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Reduction of Oxidative Stress (Os): Successful Measurement using the Akers Biosciences Breathscan Oxichek™ after use of the Lifevantage Nrf2 Synergizer: Protandim™

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Introduction:

Free Radical Or Oxidative Stress, Disease, And Aging

Nearly 200,000 peer-reviewed research studies on oxidative stress can be found on www.pubmed.gov, covering nearly every major disease process our body can develop. In light of this evidence, it can no longer be argued whether Oxidative Stress is considered a major-medical concern in our society. It has clearly been demonstrated when a critical amount of oxidative stress occurs, "diseases of aging" can manifest in our bodies as diabetes, atherosclerosis, neurodegenerative diseases, strokes, arthritis, cancer, and many more. It is suspected the number of diseases associated with OS may exceed 300.

The National Institutes of Health (NIH) has reported as many as 30 different theories of the causation of aging. The most widely accepted of these is the Free Radical Theory, now recognized as Oxidative Stress. Dr. Denham Harman first proposed this free radical theory of aging in 1954. Harman tested this theory by administering dietary antioxidants to various strains of mice. By 1957, he had shown that radio-protective compounds prolonged the median life span of mice. Thus, was born the first dietary antioxidant study and the topic has continued to be discussed for more than 60 years. We now understand that higher levels of free radicals occur more rapidly in our bodies than can be neutralized by our cellular defenses. This results in a state referred to as "Oxidative Stress". We live in a world of commonly occurring conditions that overwhelm the body's natural defenses against free radical damage and contribute to OS on a daily basis. A few of the conditions leading to Oxidative Stress are:

•Exposure to air we inhale can have chemicals and toxins within it
•Consumption of daily food products that no longer contain the level of nutritional support required by our finely tuned cellular system
•Stressful environments in the home or at work
•Free radicals arise from external and internal sources. Eg. the products we put on our skin may contain harmful chemicals, polluted air and water, and ultraviolet radiation from the sun cause free radicals. Internal sources which can cause OS are: mitochondria (which produce 90% of the cell's production of free radicals) as well as other by-products of the normal cellular processes (chemical reactions, DNA mutations, etc.).

These contribute to higher levels of oxidative stress and directly relates to an increased rate of aging and eventual illness. Other biologic mechanisms such as inflammation and DNA damage also play significant roles in the process of aging and are also attributed to higher levels of OS.

NRF2 Activation And Protandim

Nrf2 is a basic leucine zipper (bZIP) protein transcription factor responsible for regulating the expression of antioxidant proteins that protect against oxidative damage at the cellular level. Nrf2 is credited with protecting the body against cellular malfunction resulting in the disease process and aging. It has also been referred to as the "guardian of lifespan." and is considered the gate keeper of the Antioxidant Response Element (ARE). Once the Nrf2 pathway is activated, NRf2 and KEAP-1 proteins separate, Nrf2 then translocates into the cell nucleus and activates the survival genes at the Antioxidant Response Element (ARE) site. This process upregulates the good genes as well as down-regulates harmful genes. Up-regulation of the good genes causes production of antioxidant enzymes which neutralize free radicals. By down-regulating bad pro-inflammatory genes, Nrf2 effectively decreases inflammatory molecules (NF-kappa B and other cytokines), thereby reducing inflammation in the cell and body.

Once, Nrf2 has performed its function, it returns to combine with Keap-1 (a process called "ubiquination") where it's held in sequestration until it needed again. This process provides for better cellular protection from OS in conjunction with prevention of damage to the mitochondria, genes, and various cellular functions.

In a recent analysis of the literature, Pall and Levine (2015) reviewed over 100 studies focusing on Nrf2. This analysis concluded Nrf2 is a well-documented master regulator of the ARE. The authors went on to state:

"We may be on the verge of a new literature on health effects of Nrf2 which may well become the most extraordinary therapeutic and most extraordinary preventive breakthrough in the history of medicine. It is our opinion that raising Nrf2 is likely to be the most important health promoting approach into the foreseeable future." (p. 11)

Protandim™ is a nutraceutical supplement developed by LifeVantage (LFVN), a Utah based science-based nutraceutical company focused on developing products that work as nutragenomic up-regulators at the cellular level. Protandim™ is composed of five well-studied medicinal herbs that work synergistically to up-regulate the cellular protein Nrf2. In 2006, McCord and others investigated Nrf2 activation with the use of the Nrf2 synergizer Protandim™. The authors reported an increase in the cell's antioxidants, Superoxide Dismutase (SOD), Glutathione and Catalase, resulting in significant reduction of OS in healthy human subjects ranging in age from 20 to 78 years. Each subject was tested using Thiobarbituric Acid Reactive Substances (TBARS) assay just prior to taking Protandim daily and again at 30 days. The follow up TBARS results revealed an average drop of OS by 40%.

Breath Analysis Testing For Oxidative Stress

When measuring OS, the TBARS test is arguably the 'Gold Standard'. However, this requires a blood draw, a specialized laboratory for analysis, and a significant fee to the patient. A TBAR test then becomes an unreasonable consideration for standard OS testing in a private clinical practice. Seeing a need for a low cost and effective way for monitoring OS, Akers Biosciences, Inc. designed and recently released an OS screening device called the OxiChek™–Rapid Breath Test for Oxidative Stress (Oxichek™). This device measures super oxides and hydrogen peroxides, which are abundant free radicals.

In 2016, a clinical comparative study between the Oxichek™ and the TBARS blood test was performed under the supervision of Adam C. Sobel, M.D., Director, Medical of Akers Bio. The results yielded a high correlation (99.5%) between OxiChek™ breath test and the TBARS blood test. This study demonstrated a reproducibility of 100%, suggesting a zero variation after multiple repeat measures in a lung simulator. Additionally, an intra-subject variation ranging from 1.61% to 14.87% was present, indicating a narrow variation upon multiple repeat tests on the human subjects.

Results Of A Pilot Study Pre And Post Os Test

A pilot study (2017) measuring the OS levels of pre and post usage of LifeVantage's Protandim™ Nrf2 product was completed using the Akers Bio BreathScan Lync™ reader with the OxiChek™ – Rapid Breath Test for Oxidative Stress device. Forty-five subjects (23 males and 22 females) ranging from 15 to 98 years participated in the study. Participants were offered free pre-Oxidative Stress Test (prior to starting their Protandim Nrf2 activator) and agreed, also, to complete a free post OS test in 30 days. Pre-test OS scores ranged from 131 to 829, with post-test scores ranging between, 115 to 756 were obtained. The measured drop in OS levels averaged for the men was 32% and for the women the averaged OS drop was 29% and a combined averaged drop was at 31%

Conclusions:

Overall results of this pilot study clearly suggest the Akers Bio BreathScan Lync Reader with the OxiChek™ – Rapid Breath Test for Oxidative Stress device is a reliable tool to measure OS in clinical and non-clinical environments when testing is conducted by either medically trained or non-medically trained testers. These results further supported Dr. McCord's earlier study that demonstrated the use of the LifeVantage dietary supplement product, Protandim™ effectively reduces Oxidative Stress.

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