

Pasteurella

- This bacterial genus is known as a pathogen-
of domestic animals.-
- The best-known species is *Pasteurella multo-
cida* which can be transmitted to human by-
dog and cat bites.-
- It is G-negative coccobacilli causing pasteurellosis-
which is rare in humans and develop only-
after unique animal contact.-

Characters of *P.multocida*

- Small ,coccobacillary, Gram-negative •
- Grow readily on blood agar but not Mac- •
Conkey agar. •
- Oxidase positive & ferments a variety of •
carbohydrates. •
- Penicillin susceptible •



Diagnosis of *P. multocida*

- Gram smear (few organisms are to be seen on direct Gram smear)
- Culture of pus from the lesion.
- For unknown reasons, *P. multocida*, occasionally isolated from sputum of patients with bronchiectasis.
- Treatment usually accomplished by penicillin.

Pasteurella pestis

- The etiologic agent of **plague**. •
- Isolated by Yersin in china in 1894 & •
the name changed later to *Yersinia pestis*
- Diagnosed by testig bubo aspirate, blood & sputum •
- : a) Gram stain(bipolar- •
staining Gram-negative bacilli). •
- b) Immunofluorescence technique for •
smears or cultures •
- c) Grow on blood & MacConkey agar(growth may •
require more than 24hrs.of incubation) •



Plague

- An explosive pandemic disease with high mortality (black death), refers only to infection caused by *Y.pestis*
- In the 14th century, 25m died of plague in Europe.
- Plague is a disease of rodents transmitted to man by the bite of rat fleas.

Epidemiology of Plague

- Plague is a disease of rodents transmitted to human body by the bite of rat flies.
- It has two epidemiological cycles:
 - a: the sylvatic & b: the urban
- Sylvatic transmission among wild rodents (*L.sylvaticus*) is primary reservoir.
- When infected rodents enter a city, the urban cycle starts.

Plague Epidemiology(Cycle)

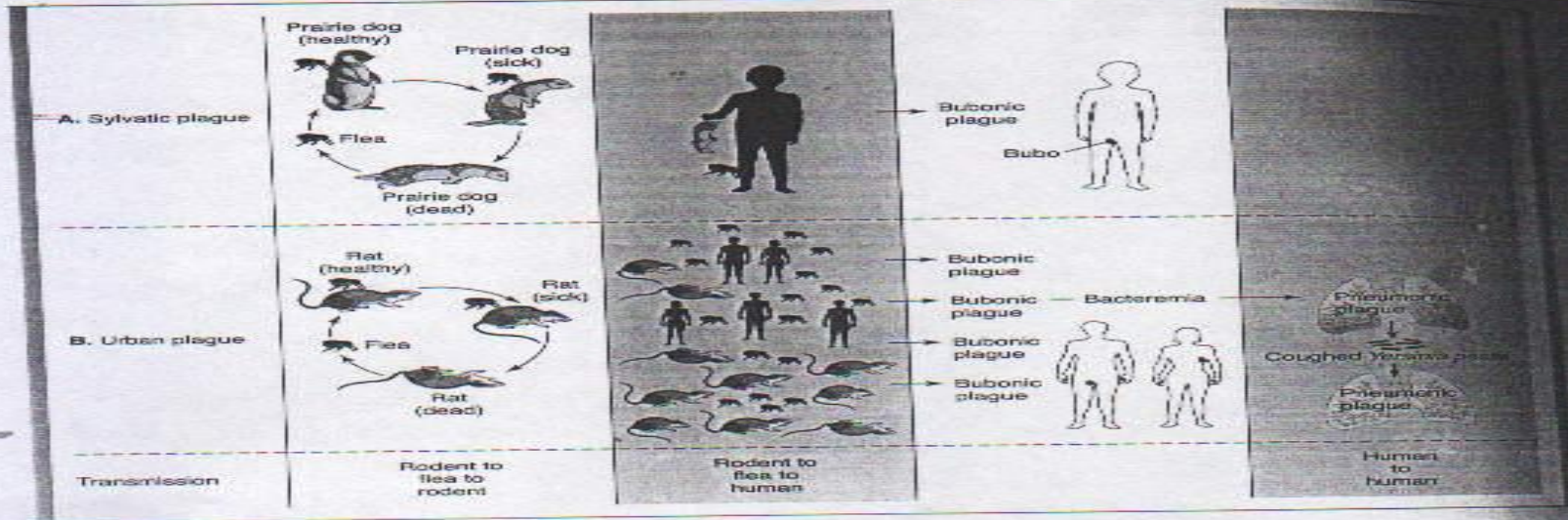


FIGURE 32-1

The epidemiology of plague. A. In the sylvatic cycle fleas leaving infected rodents, such as mice and prairie dogs, pass the infection to others in the population. Humans rarely contact these rodents but when they do, the flea bite transmits plague. B. In the urban cycle, masses of rats are in closer contact with humans and bites from infected fleas transmit the infection to many. In both cycles, initial transmissions result in bubonic plague. Bacteremia with *Yersinia pestis* may infect the lungs to cause pneumonic plague. Pneumonic plague is transmitted human-to-human by the respiratory route without the involvement of fleas.

dogs, deer mice, rabbits, and wood rats. Transmission between them involves fleas. Coyotes or wolves may be infected by the same fleas or by ingestion of infected rodents. By their nature, the reservoir animals rarely come in contact with humans; when they do, however, the infected fleas they carry can transmit *Y. pestis*. The most common circumstance is a child exploring the outdoors who comes across a dead or dying prairie dog and pokes, carries, or touches it long enough to be bitten by the fleas leaving the animal. The result is a sporadic case of bubonic plague, which occasionally becomes pneumonic.

Sylvatic plague, which exists in most continents, is common in Southeast Asia but is not found in Western Europe or Australia. In the United States, the primary enzootic areas are the semiarid plains of the western states. Infected animals and fleas have been detected from the Mexican border to the eastern half of Washington State. The geographic focus of human plague in the United States is in the "four corners" area where Arizona, New Mexico, Colorado, and Utah meet, but cases have occurred in California, west Texas, Idaho, and Montana. Most years, as many as 15 cases are reported, although this has varied from 20 to 40 in the mid-1980s. These variations are strongly related to

Nonepidemic disease is linked to animal contact

Most US cases are in western states

Pneumonia can be acquired from animals

Pathogenesis of Plague

- Fleas feed on infected with *Y.pestis* •
- Bacteria multiply in infected flea. •
- Virulence factors such fibrinolysin and •
phospholipase are produced at 20-28C. •
- That will enhance multiplication of *Y.pestis* in the •
flea gut may be blocked.
- Upon biting the rat or human a new case •
is created. •

IMMUNITY

- Lasting immunity can be obtained after recovery from bubonic plague. •
- The mechanism of immunity in human body has not been studied extensively. •
- Animal studies suggest that antibody against the F1 capsular protein is protective by enhancing phagocytosis. •

Diagnosis

- Staining of a smear aspirated from a bubonic plague should show Gram negative bipolar stained bacteria.
 - Immunofluorescence technique is used for immediate identification of smear or culture.
 - *Y.pestis* can be grown on MacConkey and blood agar from blood, sputum and *Bubo aspirate*.
- (Results must be reported without any delay)

Treatment & Prevention

- Streptomycin is the treatment of choice for both bubonic and pneumonic plague.
- Tetracycline, Chloramphenicol and Trimethoprim-sulfamethoxazole are alternatives.
- Rat control and general public health measures are useful for prevention of plague.
- Tetracycline can be used as prophylactic Antibiotic.