# THE LYME DISEASE BACTERIUM – NOTHING IS SIMPLE

The bacterial cause of Lyme disease is called Borrelia burgdorferi, named after Willy Burgdorfer PhD, the researcher who first identified this germ in 1982. This spirochete, a corkscrew-shaped bacterium, is unique in the known bacterial realm because of the quantity of extra DNA it carries that enables it to evade detection and attack from our immune systems. It can change its outer protein coat, thus cloaking itself from immune detection. It also can completely change form becoming a treatment resistant cyst or by totally shedding its outer coat and entering our own cells to set up shop. Antibiotics generally depend on the activity level of a bacterium; how fast it grows and how often it reproduces. Most of the common bacterial diseases we encounter in medicine are from bugs that reproduce in less than 24 hours. When antibiotics 'hit' the reproductive or active metabolic machinery of these germs, they die. This is why when we treat common illnesses such as pneumonia or urinary infections, people usually get better in a few days. The Lyme bacterium, however, has a reproduction cycle as short as a day but as long as about nine months. During a phase of prolonged inactivity, it is very hard to kill. These are some of the reasons that an established Lyme infection can be hard to eliminate. Additionally it is thought, and there is real data to support this, that the Lyme bacterium eventually takes up residence, almost certainly with other co-infecting bacteria, in what is called a biofilm community. On a microscopic level, the bacteria clump together in a gel-like secretion where they are insulated from our immune system and circulating antibiotics or antibodies. This is their bunker from which they can still wreak havoc by releasing the neurotoxic products of their metabolic life. It's an evolutionary match – they thrive in a body that they modify to suit their needs. They can suppress our immune systems and alter other vital processes, making us ill, helping them to thrive. They don't tend to kill us, though they sometimes do. It is a parasitic existence.

In addition to symptoms that stem from inflammation of the brain, nerves, heart, blood vessels, joints, and connective tissue, which the Lyme bacteria cause through multiple mechanisms, we also know that the disease can induce another class of illness called autoimmune disease. Maladies such lupus, multiple sclerosis, and Lou Gehrig's disease (ALS) can actually be caused by Lyme disease. These diseases are not considered to be curable, but there are many cases in which the autoimmune disease resolves completely when the Lyme disease has been treated – always with long term, high dose antibiotics.

Tests to determine whether someone has Lyme disease are very problematic. The common tests measure levels of antibodies we make that are specific to the Lyme bacteria. But, if the bacteria can hide, change form, immunologically 'cloak' itself, and can suppress our ability to make antibodies, a person quite ill with Lyme can have totally negative tests. What commonly occurs though is that after a year or so of antibiotic use, which can render some of the bacteria into fragments that the immune system can recognize, the tests turn positive. The dilemma is that when someone is looking for a diagnosis, an answer to profound suffering, a physician who relies on initial test results might call it wrong and the patient will have no answer and no effective treatment. This is part of what defines the difference between 'Lyme literate' MDs who understand the problems with testing and treatment challenges verses non-Lyme literate physicians who, for some very compelling reasons, can't or won't manage this disease. The range and depth of this problem is immense and will be discussed in the next article to follow.