

Hello students.

I'm Celly, Associate Professor from Government College, Quepem, Goa. Today we'll be dealing with plastids. Under the unit of cell and its components, what we're going to do is we learn what is a plastid.

What are the types of plastids and the functions of different types of plastids. Now if you see here in the image, you can see these small structures what we call as plastids.

Plastids are double membrane bound, self-replicating units. They can multiply, self-replicating cell organelles found in the cytoplasm of cells of plants, algae and a few other eukaryotes.

It was **A. F. W. Schimper**, who first defined and classified them according to the pigments and the structure and the function. Plastids, they have their own DNA. They have ribosomes which help in protein synthesis. And they differ in their size. They range from 2 to 10 microns in diameter.

And what do they do? They help by being sites for manufacture and the storage of important chemical compounds in the plants. Plus they have the ability to absorb sunlight and also convert this light energy into chemical energy.

Now let us classify plastids.

Plastids are actually formed from pro-plastids in the cytoplasm, which already exists. So pro-plastids are actually seen in the meristematic tissue, which are undifferentiated plastids.

They're classified broadly into three types, the chromoplast, the leucoplast and the chloroplast.

Now here we have the etioplast. If we see here it's actually developed and they change their form into chloroplasts and back again chloroplasts into etioplast. We'll come back to that. But if you go further on,

Leucoplast are classified into three types, the amyloplast, the elaioplast and the proteinoplast.

Now, proplastid is undifferentiated. They are found in the meristematic cells. And these develop into plastids

And different types depending upon the needs of the cell. If plants grow in darkness, the pro-plastid will enlarge and it will form etioplast. But if there is sunlight it will develop into a chloroplast.

So now if we see here pro-plastids they form plastids. If the plant is in shade or darkness or light,

depending upon that, they will interchange into their different types.

We come back to the **Etioplast**, They are large plastids which actually you see here.

They are not differentiated. They don't have a well developed structure, but you can see the Pro-lamella body, the central and some extensions like which are pro thylakoids.

Now, this develops when they are formed in absence of light.

Green pigment is lost and the membrane becomes these organized and these

if they are chloroplasts they will change or turn into etioplast. The inner membranes are all arranged like a semi-crystalline body. And they have the extensions which are pro-thylakoids.

Plus they have the chlorophyll that is a yellowish color precursor.

It's a pigment and there are no thylakoids or ribosomes in etioplast. They occur in dividing

cells or meristematic cells and what is the function that they perform. These plastids when

they're exposed to light they are found in angiosperms, but if they are in darkness you

will see them formed again from the chloroplast and there is Inter conversion of the chloroplast into

into Etioplasts and vice versa. Now let us go to **chloroplast**. Chloroplasts consist of plastids

which have green pigment. The blue-green pigment, we call is chlorophyll A and the yellowish green or

the greenish yellow one which is called chlorophyll B. They are well developed, have thylakoids inside

DNA, ribosomes are well developed, cell organelles, and they are found in green leaves and green algae.

What is the function of chloroplasts? They are the main cell organelles that help in photosynthesis.

And with the help of the chlorophyll pigment, they are able to capture the energy from light and convert it.

And then store this energy in chemical form as ATP and NADPH molecules.

And when this process is going on of conversion of light energy we see oxygen and water being released

by the plants. Now we go back to other plastids, sorry the **chromoplast**.

The chromoplasts have different types of pigments.

Now if they are yellow color, we call that pigment Xanthophyll, which is normally seen in Flowers and

the fruits. Then we have the orange what we call as Carotenoids seen in carrot very prominently,

then in tomatoes we see a pigment lycopene, which is red in color; fucoxanthin which is Brown color.

You see it in sargassum algae. Then we have the phycoerythrin, which is found in the red algae

that is Polysiphonia example and these are needle shaped, small tiny structures which store lycopene, red

pigment or maybe Brown pigment. So all with colored pigments these plastids we call chromoplasts.

And their function is to prepare the colored pigments or the colored compounds and store them for different purposes. Now those found in different petals and different fruits. You'll see their color because of chromoplast and this is to help them attract pollinators and dispersal of seeds to attract the agents.

There we have the **leucoplast** which are colorless and they are located in non photosynthetic pigments of the plants such as roots- sweet potato. Then we have the underground stem that is a potato. We have bulbs like onions, Nuts and different seeds.

So Leucoplasts exist like this in the cell They are colorless.

And then we have the Classification of leucoplasts they are of three types depending upon what they prepared and what they store. So we have the rice grains and the potato where there are amyloplasts. That is, they have lots of starch in them.

Elaiooplasts, which have oils or lipids in them and then of course, the proteinoplasts which have proteins where we can see here grams and seeds. In other words, the pulses which have them.

Like if you take a single amyloplast you see like this and we see concentric circles here deposition of the starch takes place and they're these pigment is actually colorless, so no photosynthesis can take place here and they occur in embryonic and germ cells. And cereals. Like I've already said, Rice. The function is to store the starch. If you take a Leucoplast. We have elaioplasts you see in the coconut.

But, it's colorless, no thylakoids, and ribosomes found in groundnuts. We find them coconut and other seeds which produce or have oil in them. So they store oil and lipids.

Proteinoplasts, which are colorless. These plastids may have some of the color may remain there, but they have a few thylakoids and there they contain crystalline bodies of proteins are found in pulses, lentils and peanuts. What they do is they store protein and they serve as a site for certain enzymatic activities you can see here how they are concentrated here.

So in the cells they are concentrated in. Other important thing about plastids is the interconversion.

They can convert from one form to another depending upon. Different factors like for example, the light color and the intensity of light. We see the color changing every time in the leaf, or maybe a fruit changes color and that is because of the environmental factors.

So Chromoplast ,Leucoplasts can become chloroplast.

And we see in a carrot, in a potato, when they illuminated how they turned greenish in color.

Now what is that all of these pigments in the plastids they help in absorbing light, and they help in photosynthesis.They absorb Violet light.They absorb red light,but they reflect the green light, giving plants their green color. So they are actually light absorbing pigments, which are found in plants in the plastids. And then if we brush up we have the chromoplasts which are storing colored pigments, in the chloroplasts which help in cell photosynthesis.

Etioplasts which are forming the chloroplasts or the precursors for the chloroplasts. Leucoplast which stores the food, different types of food accordingly are classified as amyloplasts that store starch.

Elaioplasts that stores oil, proteinoplast stores and modifies different proteins.

These are some references for you and.

We have the web references.

Thank you.