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## **STD Caused by Multicellular Parasites**

Two common STDs are caused by lice or mites, multicellular skin parasites that are distributed worldwide and infect only human beings. Nonsexual transmission can sometimes occur in both instances. Besides the discomfort they cause, their chief importance is to raise the possibility that other, unrecognized, STDs might be present. Fortunately, neither of these parasites are vectors of microbial diseases.

### **“Crabs” (Pubic Lice, Pediculosis Pubis)**

Pediculosis pubis results from infestation by a species of louse. Lice are wingless insects dependent for nutrition on sucking blood from their host.

#### **Symptoms**

The principal symptoms are itching in the pubic area, and psychological stress from seeing the tiny lice and their eggs, called nits, both visible to the unaided eyes. Sometimes, tiny spots of

blood are seen on the underclothing. In heavy infestations, these lice may cling to hair of parts of the body other than the pubic area, sometimes even the eyebrows and eyelashes.

### Causative Agent

Pediculosis pubis is caused by *Phthirus pubis*, a slow-moving insect resembling a microscopic crab (figure 25.22). The adult form is approximately 2 mm in diameter; smaller juvenile forms feed along with the adults. The females lay about six eggs daily, attached tightly to body hairs. Hatching occurs in about 1 week, and after several developmental stages, adulthood is reached in about 2 weeks. Their life span is approximately 1 month.

### Pathogenesis

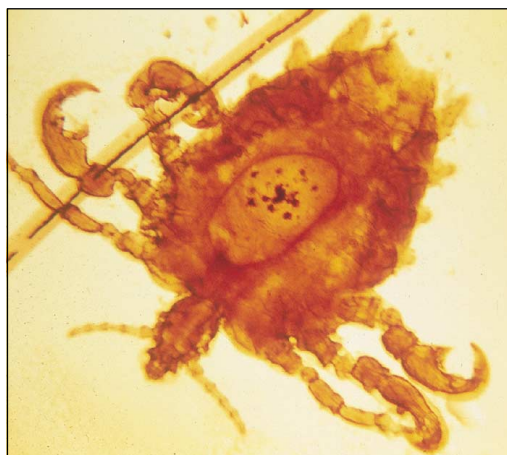
Crab lice have piercing mouthparts with which they penetrate the skin to obtain a blood meal. They usually feed for several hours twice daily, leaving a tiny puncture site that can ooze a little blood. Symptoms are due to an allergic reaction to the feeding lice, and they do not appear for about a week after the infestation begins. If the host becomes reinfested at a later date, symptoms begin almost immediately. The intense itching leads to scratching, which can in turn lead to secondary bacterial infection.

### Epidemiology

*Phthirus pubis* is slow moving and prefers to cling to the host's hair using its clawlike hooks. Since it can live only about 24 hours away from a human host, transmission generally occurs during close physical contact, mainly but not exclusively during sexual intercourse. Fomites such as a towel or a theater seat can occasionally transmit the organisms.

### Prevention and Treatment

Condoms do not prevent transmission. Several insecticides are approved for treating pediculosis pubis, but they must be used exactly as directed to avoid possible serious toxicity. Bedding



1 mm

**Figure 25.22** Crab Louse, *Phthirus pubis*, is Usually Sexually Transmitted It is not known to be a vector of infectious agents.

and clothing is washed in hot water, dry cleaned, or kept from human contact for 3 days. Any sexual partners over the prior month are examined and treated if needed. All are reexamined after 1 week and retreated if necessary.

### “Seven-Year Itch” (Scabies)

Scabies, also known as the “seven-year itch,” results from infestation with a mite, a tiny member of the arachnids, the class of eight-legged creatures that includes spiders and scorpions. Other mites, such as the house mouse mite, can transmit microbial diseases, and the dust mite causes allergic asthma. The scabies mite is restricted to human beings, and it does not transmit microbial diseases. Scabies occurs worldwide predominantly associated with poverty and crowding, but anyone can contract the disease.

### Symptoms

As with pediculosis pubis, the dominant symptom of scabies is intense itching. Besides the pubic area, the space between the fingers, the wrists, and the area under the breasts are often involved. Rarely, the entire body below the neck is infested, causing a scaly rash.

### Causative Agent

The causative agent of scabies is *Sarcoptes scabiei*. The adult female (figure 25.23a) is only 330 to 450  $\mu\text{m}$  long; the male is smaller. The organisms live on the surface of the human skin. The females make burrows into the outer layers of epidermis (figure 25.23b), forming tunnels where they lay several eggs daily over a life span of 1 to 2 months. The tunnels are visible to the unaided eyes as short, dark-colored wavy lines, sometimes with a vesicle overlying the end containing the mite. The mites can be scraped from the tunnels with a scalpel and identified microscopically, the only way accurately to diagnose scabies. Six-legged larvae hatch from the eggs and mature on the skin surface to the eight-legged form in about 2 weeks.

### Pathogenesis

Usually it takes 2 to 6 weeks after contracting scabies for symptoms to appear. If following a cure scabies is contracted again, however, symptoms appear in 1 to 4 days. Thus as with pediculosis pubis, the host's allergic response to the mites and their feces is largely responsible for symptoms of the disease. In the usual individual with scabies, the number of mites is less than 100 and the disease goes away by itself in a matter of months. In individuals with AIDS and other immunodeficiencies, however, millions of the organisms can be present, spreading over much of the body and causing a severe rash with thickening and peeling of the skin. Opportunistic bacterial pathogens, introduced by scratching, are a serious threat to patients with scabies.

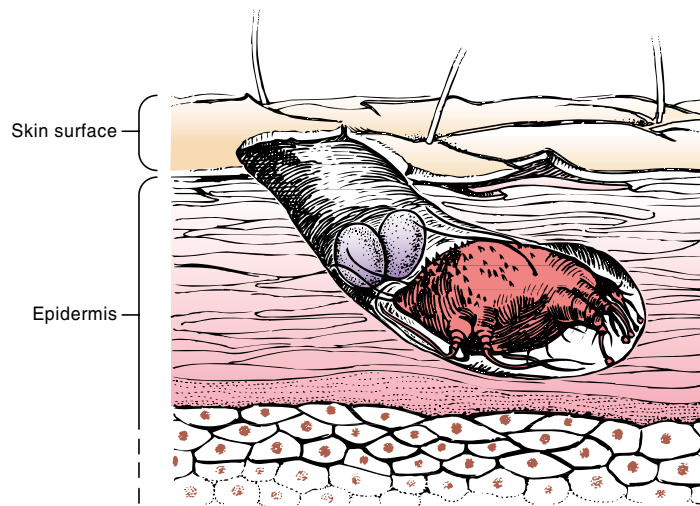
### Epidemiology

Scabies is usually transmitted by close contact with a person who has the disease. In adults, transmission often occurs as a result of sexual contact; in children, this is rarely so. Adults with the disease should be checked for other possible STDs. Nonsexual transmission of scabies occurs readily among children, especially those less than five years old.



(a)

0.25 mm



(b)

**Figure 25.23** Seven-Year Itch Mite, *Sarcoptes scabiei*, Commonly Sexually Transmitted

(a) Microscopic appearance in scrapings of a scabies burrow. (b) The female mite burrows into the outer layer of skin to lay her eggs, causing an intensely itchy rash. *Sarcoptes scabiei* is not known to be a vector of infectious diseases.

### Prevention and Treatment

Scabies is prevented by avoiding contact with those who have scabies, their bedding, and their clothing. Sexual and other close contacts within the month prior to diagnosis need to be examined and treated. Bedding and clothing is washed in hot water, dry cleaned, or removed from human contact for 3 days. Insecticides suitable for use on the skin are effective against *S. scabiei*, as is a sulfur-containing ointment, and ivermectin, an antiparasitic medication that paralyzes the organism. These medications must be used exactly as prescribed in order to minimize the risk of serious side effects.

The main characteristics of pediculosis pubis and scabies are presented in **table 25.17**.

### MICROCHECK

The main importance of pubic lice and scabies is to raise the possibility of other sexually transmitted diseases. The possibility of secondary infection

introduced by scratching the involved area is another important consideration.

- Explain why it takes 2 to 6 weeks for symptoms to appear after first contracting scabies, but only a few days after contracting the disease again.
- What further testing should be considered once pubic lice or scabies is diagnosed in an adult?
- What evidence can you present that the immune system plays a role in controlling scabies?
- Why will condoms not prevent the spread of crab lice?

### FUTURE CHALLENGES

**F**ew problems are as complicated as getting control of sexually transmitted diseases because of the psychological, cultural, religious, and economic factors that are involved, which vary from one population to another.

**TABLE 25.17** Pediculosis Pubis and Scabies

	<b>Pediculosis Pubis (“Crabs”)</b>	<b>Scabies (“Seven-Year Itch”)</b>
Symptoms	Intense itching, visible lice and eggs	Intense itching
Incubation period	Usually about 1 week	Usually about 1 month (2 to 6 weeks)
Causative agent	<i>Phthirus pubis</i> , a louse	<i>Sarcoptes scabiei</i> , a mite
Pathogenesis	Skin penetration by a blood-sucking insect; allergic reaction to it	Burrowing into the epidermis by an arachnid; allergic reaction to it
Epidemiology	Transmitted by sexual intercourse and other close physical contact; sometimes by fomites	Same as for pediculosis pubis
Prevention and treatment	Avoidance of persons with the disease, their clothing and bedding; treatment of contacts; insecticide medications applied to the skin	Same as for pediculosis pubis. Additional treatment options include ivermectin and a sulfur ointment