids, starch granules, osmophilic granules & pyrenoids

- it is the principal site of the dark reaction of photosynthesis

A lipoprotein is a biochemical assembly whose purpose is to transport hydrophobic lipid