



## Human Ehrlichiosis

### WHAT IS HUMAN EHRLICHIOSIS? (pronounced *air-lick-ee-OH-sis*)

Human ehrlichiosis is a tick-borne illness that is caused by an extremely small type of bacteria known as "ehrlichiae." Human ehrlichiosis is just one member of a group of diseases known collectively as 'ehrlichoses,' so named because they are each caused by a different species of ehrlichiae. Ehrlichiae invade, and live within, white blood cells. They belong to the family Rickettsiaceae, genus *Ehrlichia*. Ehrlichiae are closely related to rickettsiae, the type of bacteria that cause Rocky Mountain spotted fever (RMSF).

### HISTORY

Ehrlichiosis was first recognized in 1935 as a disease of dogs (canine ehrlichiosis) caused by *Ehrlichia canis*. In the 1960s a number of military guard dogs stationed in Vietnam died from this disease. Human ehrlichiosis is a more recently recognized illness. The first diagnosed case occurred in 1986 in a 51-year-old man from Detroit who had been exposed to ticks in a rural area of Arkansas. In 1990, the agent of human ehrlichiosis was isolated from the blood of a U.S. Army reservist at Fort Chaffee, Arkansas. The new species of ehrlichiae was named *E. chaffeensis*.

### SYMPTOMS

Symptoms of human ehrlichiosis begin in 1-21 (average 7) days following infection, and they resemble

those of RMSF without a rash. Symptoms vary greatly in severity, ranging from an illness so mild that no medical attention is sought, to a severe, **life-threatening** condition. The most common symptoms are high fever, headache, chills, and muscular aches and pains, but may also include nausea, vomiting, loss of appetite, and an overall feeling of bodily discomfort. A spotted rash similar to that seen in RMSF, although usually less prominent and more variable in appearance and location, is present in only 20-40 percent of cases. Since *E. chaffeensis* invades white blood cells, the body's immune system is adversely affected. This lessens the body's ability to fight other infections, and complications can quickly arise. In the most severe cases, kidney or respiratory failure occurs. There have been a small number of deaths.

### OTHER TYPES OF EHRLICHIOSIS

Prior to the discovery of *E. chaffeensis*, *E. sennetsu* was the only *Ehrlichia* species known to infect humans. *E. sennetsu* causes Sennetsu fever, a **mononucleosis-type** illness first described in 1954, and occurring primarily in Japan. Sennetsu fever is very rare, and is usually extremely mild, with no deaths having ever been reported.

Most recently, the Journal of the American Medical Association reported 12 cases of what may be a new type of human ehrlichiosis (termed 'human granulocytic ehrlichiosis,' or 'HGE'), occurring in



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Minnesota and Wisconsin from 1990 through 1993. Two of the patients died from complications and secondary infections.

The species that causes HGE has not yet been conclusively identified, but differs from *E. chaffeensis* in that it attacks a different type of white blood cell. While *E. chaffeensis* infects white blood cells known as monocytes, the HGE organism infects white blood cells known as granulocytes. Clinical symptoms of both infections are the same.

Other species of *Ehrlichia* cause disease in animals, and include *E. ewingii* (canine granulocytic ehrlichiosis), *E. risticii* (Potomac Horse Fever), *E. equi* (disease in horses), and *E. phagocytophila* (disease in sheep and cattle).

### **DIAGNOSIS AND TREATMENT**

A diagnosis of ehrlichiosis is confirmed by testing blood samples for antibody titers to different species of *Ehrlichia*, and by observing the bacteria in different types of white blood cells. The antibiotic doxycycline is very effective for treating both human ehrlichiosis and HGE. Because ehrlichiosis can be so severe, or even deadly, it is very important to obtain early diagnosis and treatment.

### **DISTRIBUTION**

The incidence of human ehrlichiosis is unclear. The Centers for Disease Control and Prevention (CDC) recorded 339 cases from 27 states for the period 1985 through 1993, primarily based on blood samples sent to them for testing. Most cases were from Arkansas, Georgia, Missouri, Oklahoma, Tennessee, Texas, and Virginia.

### **HOW IS EHRLICHIOSIS SPREAD?**

Both human ehrlichiosis and HGE appear to be tick-borne. The suspected vector for human ehrlichiosis is the Lone Star tick, *Amblyomma americanum*. This tick is very common in the south central and southeastern United States, where the majority of cases of human ehrlichiosis have been acquired. It is less clear which tick species transmits the causative agent of HGE, but there is some evidence that the American dog tick (*Dermacentor variabilis*) or black-legged tick (*Ixodes scapularis*, also known as the deer tick) might play a role. The brown dog tick, *Rhipicephalus sanguineus*, is the most likely vector of canine ehrlichiosis.

### **PREVENTION**

Help prevent human ehrlichiosis, and other tick-borne diseases, by protecting yourself from ticks. When you are in tick habitat (tall grass and weeds, scrubby areas, woods, and leaf litter), follow these precautions:

- ◆ **Wear the proper clothing** — long pants tucked into socks or boots, long sleeve shirt, shirt tucked into pants, light-colored clothing to more easily spot ticks.

- ◆ Perform frequent tick checks. Ticks are often found on the thigh, groin, arms, underarms, legs, and scalp.

- ◆ Use a repellent containing permethrin on your clothing (NSN 6840-O 1-278-1336, aerosol spray; or NSN 6840-01-345-0237, individual impregnation kit for the field uniform) and a repellent containing deet (N,N-diethyltoluamide, NSN 6840-O 1-284-3982, long-acting lotion) on your exposed skin.

- ◆ Remove attached ticks as soon as they are found. Use tweezers to firmly grasp the ticks mouthparts up against the skin, and pull back slowly and steadily. Be patient — the ticks central mouthpart called the hypostome is covered with sharp barbs, sometimes making removal difficult. Don't pull back sharply, as this may tear the mouthparts from the body of the tick, leaving them embedded in the skin. If the mouthparts do break off, don't panic - the mouthparts alone cannot transmit disease because the infective body of the tick is no longer attached. However, to prevent secondary infection, remove the mouthparts as you would a splinter. Never squeeze the body of the tick or use such things as Vaseline, fingernail polish remover, or a match while the tick is attached: these materials might agitate the tick and cause it to regurgitate infective fluid into the skin.

- ◆ After removal, wash the wound site, and apply an antiseptic. **SAVE THE TICK** in a jar or plastic bag for identification should you later develop disease symptoms. Preserve the tick by either adding some alcohol to the jar or by keeping it in the freezer. Identification of the tick may facilitate the physician's diagnosis and treatment.

- ◆ See a physician if you become ill after being exposed to ticks.