

The European and Asian Tick Borne *Borrelia* Neuropathogens; *Borrelia garinii* and *Borrelia afzelii*, are now being Found in Deer Ticks (*Ixodes scapularis*), and Produce Positive Serological Reactions for Same in Tick Bite Victims in North America

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Borrelia garinii has been cited as, “most neurotropic of the genospecies of *Borrelia burgdorferi* ‘sensu lato’” that causes Lyme Disease in Europe and in Asia [2]. *Borrelia garinii* has been reported in the literature as being the most frequent causative agent for Lyme Neuroborreliosis in Europe and Asia [1-4]. The lesser cause of Lyme Neuroborreliosis in Europe is *Borrelia afzelii* [1-4]. In North America the causative agent of Lyme Neuroborreliosis is *Borrelia burgdorferi*.

In European Lyme Neuroborreliosis the most common presentation is the “triad of Bannwarth’s syndrome (lymphocytic meningitis, cranial neuropathy and painful radiculitis) [4]. In addition, when European Lyme Neuroborreliosis is untreated, the infections that are associated with European *Borrelia genospecies* more likely to “progress to chronic low-grade encephalitis” [4].

North American Lyme Neuroborreliosis is caused by *Borrelia burgdorferi*, which clinically manifests as CNS infections associated with mainly, encephalitis, segmental myelitis, cranial neuritis, radiculoneuritis, vasculitis and intracranial hypertension [5]. Additional clinical manifestations in North American Lyme Neuroborreliosis can also include “ataxia, paraparesis, sphincter dysfunction, Parkinson-like symptoms, confusion, and cognitive impairment” [5]. Furthermore, “ischemic stroke is the most frequent cerebrovascular manifestation in North American Lyme Neuroborreliosis (present in 76% of cases), followed by transient ischemic attack [5]. The literature does cite that there have also been a few reports of Bannwarth’s Syndrome in North America Lyme Neuroborreliosis [6].

Borrelia garinii infections in Europe are transmitted to bird and mammalian reservoir hosts and finally to humans by the *Ixodes ricinus* ticks [2]. *Borrelia garinii* is also carried by *I. uriae* ticks found in seabirds [2]. In Europe investigators have found that *Borrelia garinii* is transmitted to bird and rodent hosts and finally to human victims by *Ixodes ricinus*, the “sheep or forest tick, and *Ixodes persulcatus*, the taiga tick [2].

Investigators in Maine and in Newfoundland have discovered that *Borrelia garinii* was present in *Ixodes uriae* or seabird ticks on the Atlantic Coast of Canada, and Maine in North America [2]. These same investigators had cited a potential scenario for *Borrelia garinii* being introduced into *Ixodes scapularis* or deer ticks (commonly carry *Borrelia burgdorferi*) in North America [2].

A doctor in Pike County Pennsylvania, recently reported that a diagnostic laboratory had confirmed the presence of *Borrelia garinii* and *Borrelia afzelii* from positive serological reactions for these pathogens. The doctor also stated that these positive serological findings were obtained from tick bite victims who had never resided or traveled outside of the Continental United States [7].

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Thus, it is important to never overlook the possibility of the presence of Lyme Neuroborreliosis resulting from *Borrelia garinii* or *Borrelia afzelii* on the North American Continent.

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