Myself, Mrs. Vishwal Kunkolienkar,

and today we will be studying the module epidermal hard derivatives in the unit integumentary system.

In this module you will be studying epidermal derivatives, that is Horns, Prong horn, Rhinoceros or keratin fiber horn, giraffe horn.

After studying this module you will be able to identify the different types of horns in mammals. You will be able to distinguish between a true horn and other horns. You will be able to sketch the diagram of different types of horns in mammals. And you will be able to explain the anatomy of Horn as epidermal hard derivatives in mammals.

Let us look at What is a horn?

The horn is an epidermal derivative. It is present in Ungulate mammals. And when you talk about a horn, there is something referred to as true horn.

When you talk about a truehorn, a true horn is a one which is outgrowth of a frontal bone encased in Keratinised epidermal covering.

So that is why it is referred tous epidermal derivative, because it has an outermost keratinized epidermal covering.

So here you can look at the structure of a true horn. You can see there is a dermal Bony code here which has a central cavity.

This dermal Bony core is covered with a horny epidermal covering.

Now in case of true Horn, there will be always a central cavity, a dermal bone, and the epidermal covering.

But there are certain horns very in one of these component may be absent. Then we do not call such an as true fan.

Example of true horn, you can see here a picture.

There is true horn in cattle. So here you can see the horns in cattle. Similarly, you can find true horn in sheep, goat etc.

Now let us look at different types of horns. You have prong horns, rhinoceros or keratin fiber horn, Giraffe horns an Antlers. So let us look at each one of them.

The first one is pronghorn. Now here, pronghorn is also a true one. That means it has a cavity. It has a dermal bone and it has epidermal keratinized covering.

Now how this is different from the Horn of the cattle, the true horn of cattle.

Now here if you see there are prongs, that means there are bifurcations.

It is not a single continuous horn, but you can find here prongs.

Now, these prongs are resulted from overgrowth or outgrowth of the dermal bone, again covered with epidermal covering.

Now, these horns are permanent and they continuously grow. Horny sheath of this horn is shed annually in case of pronghorns.

Pronghorns are present in both the sexes that is found in male as well as female and such typeof horns. You will be able to see in case of Antelope.

So, what picture you are seeing, This is a picture of antelope showing up prong horn.

Next type of horn is rhino seerose or keratin fiber horn.

The name itself indicates such type of horn is found in rhinoceros. That's why it has been named as Rhinoceros horn.

Keratin fiber horn. Here there is no skeletal element, so there is no dermal bone indicating it is not a true horn.

It is made up of metted keratin fibers which are bound together and that forms the horn.

So here is the diagram.

If you look at the diagram, here you can see there are number of keratin fibers which have been bound together and it gives it a shape of the horn.

This again is a permanent horn and if it is broken it will grow again.

Such type of phone is present in both the sexes.

That is, it is found in male as well as female rhinoceros.

Now this is a picture of a rhinoceros showing the presence of a horn.

The next one is Giraffe horn now in case of Giraph.

The horn consists of ossified cartilage fused with the top of the skull and covered with keratinized epidermis.

Now, here the cartilage is fused with the top of the skull, and the cartilage grows to form a projection.

During the growth period of the giraffe, that is covered with the keratinized or cornified epidermis forming a horn.

Now the difference here is, Here there is no cavity found in the horn.

So the horn has a dermal bone, with the keratinized covering, but without a central cavity.

Again in Giraffe also the horn is a permanent horn.

They are not shed.

And they are present in both the sexes, that is, in male giraffe as well as in the female Giraffe.

So here you can see the picture of a giraffe and here you can see the presence of horns which are present right on the top of the skull's extension of the head region and covered with the keratinized epidermis.

The next one is Antlers.

They are type of horns which are found in ungulates.

Now it is having nothing but a branching solid outgrowth of a frontal bone covered by velvet during the growth period.

Now what is this velvet? Velvet is nothing but it is a epidermis of the integument which is richly supplied with blood vessels.

Now this helps in keeping the velvet or the integument part which is covering the horn in a proper condition, during particularly through Growth period or the breeding season.

This horns here are not permanent and they are shed and yearly.

Then, normally antlers will be present only in male deers, not in females.

So, here you can see a male deer wherein you can see the branched antlers.

Now, here if you see the difference, this is not with the velvet.

It will be very well seen during the growth period and later as the growth period or the breeding season is over, the Velvet will start degenerating.

The velvet will be shed and soon even the horn will be shed.

This is not a true horn, because it doesn't have a cavity inside it.

When you compare the different types of horns which you have studied, now you will find that Rhinoceros on is not a true horn among all of them.

And among all antlers are shed periodically.

So, these are the references for this topic, which you can refer.

Thank you.