Garlic as an Insect Repellent

To the Editor: Lyme borreliosis is the most common vector-borne disease in Sweden, and as many as 10000 individuals are thought to be affected each year.[1] Recent studies have suggested that individual variability in vector attachment may be linked to different body odors.[2,3] Other studies suggested that diethyltoluamide is the best repellent against insect vectors and permethrin against ticks, in particular. However, insect repellents may have adverse effects on humans and animals.[4] Because military personnel are at particularly high risk for tick bites and tick-borne diseases,[5] we conducted a prospective, randomized, double-blind intervention trial of garlic (*Allium sativum*) to prevent tick bites among Swedish marines.

Methods. Of 100 individuals in Swedish military service in 1998, 50 consumed 1200 mg/d *Allium sativum* in capsule form and 50 consumed placebo for 8 weeks, followed by a washout period of 2 weeks, and then a crossover to placebo or *Allium sativum* consumption for another 10 weeks. All participants wore the same type of uniforms, consumed approximately the same diet, participated in similar activities, and spent equal amounts of time in tick-endemic areas. Tick bites were recorded in a diary after daily self-inspection of the skin. Written informed consent was obtained from all participants. The study was approved by the Research Ethics Committee of Lund University and the Swedish Medical Products Agency. Data were analyzed by both intention to treat (involving all participants present at the start of the study) and per protocol (only the 80 individuals who completed the study).

Results. In the intention-to-treat analysis, 66 (66%) of 100 participants recorded tick bites vs 55 (69%) of 80 participants in the per-protocol analysis. A total of 286 tick bites were recorded by the participants. On average, the participants recorded 0.2 tick bites per week during military service, compared with 0.03 tick bites during leave. There was significant reduction in tick bites when consuming garlic compared with placebo in per protocol analysis (Wilcoxon test, P=.04). A greater number of the participants were bitten by ticks during placebo consumption (normal approximation of binomial assumption, relative risk by intention to treat, 0.79 [95% confidence interval {CI}, 0.65-0.96]; relative risk per protocol, 0.70 [95% CI, 0.54-0.90]).

Comment. Swedish marine conscripts are at high risk of tick bites during military service. Preventive measures, including vaccinations against tick-transmitted diseases, should be considered. However, our results suggest that garlic may be considered as a tick repellent for individuals and populations at high risk for tick bite, rather than other agents that might have more adverse effects.

Louise Stjernberg, RN, MPH
Johan Berglund, MD, PhD
Lund University Malmo¨, Sweden

1. Berglund J, Eitrem R, Ornstein K, et al. An epidemiological study of Lyme disease in southern Sweden. *N Engl J Med.* 1995;333:1319-1324.
2. Mwase ET, Pegram RG, Mather TN. New strategies for controlling ticks. In: Curtis, ed. *Control of Disease Vector in the Community*. London, England: Wolfe Publishers; 1991:93-102.
3. Keystone JS. Of bites and body odor. *Lancet*. 1996;347:1423.
4. Brown M, Herbert AA. Insect repellents: an overview. *J Am Acad Dermatol.* 1997;36:243-249.
5. Schmutzhard E, Stanek G, Pletschette M, et al. Infections following tickbites: tick-borne encephalitis and Lyme borreliosis: a prospective epidemiological study from Tyrol. *Infection*. 1988;16:269-272.