

After a tick bite, how long for disease transmission?

Tuesday, June 22, 2021

<https://danielcameronmd.com/have-you-been-bitten-by-a-partially-fed-tick/>

People often ask: How long does it take for disease transmission to occur after a tick bite? According to investigators, Lyme disease may be transmitted faster if the tick previously fed on another host.

In a 2014 article entitled [“Lyme borreliosis: a review of data on transmission time after tick attachment.”](#) Michael J Cook explored the topic. “It is frequently stated that the risk of infection is very low if the tick is removed within 24 to 48 hours with some claims that there is no risk if an attached tick is removed within 24 hours or 48 hours.”

However, in animal models, Cook found, “transmission can occur in less than 16 hours, and the minimum attachment time for transmission of infection has never been established.”

Have you been bitten by a partially fed tick?

Investigators suggest that transmission time may be shorter if a tick has already fed on a host. A study by Shih and colleagues, found that, “Partially fed nymphal ticks transmit spirochetal infection more rapidly than do ticks that have never been attached to a host.”¹

So, how quickly a tick can transmit Lyme disease may depend on whether the tick had been partly fed BEFORE it attached to its second host.

Shih et al. demonstrated that partially fed nymphal ticks (84%) were capable of transmitting spirochetes to a non-infected mouse within 24 hours. The authors discovered it took less time for an infected nymphal deer tick to transmit Lyme spirochetes to a mouse if the tick was partially fed.

Ticks spontaneously detach from hosts

Individuals may mistakenly believe that once a tick bites it will remain attached throughout the entire feeding or until it is removed. But this isn't the case.

In the mouse study, Shih found that ticks can spontaneously detach during the feeding process. And this action can profoundly impact the time it takes for spirochetes to infect the host.

“Virtually all nymphal ticks that previously had fed for 16 hours reattached efficiently.”¹

“We found that nymphs do detach spontaneously from free-ranging mice in the laboratory, perhaps as frequently as 15% of the time,” the authors report.

“Indeed, about [one tenth] of questing nymphs in nature seem to be distended, and reattachment by partially fed sub-adult ticks commonly occurs.”

In the laboratory, partially fed ticks would reattach to a second host and commence feeding. “Virtually all nymphal ticks that previously had fed for 16 hours reattached efficiently.”

What happens in partially fed ticks?

The tick attaches to a host, feeds and the Lyme bacteria multiply rapidly in the tick’s mid-gut. Normally, the tick eliminates all of the bacteria, leaving behind only those spirochetes that survive in the mid-gut before they molt into an adult.

But, in a partially fed tick, spirochetes multiply in the mid-gut and then move to the salivary glands.

If the tick bites again, the spirochetes residing in the salivary glands can be transmitted more quickly. “Partially fed nymphs [ticks] are able to reattach to another host and Lyme disease spirochetes may be transmitted by partially fed nymphs more rapidly than by nymphs that have not already fed.”

Pet owners: be wary

Their findings are particularly relevant to people who own pets. “These partially fed ticks may already have acquired spirochetal infection and avidly seek other hosts,” writes Shih.

“Pet ownership appears to be a risk factor for human Lyme disease, and this may reflect contact with ticks that have detached from a cat or dog within the household.”

If an *unfed tick* attaches it can take up to 36 hours to transmit the Lyme spirochetes to a mouse, Shih claims. “The chain of events that culminates in migration of the spirochetes from the gut of the tick to its salivary apparatus begins within the first day of attachment and requires at least another day for completion.”

Note: The study by Shih and colleagues was conducted only with mice and has not been replicated with humans.

UPDATED: June 22, 2021

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References:

1. Shih CM, Telford SR, 3rd, Pollack RJ, Spielman A. Rapid dissemination by the agent of Lyme

disease in hosts that permit fulminating infection. *Infect Immun*, 61(6), 2396-2399 (1993).

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