

TICK-BORNE DISEASES

Ticks (order Ixodida) are parasitic arachnids. They can be active throughout the year whenever temperatures remain above approximately 7–8 °C for several consecutive days. Their activity is highest from spring to autumn but, due to increasingly mild winters, ticks may also be active during winter months. Ticks tend to rest where it is warm and humid: in low-lying bushes, in the grass, along the way or in the undergrowth and transfer on a passing animal or person.

Ticks mostly feed on the blood of host animals like rodents and deer. The blood of the host animals may contain germs, which are then transferred to the feeding ticks and can be passed on to humans later on.

There are mainly two tick-borne diseases:

1. Tick-Borne Encephalitis, TBE (in German: **Frühsommer-Meningoenzephalitis, FSME**)

Tick-borne encephalitis (TBE) is caused by a virus (a Flavivirus) that is transmitted by infected ticks (0.1 – 5%).

According to the Robert Koch Institute the area of Heidelberg as all Baden-Wuerttemberg is classified as a risk area for TBE. Please find [here](#) a map of risk areas in Germany.

Signs and symptoms

The incubation period of TBE is typically between 7 and 14 days, sometimes up to 4 weeks. TBE is a two-phase illness starting with non-specific flu-like symptoms which may include fever, malaise, limb pain, headache, nausea, and/or vomiting in the first phase.

Only 5 – 30% of the infected individuals develop the second phase after a few days of remission. The second, the neurologic phase involves the central nervous system causing neurological disorder with symptoms of meningitis (e.g., fever, headache, and a stiff neck), encephalitis (e.g., confusion, sensory disturbances, and/or motor abnormalities, paralysis) or myelitis (e.g. muscle weakness or paralysis, paresthesia).

The convalescent period can be long and the incidence of sequelae may vary between 30% and 60%, with long-term or even permanent neurologic symptoms. The disease is fatal in rare cases only (mortality is about 1%).

If you perceive any of the above-mentioned symptoms after a tick bite, please consult a physician.

Treatment

There is no specific antiviral treatment for TBE. Meningitis, encephalitis, or myelitis or a combination thereof (meningo-encephalitis) requires hospitalisation and supportive care based on syndrome severity.

Prevention

As a prophylactic measure, there is a **vaccination** against TBE (an active immunisation) available which is also offered at EMBL. The vaccine FSME immune[®] is administered initially, a second shot 1 – 3 months later and a third one 5 - 12 months after the second one. Boosters should be given every 3 or 5 years, depending on age and vaccine. The vaccination schedule for another vaccine called Encepur[®] varies slightly.

If you plan to become pregnant, aim to complete vaccine protection beforehand. Consult your physician about contra-indications for the TBE vaccination.

2. Lyme Disease (Borreliosis)

Lyme disease which is caused by the bacterium *Borrelia burgdorferi* is far more common than TBE. 10-35% of the ticks are *Borrelia* infected versus only 0.1-5% TBE. Transmission of the bacterium typically occurs after 1-2 days after the bite whereas the TBE causing virus is transmitted within a few minutes.

Signs and symptoms

By far the most common form of the disease is a characteristic skin rash which starts at the site of the bite, the so-called *erythema migrans*. It occurs a few days (up to weeks) after a tick bite. It may begin as a small red spot and grow larger. This clear ring-shaped reddening of the skin is often paler in the centre than at the edges. The red ring then gradually moves outwards. Other general symptoms may involve flu-like symptoms such fever, muscle pain, headache, fatigue. It can progress in several stages and even cause heart diseases and neurological problems among others.



Erythema migrans

Treatment

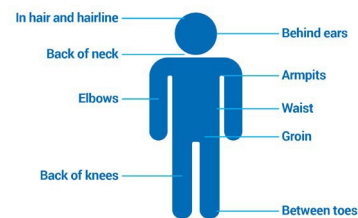
Lyme disease can be efficiently treated with antibiotics, if early diagnosed. However, the prophylactic administration of antibiotics after every tick bite is not recommended.

Prevention

There is no vaccination available but Lyme disease can be prevented by preventing tick bites. Further reading about Lyme disease at <http://www.cdc.gov/ncidod/dvbid/lyme/>.

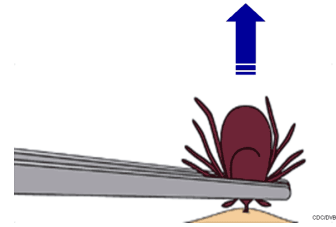
Prevention of tick bites when outdoors

- Avoid tall grass and over-grown, brushy areas where ticks like to rest.
- Stay in the middle of the trail when in the woods or grass-land, avoid sitting on the ground
- Wear light-colored clothing so the ticks can be easily seen.
- Wear closed shoes and long pants tucked into socks. Wear long-sleeved shirts. Use insect repellents (Icaridin or DEET as active ingredient) although their effectiveness against ticks lasts only a few hours. Don't apply on open wounds or near mucous membrane. If using sun protection, apply sun protection first.
- When returning indoors, examine yourself, your children, and pets for ticks. Ticks have a tendency to walk on the body before biting and possibly transmitting a disease.
- If you detect a tick, remove it as soon as possible.
- Examination of the removed tick for pathogens is not considered as useful.



Removal of a tick

Remove it very carefully using fine-point tweezers or specific tick forceps or cards (available at the pharmacy) and grasp the tick at the place of attachment, as close to the skin as possible. Gently pull the tick straight out. Do not use oil or glue to remove the tick! Do not prick, crush or burn the tick as it may release infected fluids or tissue. Disinfect effected area afterwards.



Remember the tick bite site. Watch for signs of an *Erythema migrans* and your general health for signs or symptoms of a tick-borne illness for the next few weeks (symptoms may occur only seven days after infection at the earliest). Consult a physician in case of any symptoms.

Further reading: https://www.cdc.gov/ticks/pdfs/FS_TickBite-508.pdf