

Hello students. This module is a  
part of Unit 4 parasitic nematodes.

The module name is *Trichinella spiralis*  
study of morphology and life cycle.

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The module comprises of  
morphology of *Trichinella spiralis*, the life cycle of  
*Trichinella spiralis* in the host.

By the end of the module,  
the student will be able to  
describe the morphology of adult  
and larva of *Trichinella spiralis* and  
will also be able to elaborate the  
lifecycle of *Trichinella spiralis*.

*Trichinella spiralis* is a parasitic  
worm belonging to the phylum  
Nematoda and is a causative agent  
of disease known as Trichinosis,

which is a serious disease

in humans and other mammals.

*Trichinella* is a smallest nematode

parasite and is most widespread

with an unusual life cycle,

and is one of the most clinically

important parasites in the world.

But morphology of adult *Trichinella spiralis* it is one of the

most smallest nematodes infecting

men and is white in color.

The male and female show sexual

dimorphism where the male is smaller

than the female and it measures in one

to 1.4 to 1.6 millimeters in length,

whereas the diameter is 0.04 millimeters.

The female,

which is much longer,

measures about 3 to 4 millimeters.

In length and 0.06 millimeters in diameter.

The body is thin and pointed anteriorly,

which is an adaptation for burrowing

into the mucosal epithelium of the host.

The posterior end of the male has a

pair of pear shaped conical papillae

which is known as claspers.

This clasper is present on either

side of the cloacal orifice and are used to hold onto

the female worm during copulation.

The male dies soon after fertilizing

the female.

The female has a terminal anus

and the vulva is located near

the oesophagus.

The uterus is filled with developing

eggs in the posterior part of the body,

whereas the anterior portion of the

body contains fully developed juveniles.

The females are viviparous that

is they give birth to young ones,

and the fertilized females they

start releasing motile larvae into

the intestinal mucosa of the host

by the 6th day of the infection.

These are the pictures of male *Trichinella spiralis* and female *Trichinella spiralis* you can see in the female that the eggs and juveniles can

be clearly seen in the diagram.

Larvae are discharged throughout

the lifespan of the female worm.

Their lifespan may

vary from 4 weeks to four months,

whereas each female gives birth

to some 1000 and it can go to 1500.

Also larvae with each measuring about 100

micrometers in length and six micrometers.

which is larger,

often encysted in striated skeletal muscles of the host.

The larvae grow 10 times in

its original size, that is,

if it is originally 100 micrometer,

it can grow up to 1000 micrometer inside

the cyst till sexual differentiation.

An ellipsoidal lemon shaped sheath

measuring 0.4 millimeters in length and

0.25 millimeter in diameter develops

around the tightly coiled larva.

So in this picture you can see a free larva,

which is not encysted in the muscle.

So once the encystment is done,

the calcification occurs of

the cyst in six to 18 months.

A protective cover around the

coil larva that is a cyst around

the coiled larva is known as the

nurse cell complex which serves

as a home for the larval parasite.

This nurse cell complex provides a

protective covering and a protection

for the larva from any mechanical

damage and also provides a or

whatever the essential nutrients

that are required by the larva.

The Nurse cell complexes basically formed

by fully transforming the muscle cell

of the host into the type of cells

which can support the growth of Trichinella larva and therefore protect it.

This occurs by dedifferentiation of muscle cells and then redifferentiation of those cells into nurse cells.

These pictures they show a cyst of *Trichinella* larva in the muscle of the host.

Life cycle of *Trichinella spiralis*.

This life cycle begins with ingestion of raw or undercooked pork with encysted larvae by host.

The pig meat, if it is consumed raw or undercooked, *Trichinella* can be transmitted to the host.

Usually the host can be human being or rat or even horse can be the host, but the horse can be exposed to the *Trichinella spiralis*, maybe by contaminated food.

once the larva enters the host body, the excystation of cyst is carried out in the stomach by the action of

digestive juices and release of larvae

occurs in the duodenum and gentlemen,

that is in the intestinal part of the host.

Within the intestines,

the larvae developed into adult

worms and after four molds

they developed to adult worms.

Over the period of 30 hours.

Once they become adults,

the mating is carried out and after

mating the female is fertilized.

This fertilized female deposits

larvae throughout her life span

that is approximately 4 months.

The number of larvae that are

deposited by the female can

vary from 1000 to 1500 larvae,

the larvae, which are delivered in the mucosa,

penetrate the intestinal wall

and migrate through the lymphatic

vessels into the bloodstream and are

carried in the circulation to various

muscle sites throughout the body,

Now it can be noted here that

only the skeletal muscles can be

a home to the larvae of *Trichinella spiralis*. They can survive only in

the skeletal muscles.

Once of the skeletal muscles,

the larvae penetrate the sarcolemma

and enter inside the muscle fibers.

here the larval development in

the muscle occurs during the

3rd to 4th week of infection.

At the time of deposition,

the larvae, as I said before,

are smaller in size and they

grow 10 times to their size.

They can reach the maximum size

by the 35th day of infection,

and this you can find one larva in

one cyst the whole life cycle of

animals of the *Trichinella spiralis* can be passed in one animal,



which may be a pig or a rat

or a human being.

But the transference of the

host is very essential for the

preservation of species of *Trichinella* from extinction. the life span of

adult host is very short usually,

but majority of larvae in the

muscle they die within six months,

but some even survive up to 10 to 31 years.

The transmission of *Trichinella* may

take place from pig to pig or pig to

human pig to rat or even from rat to rat,

but the primary host of

*Trichinella spiralis* is pig,

which serves as a reservoir host for men.

The pig may be exposed to the parasite,

maybe because it is cannibalistic

feeding on its own species or by

ingestion of feces containing the larvae.

Though this pig is a reservoir host

for other animals such as rat dogs

or even humans can be infected.

Although one individual animal can serve as

both definitive as well as intermediate host,

two hosts are needed by the *Trichinella spiralis* parasite to complete its life cycle.

The parasite entering the man

is unable to complete the entire

lifecycle within one host,

so continuance of the parasite

is maintained by another animal.

Infection of new host is always brought

about by ingestion of raw flesh of

the Trichinised animal, and the life

cycle begins as explained earlier.

These are my references.

Thank you.