

—Babesiosis:

Babesiosis is a zoonotic disease which is triggered by infection with a protozoon of the genus *Babesia*. Babesia is so named after Babes who in 1888 described the intra-erythrocytic parasites in the blood of the cattle and sheep in Romania. In 1893, the parasite was shown to cause the tick-borne disease Texas fever, which is acute hemolytic disease of cattle in the USA.

Infection in the vertebrate is acquired through the bite of ixodid ticks in which the parasite undergo its sexual cycle. The sporozoite (vermicles) present in the salivary glands of the ticks, are inoculated into the vertebrate host. Enter the blood stream and invade erythrocytes in which they undergo asexual multiplication by budding. Release of daughter parasites leads to invasion of fresh red cells and further asexual multiplication. The intra-erythrocytic parasite is typically pear-shaped, about 2-5 μm in size and usually occur in pairs. The appearance in giemsa-stained film may be mistaken for plasmodium falciparum ring stage. The parasite digests hemoglobin, but no pigment is formed, in contrast to plasmodium. Ticks feeding on the vertebrate get infected. The parasite can be maintained through successive generations transovarian transmission. The passage of Babesia from a tick to its progeny in this manner is known as transovarian transmission. Ticks can therefore act as reservoir host as well as vector.

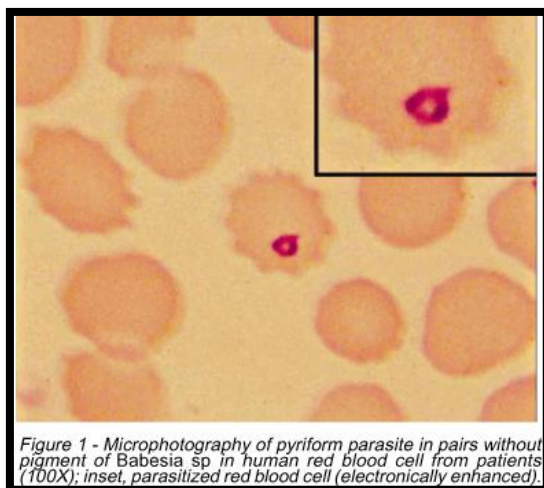


Figure 1 - Microphotography of pyriform parasite in pairs without pigment of Babesia sp in human red blood cell from patients (100X); inset, parasitized red blood cell (electronically enhanced).

Transmission:

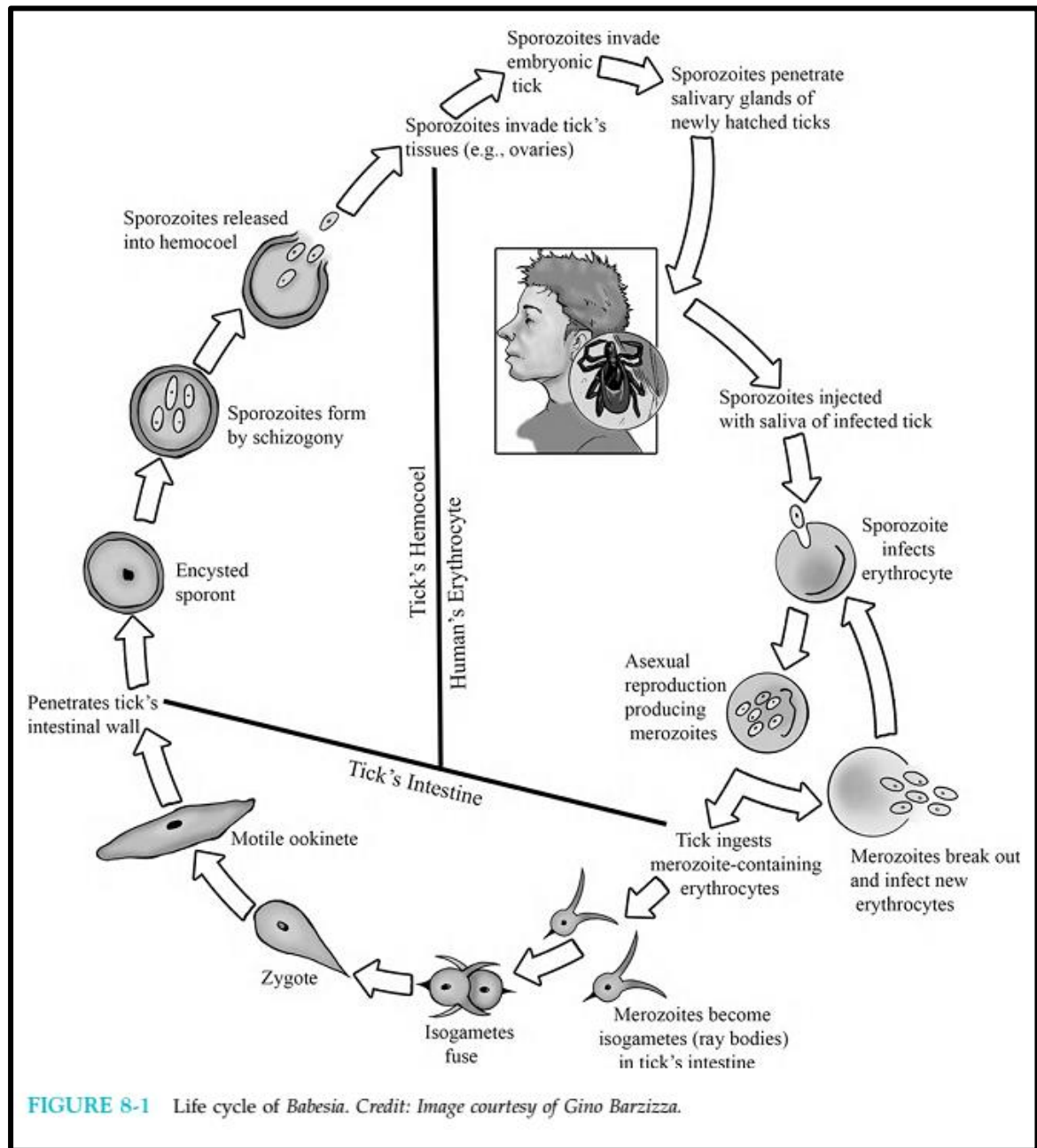
Transmission is via the bite of hard ticks such as *Ixodes scapularis* and *Ixodes ricinus*. In ticks transstadial transmission occurs. The parasite passes from larva to nymph to adult tick. The name of Piroplasma was given to this parasite because of its pear-shape, so the disease caused by this parasite was known as piroplasmosis (from pyrum-pear). Human infection caused by *B.microti* , *B.divergens* , *B.bovis* have been recorded in Europe and USA.



Babesia microti trophozoites undergo asexual reproduction in human blood and divide into two or four merozoites. To date no exo-erythrocytic cycle, as exists in *Plasmodium* species, has been described. Infected red blood cells undergo haemolysis. This releases the protozoa which can then penetrate new red blood cells.

Infections via blood transfusions have been described. Transplacental infection may occur. When a tick sucks blood, the parasites are in the blood meal. This blood meal is enclosed in a peritrophic membrane in the tick's gut. The parasite changes shape and it is assumed that it produces gametes. Once fertilisation is complete the zygote penetrates the peritrophic membrane and passes through the intestinal epithelium by endocytosis. Once in the haemolymph it forms an cigar-shaped ookinete, which penetrates the salivary glands. There, the parasite forms sporoblasts, a stage which can overwinter. Thousands of

sporozoites are formed. At the time of the tick's next feeding, the parasite is mature and ready to be injected with the saliva.



Clinical aspects:

Asymptomatic infection may persist for months or years. If symptomatic, the first symptoms occur after an incubation period of one to two weeks. Malaise, tiredness, fever, headache, nausea and abdominal pain, myalgia and joint pain are early but aspecific symptoms. The body temperature may rise to 40°C.

Hepatosplenomegaly with haemolysis and jaundice, haemoglobinuria, mild neutropenia and thrombocytopenia follow. There is no lymphadenopathy.

In severe cases ARDS [acute respiratory distress syndrome] with shock may develop. Infections may have a dramatic course in asplenic persons, chiefly in the European forms. Here the infection is similar to *P. falciparum* malaria. Splenectomy or immunosuppression during asymptomatic infection may lead to a full blown infection.

Diagnosis:

Diagnosis is made from a blood smear stained with Giemsa. The parasitaemia is generally 1 to 10%. Haemoglobinuria and proteinuria occur. Sometimes the mature parasite is in the form of a clover leaf: a so-called tetrad or Maltese cross.

The intra-erythrocytic dimension of the merozoite is 1 to 2.5 μm . It is pear-shaped, oval or round. The circular appearance means that Babesia is often confused with Plasmodium falciparum, but malaria pigment cannot be detected.

There are also no gametocytes or malaria schizonts. In Babesia infections, large parasites may contain a central white vacuole, which is not present in malaria.

Serological tests and DNA analysis may help in diagnosis. Hamsters and gerbils can be inoculated to cultivate the protozoa, but this can only be done in specialised centres. It is possible that some of the "malaria" in Africa is in fact babesiosis.

Treatment:

Since babesiosis can be mistaken for malaria, it is sometimes treated with chloroquine. In spite of some claims of success, there is no real evidence that the drug is effective against this disease.

- ❖ Pentamidine with cotrimazole,
- ❖ Clindamycin and oral quinine have been used for treatment.

Prevention:

Asplenic persons should avoid endemic regions and pay extra attention to tick prevention (proper clothes, repellent containing at least 30% DEET, permethrin, physical inspection after walking).