

Stop scabies and the microscopic worms called strongyloides



Ivermectin medicine
kills scabies mites
and strongyloides in
our body



The Story about Cycad Food



We do a lot of work because we can't eat cycad nuts any old way, because that food is poisonous. There is a right way to do the work that takes the poison out of the cycad food.



The story about the cycad food gives us a clue about how to fight the diseases in our body, and how we can help ourselves to live well as strong and healthy people. We must do it in the right way.



First, we will learn about scabies and strongyloides, what they look like, where they live and what they do. Then the meaning of the logo will become clear.





The microscope makes things look bigger, and shows us that there are tiny living things that we can't see with our eyes alone.

These tiny living things are called germs. Some germs make us sick.

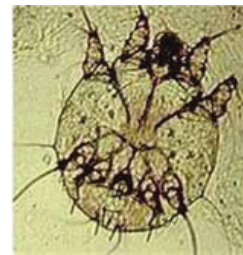
Strongyloides, scabies mites and bacteria are germs, and we can see them with a microscope.

Strongyloides and scabies mites are also called parasites.

Strongyloides look like threadworms. We can't see Strongyloides with our eyes alone, but we can see them with a microscope.



Strongyloides



Scabies

Some people can see scabies mites when they look carefully.

When we look at them with the microscope, we see that scabies mites have arms and legs like ticks.

Secondary Infection

Strongyloides and scabies mites make a pathway so that smaller living things called bacteria can get into the body

Bacteria

Bacteria are very small, much smaller than strongyloides and scabies mites. We can't see them with the eye alone, but we can see them with a microscope. Some bacteria are harmless, and some make us sick.



These are good bacteria called Lactobacillus that live in our gut.

They help us to digest our food so that we can become strong.



These are bad bacteria called Strep A.

They get into our body through sores, and can make us very sick.





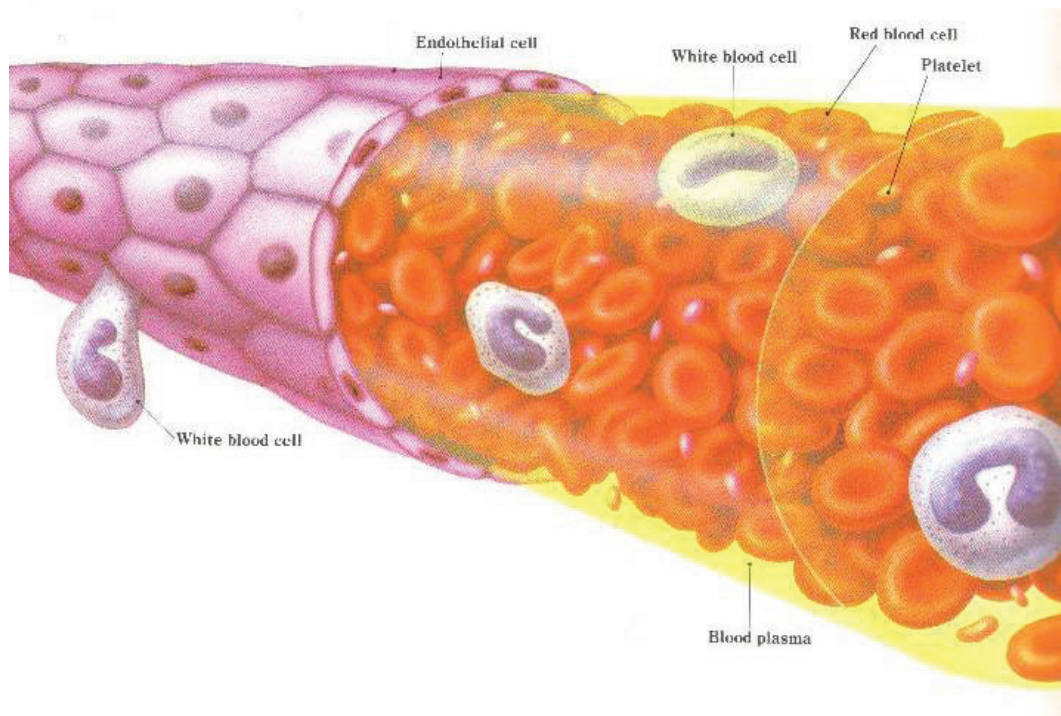
Immunity

The story about immunity tells us how our body fights foreigners, called germs, like bacteria and strongyloides and scabies mites inside our body.

This story helps us understand the story about scabies mites and strongyloides and the bacteria that they carry with them into the body

White cells

White cells look after our body. They fight foreigners (germs) inside our body. They are very small but we can see them with a microscope. White cells can go anywhere in our body. They travel through the body through the blood. When they are near germs, they squeeze out of the blood vessel and go to the foreigners. Pus is white cells together with bacteria.



This is a small blood vessel with red cells and white cells inside, seen with a microscope.

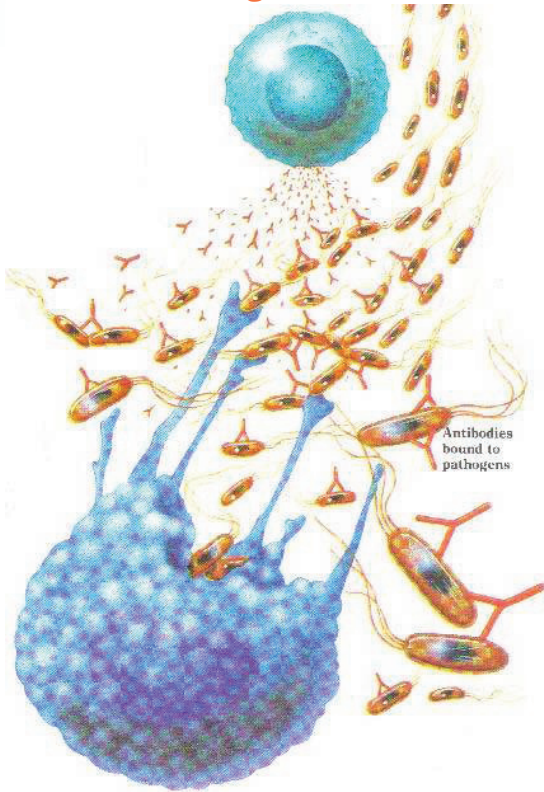
One white cell is leaving the blood vessel

White cells attack foreign disease organisms in our body



White cells search in our body for foreign disease organisms, like bacteria and parasites.

When they find the foreigners, they learn about them and make special weapons called antibodies, especially for those foreigners



This is how white cells fight bacteria

They send the antibodies to wound the foreigners.

Antibodies are like special spears made just for those particular foreigners, to wound them. Then other white cells finish off the bacteria.

These white cells eat the bacteria.

The antibodies are like a "Y" and the two ends stick to different bacteria.

So they stick the bacteria together.

Then other white cells finish off the bacteria.

These white cells eat the bacteria.

White cells cannot kill scabies or strongyloides.

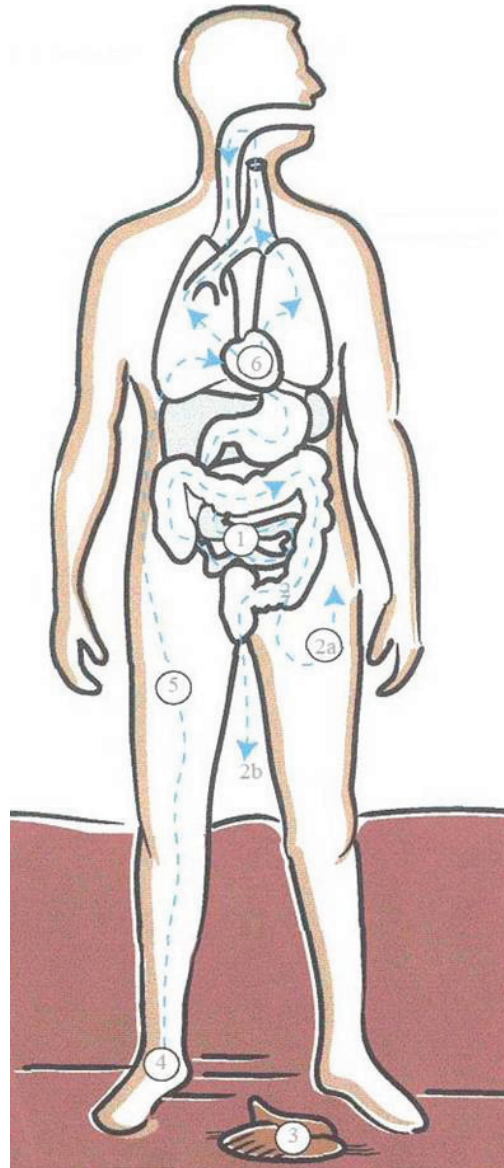
The antibodies block their mouth and other body openings, so that they become weak and lay only a few eggs.

Strongyloides direct life cycle

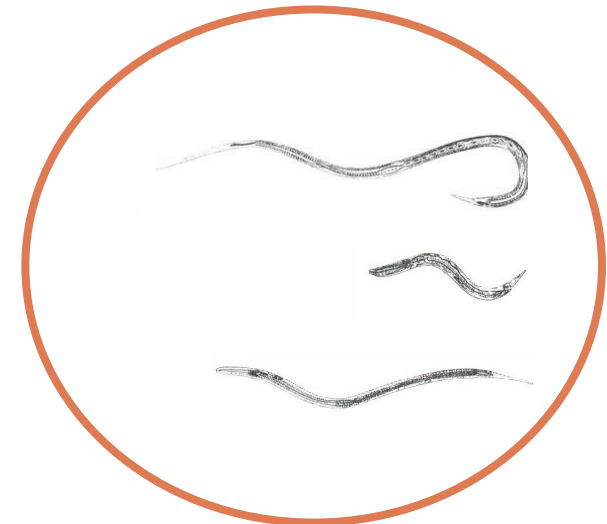
The strongyloides life cycle story has two parts

This story tells how strongyloides gets from one person to another through the faeces

1. Mother worms dig a hole in the wall (villi) of our small intestine,
They continually lay eggs inside our intestine.
The eggs hatch.
The baby strongyloides then go from the villi into the food inside our intestine.
They eat the harmless bacteria that live with the food.
2. Then the baby worms travel with the food through the intestine.
Some go out of the body with the food when the person goes to the toilet.
3. Then they live in the faeces especially where the ground or floor is damp.
They grow into teenage worms in the faeces.
Then these teenage worms look for a person.
They can live in the faeces only for a short time.
They die if the faeces becomes dry.
In the wet season they can live for only 2 weeks, then they die.



4. When a person goes near that faeces, they attach to the person's skin, then bore a hole in the skin and go into the body.
5. Then the teenage worms travel around anywhere through the body.
They eat the person's flesh and body fluids.
6. They can go into a blood vessel, then to the heart, then to the lungs, then into the air spaces in the lungs, then up the air tubes to the throat.
Then we swallow them, and they go to the small intestine and make their home there.
Then, these young worms reproduce in the villi of the small intestine.



Autoinfective Cycle

This story tells how strongyloides multiply in the body
So they always live in the body, and take over the body when the white cells
can't do their work.

This story starts in the body

The baby strongyloides are traveling with the food through the intestine.

Some baby worms grow into teenagers inside the lower intestine.

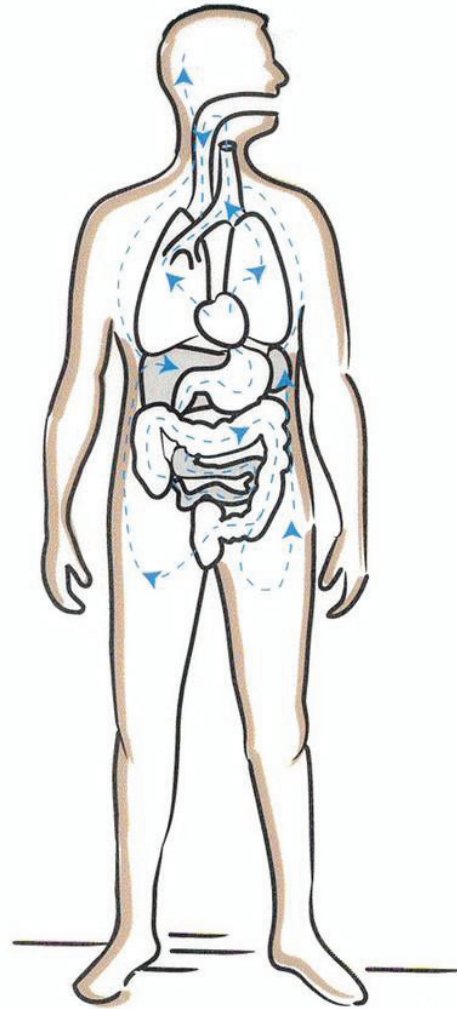
They are ready to go into the body to look for their home in the small intestine.

So they dig a hole in the side of the lower intestine or the skin near the anus, then go anywhere in the body, to the lungs, the kidneys, the liver or the brain.

Some of them follow the same path that their mothers travelled.

When they get to the small intestine, they dig a hole in the villi of the intestine, then they too reproduce.

In this way, strongyloides always remain in the body.



The white cells attack strongyloides, but they don't kill the worms. They just wound them, so that the worms produce only a few eggs. Then the person feels a little better.

If a person with strongyloides is given corticosteroid medicine such as prednisolone for a different disease, this medicine will stop the white cells from attacking strongyloides.

But if the white cells can't do their job, the strongyloides will recover, multiply quickly, take over the body, and might kill the person.



But Ivermectin medicine can kill strongyloides in the body.

Secondary Infection

There is another way that strongyloides can make people sick. Strongyloides teenagers carry bacteria through the body and the bacteria make some people sick.

Lots of bacteria live in the intestine with the food.

They are good in the intestine because they help us get strength from our food, but if they get into our body tissues, they cause sicknesses in the body.



This picture shows teenage Strongyloides and bacteria together.

When the teenage worms go from the lower intestine into the body, bacteria from the gut go with them.

Then the worms leave the bacteria behind anywhere in the body.

The bacteria reproduce and our white cells come to fight the bacteria.

This makes pus that causes abscesses anywhere in the body.

Other people become very sick when the bacteria multiply very quickly. The person might get

Pneumonia in the lungs, Meningitis in the brain or Septicaemia in the whole body.

Symptoms of Strongyloides disease

We might feel well, a little bit sick or very sick. Strongyloides might be anywhere in our body, the skin, the lungs, the intestine, the faeces, the brain, the bladder, the liver, the kidneys and the joints.

This is what can happen when we have strongyloides.



Skin

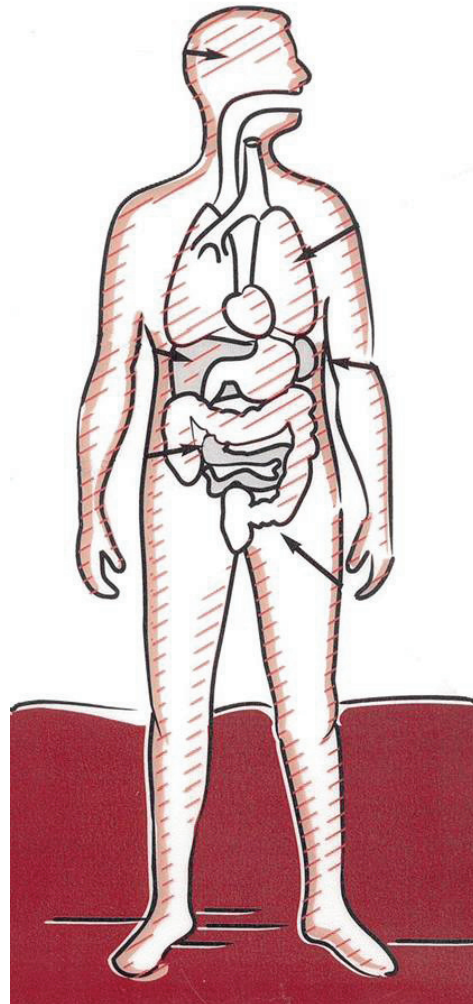
Itchy rashes that come and go, called hives or urticaria



This rash is like a track and is caused by the white cells following a teenage Strongyloides that is travelling under the skin.

Buttocks

Sores or rash on buttocks.



Brain

Meningitis.

Lungs

Coughing, wheezing, difficulty breathing, abscess, pneumonia.

Intestine

Pain in the belly that comes and goes, indigestion, bad smelling diarrhoea

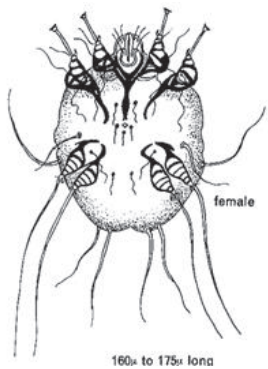
Body

Septicaemia (blood poisoning) when lots of bacteria are everywhere in the body.

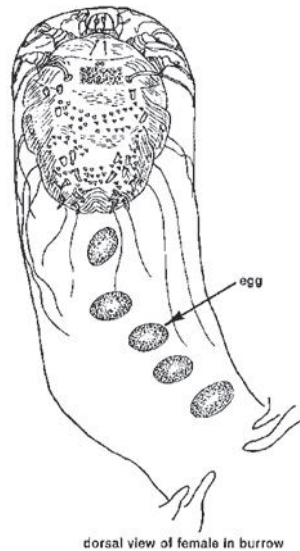
Life cycle of scabies mites

Scabies mites reproduce in our skin

Father and mother scabies mites mate on the surface of the skin



Mother
Scabies Mite

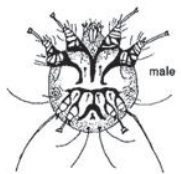


Mother Scabies mite and eggs inside a burrow

The mother scabies mite digs a burrow in our skin.

She lays about three eggs every day.

After 1 month, she will die.



Father
Scabies Mite



Baby scabies mite inside the egg

The eggs hatch after 3 days, then the babies leave the burrow.

Some make a new burrow and grow up.

Others go to another person, or into clothing.

Symptoms of scabies



When a person first gets scabies, he or she has an itchy rash in a few places on the body such as between the fingers and near the arm pits.



Scabies tracks in the skin.
The doctor put a dye on the skin to show up the burrows

In babies the scabies rash in everywhere on the body



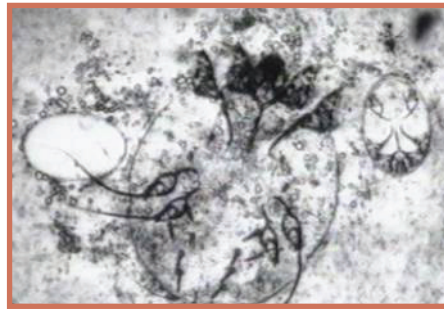
These two people have crusted scabies. Their white cells aren't doing their work properly and the scabies mites reproduce quickly.

People with crusted scabies have many scabies mites. And the mites easily travel to other people. These people are very sick and should go straight to the clinic.

Secondary Infection

There is another way that Scabies can make people sick.

Sores caused by Scabies make a pathway for bacteria called Strep A to get into the body



Bacteria live with Scabies mites in the burrow in the skin.



Strep A bacteria can make us very sick.

When the skin is broken, bacteria can get into our body through the cut or sore.

Then the white cells and the antibodies fight the bacteria and make pus in the sores. The bacteria can go through the blood system anywhere in the body.

The white cells and the antibodies fight the bacteria, but in some people the white cells also mistakenly attack the heart, causing rheumatic heart disease.

In other people, the white cells mistakenly attack the kidneys causing kidney disease.

Later on, the person may need a big heart operation or dialysis.



This person has scabies sores with pus.

Scabies mites go from one person to another very easily

Directly

Scabies is spread when a person with scabies touches another person.

Then scabies mites can go to the other person.

then burrow into his or her skin and lay eggs in that burrow,

Indirectly

Scabies also spread when the scabies mites leave our skin and go into our clothes, our sheets, blankets or mattresses.

From there they can go on to another person.

They can live in damp places, but they will die after 3 days if they do not find another person.

Scabies mites die in dry or hot places.

It is very easy to kill scabies with medicine if everyone has it at the same time.



The Ivermectin Treatment Program

The treatment team and everybody are doing all this work so that we can get rid of Scabies and Strongyloides from the community



Testing

We will examine the exposed skin to look for scabies. We may take a photo of the skin of some people with scabies, or take skin scrapings to collect scabies mites for a new scabies test.

We will take blood from the arm of adults to test for strongyloides and we will take finger-prick blood from children to test whether they are anaemic and to make a better test for strongyloides.

Some people will give us a urine specimen for us to test whether there is blood in the urine because this might be a sign that we have scabies or strongyloides in our body.

We will also test the urine of women to check whether they are pregnant.

Medicine

We will give Ivermectin medicine to everyone.



But women who are pregnant will get Lyclear cream only.



And very small children, smaller than 15 kg, will get albendazole medicine and lyclear cream (or eurax cream).



The Ivermectin Treatment Program

Second treatment

Everyone who has Strongyloides or Scabies will get a second dose of medicine about 2 weeks later.

Check-up

6 months later we will again visit everyone who had scabies or strongyloides, and test them again and given them the medicine again.

Checkup and treat everyone

Again the following year we will test and give the medicine to everyone again as before, and return 6 months later as before.

Second checkup

Everyone who has scabies or strongyloides will get a second dose of medicine about 6 months later.

Consent

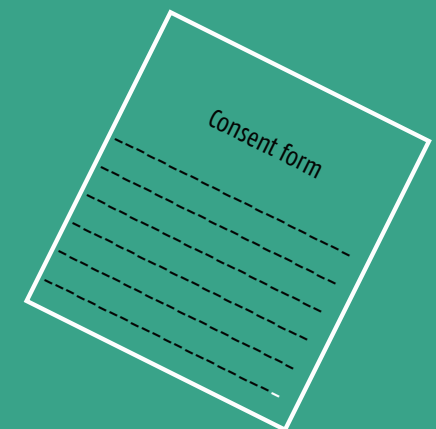
sign the consent form if you agree that it is OK:
For us to look at your skin (to look for scabies), take a photo or skin scrapings

For us to take a blood sample

For children to give us a sample of faeces

To give us a specimen of urine

To take the medicine for scabies and strongyloides diseases.



The Story about Cycad Food (Dingu) is about doing all the work

In the old days, when the clouds gathered in the south, it reminded the people about the cycad food called dingu. Then they used to spread the news around the camp and say to each other, "It is the right time to harvest the cycad food. Come, come, let's go. It's time to wash away the poison and grind the food. Once again we will get our dilly bags, then we will collect the nuts. Come, it is time to grind the food and get rid of the poison". Early in the morning just before sunrise, the people used to get up, and pick up their dilly bags, their special sticks and special stones.



Early the next morning they would wake up, have breakfast, get their bags and sit under the shade, under the special tree where people had meetings and other important discussions. That is where they would prepare the cycad food.

They would begin by sorting the nuts. Then the real work would begin. They would take the special stick of maypiny or iron wood, and crack the hard shells away from the kernels. Then they would place the kernels on paper bark for a short time to dry until they were hard. This work took a long time.

Then they would set off to the place where there were plenty of cycads, then start collecting, then keep on collecting for a long time until their bags were full. Then they would sit down under the shade and rest. While they were resting, they would sort the nuts and separate them into three different groups, old nuts, brownish yellow nuts and green nuts.

The old nuts are collected from the ground, and are not poisonous so do not need to be soaked.

The green nuts are kept until they turn brownish yellow. The brownish yellow nuts are good for washing out the poison. They used to put the different kinds of nuts into three dilly bags.

Then they used to take the old nuts, crack the shells, get out the kernels, crush them, then put the food on to bark from the paperbark tree. They would fold the paper bark, tie up the end, then put it into hot sand until it was cooked. While they waited for the kernels to cook, they would tell stories to each other. Then they would go to bed in anticipation of another day's work.



When the dilly bags were full, they used to tie them up with string, take them down to the creek, then put them into running water for 5 days to wash the poison out of the kernels.



Then they would cut the paper bark, get the special stones, the round ones called dhirrimul and the flat ones called rarralany and get the special maypiny stick ready for the next step. After 5 days, they would go back to the creek. They would take out the dilly bags full of cycad kernels, and taste them to make sure that all the poison had gone. Then they would begin to pound the kernels with the special stone called dhirrimul on the flat stone called rarralany, then grind them and form them into a fine damper or bread. Then they would cook the cycad food in hot sand, then eat it. It is real food.

Gurrigurrinydja, Baywunundhuny and Djapununudhuny are the women from the beginning times who established the way to prepare cycad food. The same method is still followed today.

Acknowledgements

Illustration acknowledgements

Dr Bart Currie

Leigh Waltman

Dr Colin Parker

Dr Maureen Rogers

Dr Wendy Page

Ewers W. 1971 Parasites of Man in Niugini. Jacaranda Press, Brisbane.

Grove DI. 1989 Strongyloidiasis a Major Roundworm Infection of Man. Taylor & Francis, London.

The Human Body. Time & Life.

Zaman V. 1978 Atlas of Medical Parasitology. Adis Press, New York.

<http://www.cdfound.to.it/html/ss26.htm>

<http://www.ifr.ac.uk/Media/NewsReleases/images/Lactobacillus-johnsonii.jpg>

<http://www.encyclopedia.com/topic/streptococcus.aspx>

<http://www.flickr.com/photos/meredith/699093383/>

<http://www.healthy-skin-guide.com/pictures-of-scabies.html>



Getting rid of Scabies and Strongyloides

Scabies

- Recognise scabies and skin sores
- Treat whole family



Strongyloides

- Test at clinic
- Test and treat whole family
- Always use toilet or dig a hole and cover it
- Keep the toilet clean
- Clean the child's bottom straight away
- When a child poos in the house or outside, clean it up straight away
- Put dirty kimbies into the rubbish straight away
- Scrub cloth nappies until they are clean, and dry them in the sun

Scabies and Strongyloides

- Wash hands after toilet and before food
- Wash bodies every day
- Clean house inside and outside
- Wash clothes often
- Dry clothes, sheets, blankets, pillows, mattresses in the sun

