Minocycline, Creatine, and Coenzyme Q10 in ALS

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I am often asked by patients what they can do to help slow the course of their ALS. Much interest centers around vitamins, supplements, and other natural products. Nearly all individuals with ALS have heard about one substance or another which is claimed by those using it to have helped them. It often seems that there are so many such substances that someone with ALS could spend all of his or her money buying them, and then spend all day taking them! How does one choose what to take? Of course, there is no one correct answer, and it would be impossible to review all such substances. Recently, minocycline, creatine, and coenzyme Q10 have been in the news. In particular, recent studies of minocycline and creatine in ALS mice provide some reason for optimism, and studies of coenzyme Q10 in patients with Parkinson's disease are most interesting and worth reviewing.

Minocycline is a tetracycline antibiotic used for treating infections, acne, and rheumatoid arthritis. It has been tested in mice who carry the familial ALS (SOD1) gene. These mice inevitably develop an ALS-like illness as they age. Minocycline was found to delay the onset of the disease, and to increase lifespan in these animals. Creatine is an amino acid which is produced in the liver, kidney, and pancreas. It is available without a prescription, and has been used by athletes for years to improve their performance. Because minocycline and creatine act by different mechanisms, combined treatment with both together was recently tried in ALS mice. Interestingly and importantly, each of these substances individually was found to delay the onset of weakness and to extend lifespan in the mice. Survival was increased by 12% in the group of mice treated with creatine and by 13% in the group of mice treated with minocycline. Together, the two compounds increased survival in the treated group of mice by 25%, an effect greater than either substance alone.

What does this mean for people with ALS? It is too early to say with certainty. Of course, mice are not humans, and the efficacy of any ALS treatment in these mice does not necessarily predict its efficacy in humans with ALS. There is currently a human trial of minocycline underway, but no results are yet available. Creatine has shown conflicting results in individuals with ALS. It was shown to produce a small but definite short-term increase in limb strength of

individuals with ALS, but no clear effect on respiratory (breathing) function. A trial from the Netherlands was negative, but a North American trial is underway, with no results yet. Once we have better safety and efficacy data on each of these substances individually, further studies can be done to determine whether a combination of the two will be as helpful in people as in the ALS mice.

Coenzyme Q10 is a part of the electron transport chain, involved in cell energy generation. It is also a strong anti-oxidant. In a recent study of Parkinson's disease, coenzyme Q10 was safe and well-tolerated at dosages of up to 1200 mg per day. Treatment with coenzyme Q10 appeared to slow the progression of Parkinson's disease, and the effects appeared to be greatest at the highest doses. There is little data yet about its effectiveness in ALS. Although both ALS and Parkinson's disease are considered to be neurodegenerative disorders, there are many differences between the two, and there is little data on the efficacy or lack of efficacy of coenzyme Q10 in ALS. Many individuals with ALS use coenzyme Q10 as well as a variety of other antioxidants. Certainly the Parkinson's disease study showed that even very high doses are safe. Whether it will provide a meaningful benefit is still uncertain.

The concept of combination therapy is an exciting one. Physicians have used combinations of different medications for years to treat other serious disorders such a cancer, AIDS, and epilepsy. There is general agreement among ALS experts that ALS has more than one mechanism by which it causes motor neuron death, and that there are probably many triggers for the disease. Because doctors are not yet able to determine the triggers for ALS, or even identify all of the mechanisms, it is logical that treatments which act in different ways should be given together. Hopefully, future studies will shed more light on existing treatments, uncover new ones, and give some clarity to the concept of combination therapy.