This is a module for the Bachelor of Science,

second year, Zoology Semester 3 Z0C103 anatomy

of animal body systems.

In this module we are going to

continue with the evolution of heart.

This is evolution of heart Part 2 under

Unit 5 circulatory system I am Mr

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The outline of this module

is the heart of amniotes,

under which we will study the heart of

reptiles and the heart of birds and mammals.

At the end of this module,

the students will be able to list the

various chambers of the heart of amniotes.

Relate the structure of heart to

the mode of respiration used and sketch

the diagram of the heart of

reptiles and birds and mammals.

The heart of amniotes in general,

includes reptiles,

birds and mammals.

Amniote hearts have two

Atria and two ventricles.

The ventricles are not completely divided.

In some reptiles the left

atrium receives blood.

From the Pulmonary veins and the

right atrium receives blood from the

sinus venosus in reptiles or directly

from the superior and inferior

vena cava in birds and mammals,

the sinus venosus present in most

reptiles is reduced in crocodilians,

and is absent in birds and mammals.

The pulmonary artery takes

deoxygenated blood to the lungs.

The heart of reptiles.

The heart is further advanced

from the amphibian art.

That we looked at in the previous module.

The atrium in reptiles is always completely

divided into left and right Atria.

The ventricle is partially divided by

the interventricular septum in reptiles,

with the exception of crocodiles and

alligators in which it is completely divided,

oxygenated,

and deoxygenated blood is more effectively separated

in this type of a heart.

During its embryonic life in a reptile,

the conus arteriosus is split

into three vessels,

the pulmonary trunk and the left

and right systemic trunks.

In turtles and squamates,

there is a unique third chamber

called The Cavum Venosum.

This cavum venosum helps to

shunt oxygen rich blood and oxygen.

poor blood into specific arteries

that leave the heart.

The heart of crocodilians is quite

different from the heart of other reptiles

in these following ways: In crocodilians,

the sinus venosus is partially

embedded in the right atrial wall.

The ventricles are completely

separated into left and right.

Ventricles by the interventricular septum

oxygenated blood from the left side thus cannot mix with the deoxygenated

blood from the right side within the heart.

Thus,

a complete separation of oxygenated

and deoxygenated blood happens within the heart.

We move on

to the heart of birds and mammals.

The heart is further advanced

from the reptilian hearts.

The hearts of birds and mammals.

Are anatomically similar and

so are discussed together now.

The atrium and the ventricle

are completely divided,

thus 4 chambers are present

2 Atria and two ventricles.

There is a complete separation

of Venus and arterial blood,

as you will see in the diagram,

the right atrium receives blood from

the precavals and the posts caval veins.

The sinus venosus is not present in adults

but his present in early development,

but later on it is indistinguishable

from the right atrium.

So the veins directly enter

the atrium in mammals,

the location of the sinus venosus

is marked by the sinoatrial node,

also called SA node.

This node plays a very important

role in the innervation of the

heart related to the heartbeat.

The blood from the right atrium then

passes through the cuspid valve,

(tricuspid valve.

In mammals) into the right ventricle.

Cusps of the valve are held together

in place by Chordae Tendineae.

These Chordae tendineae are strong and

prevent the backflow of blood.

From the ventricles,

the blood passes through semi lunar

valves and enters the pulmonary artery.

Now you may notice that the

Conus arteriosus is absent here,

and it is simply replaced by the

pulmonary trunk and the aortic trunk. Oxygenated blood,

then enters the left atrium

through the pulmonary veins.

From the left atrium,

the blood enters the left ventricle

through the bicuspid or mitral valve.

Oxygenated blood leaves the left

ventricle through a single systemic aorta,

to supply blood to the

various parts of the body.

The backflow of blood is

prevented by the semilunar valves.

The Inter atrial septum gets

completed in late embryonic stages in embryos inter-atrial foramen or a foramen ovale is present. at

The site of this forum and is

marked by a scar in the atrial

wall called the fossa ovalis.

In mammals,

each atrium also has air like flaps,

which are blind chambers,

and they're called auricles.

As you may see in the diagram.

With this,

we come through the end of

the evolution of the heart.

We have seen how the heart has

evolved from a simple modified vessel

to a powerful 4 chambered heart.

It must be noted that the evolution

of the heart goes hand in hand

with the mode of respiration.

Taken by the Organism to make it

better suited to its environment,

Here are some references for further reading.