

ADHD

Attention Deficit Hyperactivity Disorder (ADHD) and NADH

Adults and children with ADHD are found to have a deficit in specific vitamins and supplements. Studies have shown that giving a child with ADHD 10mg of NADH will increase brain performance by up to 25%. NADH is a natural supplement that helps increase brain activity, improve focus, and helps relieve symptoms of ADHD.

Alzheimer's Disease

New follow-up study shows that a naturally occurring coenzyme nutritional supplement Enada® NADH clinically demonstrates benefits for Alzheimer's patients

Vienna, Austria (11/02) – At the 2nd International Conference on Mechanisms and Actions of Nutraceuticals (ICMAN) the findings of a study conducted by an international team of medical researchers under the direction of Professor V. Demarin, MD, Ph.D. of Sestre milosrdnice University Hospital confirmed the use of ENADA® NADH as a treatment for Alzheimer's disease. In this double blind, placebo controlled, matched pairs, clinical study after 6 months of treatment, the subjects treated with NADH (10mg/day) showed no evidence of progressive cognitive deterioration and had significantly higher total scores on the Mattis Dementia Rating Scale (MDRS) compared to subjects treated with placebo ($p < .05$). Also, no side effects have been observed in any of the patients.

Anti-Aging

The aim of this study was to investigate the effect of NADH-supplementation on the metabolic condition of isolated guinea pig ventricular cardiomyocytes using the pinacidil-primed $IK(ATP)$ as an indicator of subsarcolemmal ATP concentration. Membrane currents were studied using the patch-clamp technique in the whole-cell recording mode at 36-37°C. Under physiological conditions (4.3 mM ATP in the pipette solution, ATP_j) $IK(ATP)$ did not contribute to basal electrical activity. The $K(ATP)$ channel opener pinacidil activated $IK(ATP)$ dependent on $[ATP]_j$ showing a significantly more pronounced activation at lower (1 mM) $[ATP]_j$. Incubation of cardiomyocytes with 300 $\mu\text{g/ml}$ NADH (4-6 h) resulted in a significantly reduced $IK(ATP)$ activation by pinacidil compared to control cells. Equimolar amounts of the related compounds nicotinamide and NAD^+ were not able to achieve a similar effect like NADH. These data show that incubation of guinea pig ventricular cardiomyocytes with NADH results in a decreased activation of $IK(ATP)$ by pinacidil compared to control myocytes indicating a higher subsarcolemmal ATP concentration due to NADH-supplementation. Measurement of adenine nucleotides by HPLC revealed a significant increase in intracellular ATP (NADH supplementation: 45.59 ± 1.88 nmol/mg protein versus control: 35.35 ± 2.57 nmol/mg protein, $P < 0.000005$).

Antioxidant

Nadh is strong reducing agent and has been suggested to act indirectly as an antioxidant. One such possibility is via the reduction of GSSG to GSH. Only recently the activity of NADH as a directly action antioxidant in mitochondria.

Blood Pressure

Oral reduced B-nicotinamide adenine dinucleotide (NADH) affects blood pressure, lipid peroxidation, and lipid profile in hypertensive rats (SHR).

Chronic Fatigue Syndrome

02-02-1999 Sufferers of Chronic Fatigue Syndrome (CFS) can be heartened by the favorable results of clinical trials of the nutritional supplement Enada NADH for use in the treatment of their debilitating disorder. The outcome of the Enada NADH study has recently been published in the respected medical journal *Annals of Allergy, Asthma & Immunology*. (Vol. 82, pp. 185-191, Feb.1999). Healthwatch and The CFIDS & FM Health Resource published preliminary results of this study, which was conducted at the prestigious Georgetown University Medical Center in Washington, D.C. This trial marks one of the first times the FDA has approved a nutritional supplement for evaluation as a medical treatment.

Benefits Seen in the Double-blind, Placebo-Controlled Study Twenty-six patients who met The Centers for Disease Control and Prevention's (CDC) criteria for CFS completed the 12-week double-blind, placebo-controlled study. Double-blind is a scientific term meaning neither the investigating doctors nor the patients knew who was given Enada NADH or the placebo. During weeks one through four, patients received either 10 mg of Enada NADH or a placebo, whereas weeks five through eight were a 'wash-out' period during which patients received no active treatment. During weeks nine through twelve, patients' treatment was switched so they received the alternate treatment – either placebo or Enada NADH – relative to their first four weeks. Laboratory tests were completed at the beginning and end of the study, and symptoms were evaluated based on patients' response to an extensive questionnaire given prior to the study, as well as at the conclusion of weeks four, eight and twelve.

Eight of the patients showed at least a 10% improvement while taking Enada NADH, as opposed to only two of those taking the placebo. The success rate after only four weeks of Enada NADH treatment was 31% versus only 8% for patients given the placebo. Presented statistically, patients receiving Enada NADH were four times more likely than those taking a placebo to experience a reduction in symptoms. A Longer Open Label Study Yields Greater Results The authors of this published study feel there is cause for optimism as to even potentially greater benefits of Enada NADH, a safe, naturally- occurring antioxidant, in the treatment of CFS. These doctors believe that a longer period of treatment may result in a higher percentage of patients responding favorably. To test this theory, doctors enrolled patients in a longer, open label (as opposed to double-blind, placebo) follow-up study. The *Annals of Allergy, Asthma & Immunology* journal article reports that to date 72% of patients in this open study have reported significant improvement of their symptoms and energy levels. However, Matthew Fitzsimmons, the president of Menuco Corporation, which supplied the patented form of Enada NADH used in the study, recently revealed that up to 80% of patients in the longer (ongoing) study have responded favorably.

CoQ10

Coq10, Co Q10, CO-E1, Coenzyme 1, NADH, & More...

Coenzyme Q10, or CoQ10, is not an antioxidant although it is characterized as such in all of the commercial available products. Coenzyme Q10 is the oxidized form of this substance and an oxidant can never ever be an antioxidant. However, when Co Q10 is absorbed into the organism it is

reduced by NADH and thus, becomes an antioxidant. In other words, NADH makes Coenzyme Q-10 in the body into an antioxidant; hence, CoQ10 needs NADH to become effective. Additionally, Co Q10 concentrations may be increased with NADH supplements . If you take commercially available coenzyme Q10 without an equivalent dose of NADH, you may deplete the cell from NADH and thereby make the cell energy deficient and prone to degeneration.

This fact implies two consequences: the intake of commercially available CoQ10 is not very meaningful unless the organism has sufficient amounts of cellular NADH available to reduce Co Q10 and make it an antioxidant.

Depression

The coenzyme nicotinamide adenine dinucleotide (NADH) has been used in an open label trial as medication in 205 patients suffering from depression with various clinical symptoms. NADH was given orally, intramuscularly or intravenously. The duration of therapy ranged from 5 to 310 days. 93% of the patients exhibited a beneficial clinical effect. An improvement up to 44 with a mean value of 11,5 was observed.

DNA Repair

Case Study in China suggests NADH helps repair DNA damage.

Energy Charts

NADH Energizes Mental and Physical Performance

Every living cell, from bacteria up to human, contains coenzyme nicotinamide adenine dinucleotide (NADH), a coenzyme critical to cellular energy production.¹ Cells that use the most energy, such as brain and muscle cells, also hold the highest amounts of NADH. Human heart cells, for instance, contain a whopping 90 mcg of NADH per gram of tissue.

Like Co-Q10, NADH is involved in the synthesis of adenosine triphosphate (ATP), the body's primary intracellular energy source.² When NADH is oxidized in cellular energy-producing organelles called mitochondria, and it forms water and energy. This energy is preserved as ATP. Every energy-consuming reaction requires ATP, so the more NADH a cell has available, the more energy it can produce. To keep up with the cellular demand for energy, the body continuously synthesizes NADH (a process that involves niacin, a B-complex vitamin).³

Although NADH occurs naturally in all plant and animal cells, its most plentiful sources are red meat, poultry and yeast. Vegetables are not as rich in NADH as animal tissues, because food processing, cooking and stomach acids can destroy the NADH present in most foods, sprinkling yeast and meals is a good way to increase NADH consumption.

Fibromyalgia

NADH has been known to improve symptoms of Fibromyalgia, among a number of other conditions. Since one of the main symptoms of FMS is lack of energy, NADH will help increase the energy production in the body—naturally. NADH also supports the synthesis of the neurotransmitter dopamine. These brain chemicals affect mood, memory, alertness and

concentration. So by increasing the level of NADH in your cells, there is an increase in dopamine production and thus users feel elevated mental clarity, levels of concentration and memory capacity.

Fibromyalgia syndrome (FMS) is a chronic condition that causes extreme pain in the muscles, connective tissues, and joints. It has a number of other symptoms that affect the entire body as well, all revolving around the feeling of hurting all over and feeling tired all the time. This means that it can be very difficult for people who suffer from Fibromyalgia to exert in physical activity, and may have trouble concentrating and remembering facts. It is difficult to detect because of its range of symptoms and is often frequently misunderstood, thus is often misdiagnosed. In fact there is no test to determine whether one has Fibromyalgia, even though it's known to affect 3 to 6 million people in the US every year. Sometimes it isn't diagnosed at all, therefore those who suffer from Fibromyalgia suffer from lack of medical care as well.

NADH is a coenzyme that exists naturally in every cell in your body. It actually exists in all living things. It is responsible for the production of ATP in the mitochondria. In non-scientific terms, this means that it is responsible for the production of energy in your body's cells. Children have a very high level of NADH naturally—hence their high energy levels—but production of NADH tends to dwindle as we age. That's why NADH supplements are so beneficial to your health.

Heart Healthy Diet

The aim of this study was to investigate the effect of NADH-supplementation on the metabolic condition of isolated guinea pig ventricular cardiomyocytes using the pinacidil-primed IK(ATP) as an indicator of subsarcolemmal ATP concentration. Membrane currents were studied using the patch-clamp technique in the whole-cell recording mode at 36-37°C. Under physiological conditions (4.3 mM ATP in the pipette solution, ATP_i) IK(ATP) did not contribute to basal electrical activity. The K(ATP) channel opener pinacidil activated IK(ATP) dependent on [ATP]_i showing a significantly more pronounced activation at lower (1 mM) [ATP]_i. Incubation of cardiomyocytes with 300 µg/ml NADH (4-6 h) resulted in a significantly reduced IK(ATP) activation by pinacidil compared to control cells. Equimolar amounts of the related compounds nicotinamide and NAD⁺ were not able to achieve a similar effect like NADH.

These data show that incubation of guinea pig ventricular cardiomyocytes with NADH results in a decreased activation of IK(ATP) by pinacidil compared to control myocytes indicating a higher subsarcolemmal ATP concentration due to NADH-supplementation. Measurement of adenine nucleotides by HPLC revealed a significant increase in intracellular ATP (NADH supplementation: 45.59 ± 1.88 nmol/mg protein versus control: 35.35 ± 2.57 nmol/mg protein, $P < 0.000005$).

Increased Brain Performance

The sensor for blood-flow need with neural activity and exercise is not known. We tested the hypothesis that accumulation of electrons in cytosolic free nicotinamide adenine dinucleotide (NAD) activates redox signaling pathways to augment blood flow. NAD is the primary carrier of electrons from glucose and lactate for ATP synthesis. Because increased glycolysis transfers electrons from glucose to NAD⁺ faster than they are used for mitochondrial ATP synthesis, electrons accumulate in cytosolic NADH. Because cytosolic NADH and intra- and extracellular lactate/pyruvate (L/P) ratios are all in near-equilibrium, NADH can be increased or decreased by i.v. lactate or pyruvate. Here, we report that elevated plasma L/P in non-naïve rats increases blood flow in numerous resting tissues and augments blood flow increases in activated somatosensory (barrel) cortex and contracting skeletal muscle. Increased flows are largely prevented by injection of

pyruvate (to lower L/P), a superoxide dismutase mimic (to block vascular effects of superoxide), or an inhibitor of nitric oxide synthase (to block *NO vasodilatation). Electrons carried by NADH, in addition to fueling ATP synthesis, also fuel redox signaling pathways to augment blood flow in resting and working tissues. These novel findings are fundamental to understanding blood-flow physiology and pathology.

Jet Lag Remedy

Background

Current remedies for jet lag (phototherapy, melatonin, stimulant, and sedative medications) are limited in efficacy and practicality. The efficacy of a stabilized, sublingual form of reduced nicotinamide adenine dinucleotide (NADH, ENADAlert®, Menuco Corp.) as a countermeasure for jet lag was examined.

Hypothesis

Because NADH increases cellular production of ATP and facilitates dopamine synthesis, it may counteract the effects of jet lag on cognitive functioning and sleepiness.

Methods

Thirty-five healthy, employed subjects participated in this double-blind, placebo-controlled study. Training and baseline testing were conducted on the West Coast before subjects flew overnight to the East Coast, where they would experience a 3-hour time difference. Upon arrival, individuals were randomly assigned to receive either 20 mg of sublingual stabilized NADH (n=18) or identical placebo tablets (n=17). All participants completed computer-administered tests (including CogScreen7) to assess changes in cognitive functioning, mood, and sleepiness in the morning and afternoon.

Results

Jet lag resulted in increased sleepiness for over half the participants and deterioration of cognitive functioning for approximately one third. The morning following the flight, subjects experienced lapses of attention in addition to disruptions in working memory, divided attention, and visual perceptual speed. Individuals who received NADH performed significantly better on 5 of 8 cognitive and psychomotor test measures ($P < .05$) and showed a trend for better performance on the other three measures ($P < .10$). Subjects also reported less sleepiness compared with those who received placebo. No adverse effects were observed with NADH treatment.

Conclusions

Stabilized NADH significantly reduced jet lag-induced disruptions of cognitive functioning, was easily administered, and was found to have no adverse side effects.

Parkinson's

A new therapeutic approach to Parkinson's disease: Nicotinamide adenine dinucleotide (NADH)

Extensive studies have shown that NADH is linked to have a therapeutic effect to Parkinson's. NADH, a natural energy supplement, was originally formulated to treat Parkinson's disease by Dr. George Birkmayer.

Of some 900 people with Parkinson's who took NADH supplements regularly, 80% showed moderate to excellent relief from hand tremors, head wobbling, limb stiffness, slow gait, fatigue,

and other symptoms of the disease. With years of regular use, it also appeared to slow the deterioration of their nervous systems.

L-dopa, a prescription dopamine is the drug prescribed for the treatment of Parkinson's disease. L-dopa causes the release of free radicals, which can damage brain cells, whereas NADH is one of the brain's most powerful antioxidants. NADH usually provides the same benefits as L-dopa, without the side effects.