

Hello students. In the previous module,
that is model number one, we have already
studied what are meristematic tissue,
different types and how these meristematic
tissue helps in the formation of root apex.

Now in this particular presentation that
is model number two, we will going to
see about the shoot apical meristem.

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Outline. Meristematic tissue system.

Significance and regulation of tissue
differentiation in shoot apex.

Learning outcomes the students will be able
to explain the shoot apical meristems,
an outline, different theories
in shoot apex differentiation.

Shoot apical meristem is also
called as the shoot apex.

If you see the structure in

this particular diagram.

Here, the apical meristems are

present at the tip of the stem

they are terminal in position.

And these apical meristem on

differentiation give rise to the

different organs like the leaf, stem,

axillary buds, are formed upon the

leaf formation and stem elongation, Protoderm and procambium.

Now to understand how this apical meristem

helps in the organization of shoot apex

there have been many theories

put forth.

The most important theories

which are applicable for the

shoot apex organization.

They are Apical cell theory.

Histogen theory and tunica corpus theory.

First we will see about

the Apical cell theory.

This theory was given by

Hofmeister in the year 1957.

So according to this theory,

apical meristem is made up

of a single apical cell.

This apical cell undergoes

posterior division.

And forms various tissues of the shoot apex.

This particular theory has a drawback as

it is applicable only in the cryptogames,

like in algae, bryophytes,

and pteridophytes.

So if you see here in

this particular diagram.

This is the typical cell which

undergoes the posterior division and

forms into the various derivatives.

These derivatives later on,

upon differentiation,

give rise to the different

organs of the shoot apex.

Like for example the leaf primordia.

Next is the histogen theory.

This theory was given by

Hanstein in the year 1870.

According to this theory.

The apical meristem.

First forms the pro meristems.

And these promeristems later on

differentiates into group of cells,

which are called as histogens.

And there are three important

histogens.

Dermatogen is the outermost layer.

It is uniseriate that is single layer which

later differentiates into epidermis.

Next is the Periblem

which is the middle layer.

It is the massive layer which undergoes

divisions in various planes to form the core.

This consists of Stele.

And the innermost is the Plerome

This is composed of the

isodiametric cells which,

upon differentiation,

forms the cortex.

So as you see in this schematic diagram,

if you see the outermost layer

that is Dermatogen

Undergoes division in two planes and

forms the uniseriate layer which is called

as the epidermis.

Next is the periblem

is the middle layer which undergoes

divisions in various planes.

And forms in central massive Core which

gives rise to the Steeler region.

The innermost is Plerome

which undergoes division in only

one plane and give rise to the.

Cortex.

Next is the Tunica corpus theory which

was given by Schmidt in the year 1924.

According to Tunica corpus theory,

there are two distinct zones

in the meristematic zone of shoot apex.

The Tunica,

which is the cover and the corpus

which is the central core.

Tunica is made up of smaller cells.

They are single layered and these

Upon differentiation give rise

to epidermis which helps in the

growth of the surface.

Then second is the corpus,

which is the central core layer.

It is made up of larger cells which

are irregularly arranged and they

divide in various planes to form the

hypodermis and the vascular system.

As you can see in this

particular schematic diagram,

The outermost is the tunica layer.

This undergoes division in two planes and

forms the outermost single layer epidermis.

An the corpus,

which is the innermost layer,

undergoes division in various planes

to form the ground tissue, that is,

the vascular system and the hypodermis.

So students in this particular presentation,

we have seen how The apical meristem divides and

differentiates to form the shoot apex.

So here are some of the references.

Thank you.