Spend your summer vacation with ticks

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While most people spend their summer vacation with their families and kids, I spent it with my ticks in Connecticut, USA. Why? To uncover what is the story behind human Babesiosis. An emerging tick-born disease caused by the parasite-*Babesia microti*. The symptoms of this disease are fever-like. Because of the unclear symptoms, it is often mistakenly diagnosed, and is ignored until it is too late. The 5% case mortality reported from studies may not seem serious; however, the potential spread of the parasite should be alarmed. Studies predict human Babesiosis will spread as far as Lyme disease-the most common tick-born disease found in northeastern USA-because their parasite agents share the same vectors and geographical range. Lyme disease has increased 20 fold since 1982. If human Babesiosis does follow the footsteps of Lyme disease, we will see a lot more human cases in the future hence, a threat to human health.

To figure out how fast does human Babesiosis spread; I had two questions in mind. First, what is the infection prevalence of *B.microti* and its relationship compared to Lyme disease. Second, what factors influence infection prevalence the most?

I collected host-seeking ticks by dragging a $1m^2$ cloth on the grass from seven sites. The collected ticks were extracted for their DNA that was analyzed using PCR and quantitative PCR. The PCR results would tell me whether ticks are infected with *B.microti*. Ticks DNA were also tested for *Borrelia burgdorferi*-the parasite that cause Lyme disease, for determining the relationship between human Babesiosis and Lyme disease. A logistic model was used to investigate which combination of factors that influences the infection prevalence.

Laboratory results show that on average, the infection prevalence of *B.burgdorferi* is almost always higher compared to *B.microti*. In addition, the infection prevalence of *B.microti* dramatically increased from 2010 to 2011. Hence, although intensity of infection in *B.microti* is lower compared to *B.burgdorferi*, the parasite is growing and spreading very fast. Model results suggest that the combination of infection prevalence of *B.burgdorferi*, sampling year, habitat and distance to disease's origin influence the infection prevalence of *B.microti* most. I also found tick infections in areas where there has been no human cases reported! This information is helpful for control and protection programs.

Ticks feed mostly in summer time which makes summer vacation the most risky time for tick bites. Therefore, the next time you are taking a summer vacation in northeastern USA, bring tick repellents along with your sun blocks and swimming suits. Have a safe and tick-free vacation!

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