

Did Lyme disease originate in the eastern U.S. from *Borrelia burgdorferi*-infected ticks that escaped from a laboratory at the Plum Island Animal Disease Center where scientists were conducting top-secret biological warfare experiments?

The Plum Island Animal Disease Center (PIADC), that is now managed by the U.S. Department of Agriculture, is dedicated to research on plant and large animal diseases likely to have a significant economic impact on the livestock and agricultural industries (1). Because of its isolation from the main land mass and stringent containment facilities, it is ideally suited for such work. In 1952, it was managed by the U.S. Army Chemical Corps as a component of its biological warfare program. However, when that program was abolished by a Presidential directive in 1969, it was transferred to the U.S. Department of Agriculture for its present use. Note that in an extensive report by PIADC in which it describes the type of work it does, in a section entitled, "What the PIADC Does Not Do", it unequivocally states that it has never conducted nor is it now conducting any research on Lyme disease (1).

Some claim that Lyme disease was introduced into the northeastern region of the U.S. by a man-made strain of *Borrelia burgdorferi* that escaped from a high containment biological warfare laboratory on Plum Island. However, there is ample evidence to indicate that both *Ixodes* ticks and *B. burgdorferi* were present in the U.S. long before the Plum Island facility was ever established. An examination of museum specimens of *Ixodes* ticks showed that the presence of Lyme disease spirochetes in suitable arthropod vectors preceded -- by at least a generation -- the year (1982) when Lyme disease was first recognized as a distinct clinical entity in the U.S. (2,3, 4). More recent studies revealed that *Ixodes* ticks and *B. burgdorferi* were present in the northeastern and Midwestern regions of the U.S. in pre-colonial times and many thousands of years before European settlements were established in the U.S. (5). Lyme disease certainly existed in the U.S. long before anyone knew how to diagnose and treat it.

Although the *per capita* incidence of Lyme disease in the Northeastern United States is more than twice that in the Midwestern United States, the prevalence of *B. burgdorferi* in the tick vector is nearly identical in both regions. The disparity in the incidence of disease did not appear to be due to a disparity in human invasiveness since a genetic analysis revealed that *B. burgdorferi* population in the Northeast and Midwest share a recent common ancestor. This suggests that substantial evolutionary divergence in human invasiveness has not occurred, and that the disparity in the incidence of disease between the two regions may be due to animal ecology or human behavior (6).

The main reason for considering any given pathogens for possible use as a biological weapon, would be its ability to create terror or havoc within an exposed population by causing serious incapacitating illness and/or death within a short period of time after its release. Lyme disease is not such an infectious agent. Therefore, if one were to prioritize a list of infectious agents ideally suited for use as a biological weapon, the organisms that cause smallpox, plague, Ebola, and anthrax – to name just a few—would be at the

top of the list. Lyme disease is a serious infectious disease that merits appropriate medical treatment and care. However, in view of the aforementioned considerations, no knowledgeable investigator would consider – even for a nanosecond-- adding *Borrelia burgdorferi*, the bacterial spirochete that causes Lyme disease, to such a list.

1. <https://www.dhs.gov/science-and-technology/plum-island-animal-disease-center>
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3. Burgdorfer, W, Barbour, AG, Hayes, SF, Benach, JL, Grunwaldt, E, and Davis, J.P. Lyme disease: a tick-borne spirochetosis? Science 216: 1317-1319,1982.
4. <https://now.tufts.edu/articles/lyme-bacterium-predates-us-labs-conspiracists-say-unleashed-ticks-public>
5. Hoen, AG, Margos, G, Bent, S.J. Duik-Wasser, MA, Barbour, A, Kurtenbach, K, and Fish, D. Phylogeography of *Borrelia burgdorferi* in the eastern United States reflects multiple independent Lyme disease emergence events. Proc. Natl. Acad. Sci. 106: 15013-15018, 2009.
6. Brisson, D., Vandermause, M.F., Meece, J.K., Reed, K.D. and Dykhuizen. Evolution of Northeastern and Midwestern *Borrelia burgdorferi* in the United States. Emerg. Infect. Dis. 16: 911-917, 2010.
7. https://www.cdc.gov/lyme/datasurveillance/index.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Flyme%2Fstats%2Findex.html