Plague

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Septicemic plague

Lymphatics ultimately drain into the bloodstream, so the plague bacteria may enter the blood and travel to almost any part of the body. In septicemic plague, bacterial endotoxins cause disseminated intravascular coagulation (DIC), causing tiny clots throughout the body and possibly ischemic necrosis (tissue death due to lack of circulation/perfusion to that tissue) from the clots.

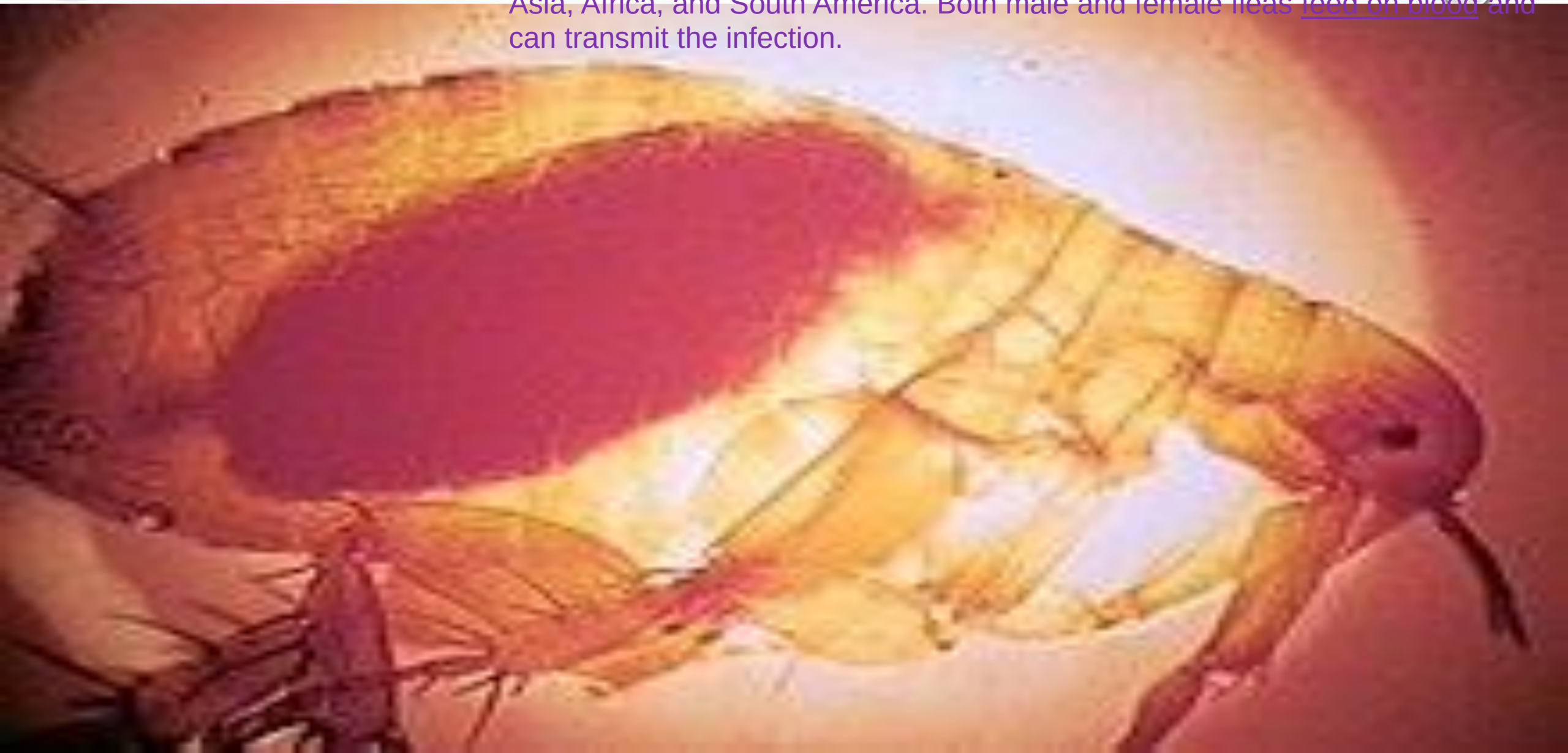
DIC results in depletion of the body's clotting resources so that it can no longer control bleeding. Consequently, there is bleeding into the skin and other organs, which can cause red and/or black patchy rash and hemoptysis/hematemesis (coughing up/ vomiting of blood). There are bumps on the skin that look somewhat like insect bites; these are usually red, and sometimes white in the center. Untreated, the septicemic plague is usually fatal. Early treatment with antibiotics reduces the mortality rate to between 4 and 15 percent.

Pneumonic plague

The pneumonic form of plague arises from infection of the lungs. It causes coughing and thereby produces airborne droplets that contain bacterial cells and are likely to infect anyone inhaling them. The incubation period for pneumonic plague is short, usually two to four days, but sometimes just a few hours. The initial signs are indistinguishable from several other respiratory illnesses; they include headache, weakness, and spitting or vomiting of blood. The course of the disease is rapid; unless diagnosed and treated soon enough, typically within a few hours, death may follow in one to six days; in untreated cases, mortality is nearly 100%.

Cause

The Oriental rat flea (Xenopsylla cheopis) engorged with blood after a blood meal. This species of flea is the primary vector for the transmission of *Yersinia pestis*, the organism responsible for bubonic plague in most plague epidemics in Asia, Africa, and South America. Both male and female fleas feed on blood and can transmit the infection.



Transmission of *Y. pestis* to an uninfected individual is possible by any of the following means.

- droplet contact – coughing or sneezing on another person

- direct physical contact – touching an infected person, including sexual contact

- indirect contact – usually by touching soil contamination or a contaminated surface

- airborne transmission – if the microorganism can remain in the air for long periods

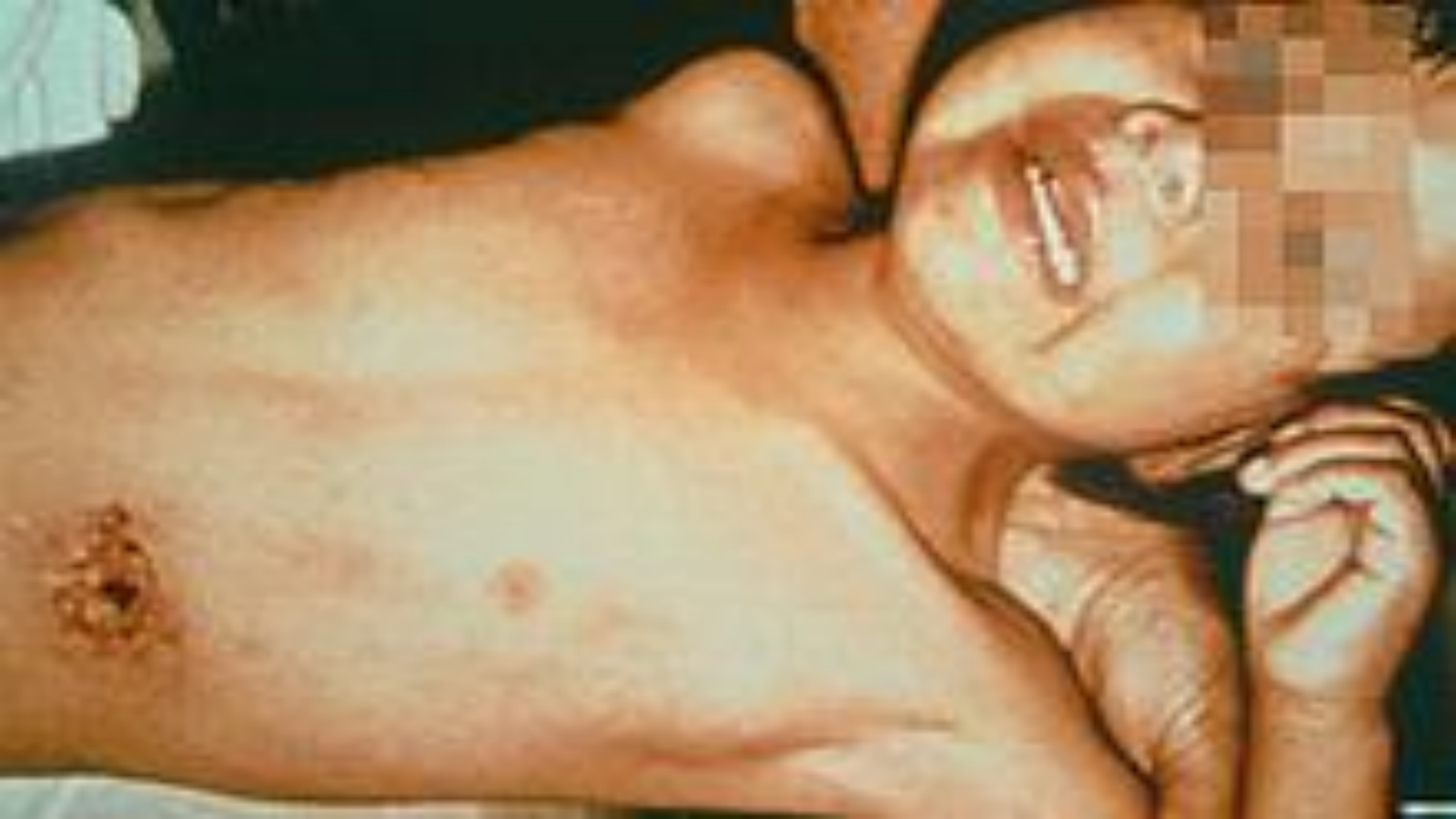
- fecal-oral transmission – usually from contaminated food or water sources

- vector borne transmission – carried by insects or other animals.

Yersinia pestis circulates in animal reservoirs, particularly in rodents, in the natural foci of infection found on all continents except Australia. The natural foci of plague are situated in a broad belt in the tropical and sub-tropical latitudes and the warmer parts of the temperate latitudes around the globe, between the parallels 55 degrees North and 40 degrees South.

Contrary to popular belief, rats did not directly start the spread of the bubonic plague. It is mainly a disease in the fleas (*Xenopsylla cheopis*) that infested the rats, making the rats themselves the first victims of the plague. Rodent-borne infection in a human occurs when a person is bitten by a flea that has been infected by biting a rodent that itself has been infected by the bite of a flea carrying the disease. The bacteria multiply inside the flea, sticking together to form a plug that blocks its stomach and causes it to starve.

The flea then bites a host and continues to feed, even though it cannot quell its hunger, and consequently, the flea vomits blood tainted with the bacteria back into the bite wound. The bubonic plague bacterium then infects a new person and the flea eventually dies from starvation. Serious outbreaks of plague are usually started by other disease outbreaks in rodents or a rise in the rodent population.



A child bitten by a flea infected with the bacterium *Yersinia pestis*. *Y. pestis*, a member of the family Yersiniaceae, has caused the bite to become ulcerated.

THANK YOU