Arthritis and Related Diseases, Mitochondrial Dysfunction and Lipid Replacement Therapy

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Arthritis is group of autoimmune/degenerative diseases that have been around since prehistoric times and now afflict approximately 50 million Americans. These diseases are characterized by inflammation, the body's natural response to injury, and/or degeneration, especially of the joints and other tissue structures. These diseases most often present with joint tenderness, pain, swelling, stiffness and reductions in joint mobility and range of movement. With time, degeneration and enough destruction of the joints can result in a condition that requires joint replacement. Typically, arthritis pain and degeneration of joints persist over many years, and generally, they slowly increase over time. However, certain events, such as trauma or infection(s), can cause sudden increases in severity of arthritic signs and symptoms.

Some Common Types of Arthritis

Osteoarthritis
Osteoarthritis is the most common form of arthritis, and it can affect both large and small joints of the body, including the hands, feet, back, hips or knees. The disease is essentially due to daily wear and tear of the joints and their protective coverings; however, Osteoarthritis can also occur as a result of injury or infection. Osteoarthritis begins in the cartilage and eventually leads to opposing bones eroding toward and into each other, narrowing the gap between joints, and eventually causing pain and reductions in joint mobility. Osteoarthritis typically affects the weight bearing joints, such as the back, spine, and pelvis. Unlike Rheumatoid Arthritis, Osteoarthritis is most commonly a disease of the elderly. More than 30 percent of females have some degree of Osteoarthritis by age 65. Risk factors for osteoarthritis include: prior joint trauma, obesity, infections and sedentary lifestyle.

Rheumatoid Arthritis
In Rheumatoid Arthritis, an autoimmune disease, the body's own immune system attacks the joints, mostly the joint lining and cartilage as well as other body tissues. This eventually results in swelling and erosion of opposing bones, often in the joints in the fingers, wrists, knees, elbows and ankles. The disease is usually symmetrical and can lead to severe deformity in a few years if not treated. Rheumatoid Arthritis occurs mostly in people aged 20 and above, and in contrast to Osteoarthritis, Rheumatoid Arthritis is a systemic or system-wide autoimmune disease affecting many other tissues and organs.

Infectious Arthritis
This form of arthritis is related to Rheumatoid Arthritis in that elements of infection are involved, and patients with Infectious Arthritis show evidence of Lyme Disease, Mycoplasma and other infections.

Juvenile Arthritis
Juvenile Arthritis refers to a systemic arthritis-related condition that develops in children or teens. Approximately 300,000 children under the age of 18 have this disease. This type of arthritis is a umbrella term for several types of arthritis previously known as juvenile rheumatoid arthritis among

others. Patients usually exhibit a variety of symptoms, including muscle and soft tissue tightening, bone erosion, joint, fevers, rashes and changes in growth patterns.

There are also other chronic diseases that can present with elements of rheumatic or arthritis symptoms, such as Gout, Lupus, Scleroderma, Reiter's Syndrome, Chronic Fatigue Syndrome, Fibromyalgia Syndrome and other less common diseases and syndromes.

All of the rheumatic diseases, and especially arthritis, have been associated with the presence of one or more bacterial and viral infections (see next section) [1, 2].

Possible Causes of Arthritis and Their Treatments

Although the causes of various common forms of arthritis are considered to be generally unknown, there appears to be a link to genetics. If a close family member has the disease, you are more likely to have it. Most researchers feel that there is no one single cause for the various forms of arthritis, and they are likely to conclude that multiple factors are involved, which are probably different in each patient and type of arthritis.

For the most part, treatments for rheumatic diseases have depended on treating symptoms, such as treatments for the alleviation of pain and other symptomatic treatments, and such treatments are usually not directed at possible causes of the disease.

Infections are extremely important in rheumatic diseases and are a major cause of various chronic illnesses [1, 2]. Bacterial and viral Infections have been found in a variety of autoimmune and degenerative diseases, and in particular in rheumatic diseases, such as Rheumatoid Arthritis, Infective Arthritis, Juvenile Arthritis, Lupus, Scleroderma, and other rheumatic disorders [1, 2]. We and others have gathered substantial evidence that chronic bacterial and viral infections are commonly associated with these conditions [1, 3], and these same infections have been found in the synovium of arthritic joints [4].

Importantly, rheumatic disease patients respond to anti-infective therapy [2, 5]. For example, for many years investigators have found that systemic intracellular bacterial infections (Mycoplasma, Borrelia, Chlamydia, etc.) are commonly found in rheumatic diseases, such as Rheumatoid Arthritis [1]. These diseases can be treated with antibiotics, and indeed, several controlled clinical trials have shown the benefit of long-term antibiotic therapy for Rheumatoid Arthritis [6, 7]. Successful treatments for the infections found in Arthritis patients have resulted in resolution of signs and symptoms.

Bacterial infections appear to be especially important, because they can stimulate immune reactions to joints and other structures. Microorganisms like Mycoplasmas can kill cells and damage cartilage, but when they exit cells, such as synovial cells, nerve cells, among others that can be infected, they can stimulate autoimmune responses. This can occur by different mechanisms. One mechanism that has intrigued us is that when certain microorganisms, such as certain species of Mycoplasmas, exit from invaded cells, they carry part of the host cell membrane on their surface. This may trigger the immune system to respond to the host antigens on the foreign microorganism but this also results in an autoimmune response to the host antigens. Alternatively, some microorganisms display surface antigens that mimic host cell surface antigens, and these may stimulate autoimmune responses. When these microorganisms exit synovial cells in the joints, they can stimulate immune responses against the cells in the joints and related cells, causing joint inflammation and degeneration [5].

Mitochondrial Dysfunction in Arthritis

Another important property of tissues involved in arthritis is that energy functions inside cells, and in particular the cells of the joints, are dysfunctional. This has been found in the most common forms of arthritis, such as Osteoarthritis and Rheumatoid Arthritis [8, 9]. These conditions, probably the result of chronic intracellular infections, result in increased oxidative stress and the excess production of Reactive Oxygen Species (ROS) or free-radical oxygen species that can directly damage cellular membranes [10].

The lipids in cellular membranes involved in providing an essential environment for energy production are inside the mitochondria-our cells' batteries that produce high energy molecules necessary for life-and mitochondria are particularly susceptible to ROS damage. Once the mitochondrial lipids are oxidized by ROS, they no longer function properly. Cumulative oxidative stress and excess ROS, such as seen in arthritis and other chronic diseases, can damage mitochondria, at a higher level cause fatigue as well as nerve cell damage at their synapses, the communication regions between nerve cells. Thus changes in mitochondria can influence both the onset and severity of arthritis and the fatigue and pain that accompany arthritis.

Arthritis and Lipid Replacement Therapy

Since arthritis patients have mitochondrial and other membrane impairments, Lipid Replacement Therapy with NT Factor® is an especially attractive, all-natural approach to replace cell membrane damage and reverse the effects of excess ROS damage to cellular lipids [11]. NT Factor® provides cells with the

specific types of membrane lipids that can repair mitochondria and cell membranes and make them functional again.

The uniqueness of NT Factor® over other lipid supplements is that NT Factor®'s lipids are required by mitochondrial membranes and other cellular membranes for their function, and NT Factor® lipids are protected from damage by ROS and other factors that damage most dietary lipids before they even reach our cells.

Thus Lipid Replacement Therapy with NT Factor® is an effective way to reduce the effects of excess oxidative damage to the cells in our joints and nerve and other cells and restore mitochondrial function. By restoring mitochondrial function and repairing cellular membranes, fatigue is reduced and cellular function can be restored.

References

1. Nicolson GL, Haier J. Role of chronic bacterial and viral infections in neurodegenerative, neurobehavioral, psychiatric, autoimmune and fatiguing illnesses: Part 1. British Journal of Medical Practitioners. 2009; 2(4): 20-28. Part 2. British Journal of Medical Practitioners. 2010; 3(1): 301-311.

2. Brown TM. Basic concept of rheumatic mechanism. Posted at www.roadback.org.

3. Haier J, Nasralla M, Franco AR, Nicolson GL. Detection of mycoplasmal infections in blood of patients with rheumatoid arthritis. Rheumatology 1999; 38: 504-509.

4. Johnson S, Sidebottom D, Bruckner F, Collins D. Identification of Mycoplasma fermentans in synovial fluid samples from arthritis patients with inflammatory disease. Journal of Clinical Microbiology 2000; 38(1): 90-93.

5. Nicolson GL. The role of microorganism infections in chronic illnesses: support for antibiotic regimens. CFIDS Chronicle 1999; 12(3):19-21.

6. O'Dell J, Haire C, Erickson N, Palmer W, Churchill M, Drymalski W, Blakely K, Wees S, Eckhoff J, Doud D, Weaver A, Dietz F, Olson R, Klassen L, Moore G. Successful Treatment of Early Rheumatoid Arthritis (RA) with Minocycline: Results of a Double-Blind Trial. Arthritis & Rheumatism 1995; 40(5): 842-848.

7. O'Dell JR, Blakely KW, Mallek JA, Eckhoff PJ, Leff RD, Wees SJ, Sems KM, Fernandez AM, Palmer WR, Klassen LW, Paulsen GA, Haire CE, Moore GF. Treatment of early seropositive rheumatoid arthritis: a two-year, double-blind comparison of minocycline and hydroxychloroquine. Arthritis & Rheumatism 2001; 44(10): 2235-2241.

8. Blanco FJ, Rego I, Ruiz-Romero C. The role of mitochondria in osteoarthritis. Nature Review of Rheumatology 2011; 7(3): 161-169.

9. Seven A, Güzel S, Aslan M, Hamuryudan V. Lipid, protein, DNA oxidation and antioxidant status in rheumatoid arthritis. Clinical Biochemistry 2008; 41: 538-543.

10. Sun G, Xu X, Wang Y, Shen X, Chen Z, Yang J. Mycoplasma pneumoniae infection induces reactive oxygen species and DNA damage. Infection & Immunity 2008; 76: 4405-4413.

11. Nicolson GL, Ellithrope R. Lipid replacement and antioxidant nutritional therapy for restoring mitochondrial function and reducing fatigue in chronic fatigue syndrome and other fatiguing illnesses. Journal of Chronic Fatigue Syndrome 2006; 13(1): 57-68.

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