

“Dozens of studies show how a specific herbal blend helps to activate Nrf2 and the body’s own protective mechanisms, resulting in an average reduction in cellular stress of as much as 40 percent within thirty days!”



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Dr. Talbott received his Ph.D. in Nutritional Biochemistry from Rutgers University, and completed the Entrepreneurial Master’s Program from the Massachusetts Institute of Technology (MIT). He has received several research awards, and published over 200 articles and 10 books on health and fitness, is a Fellow of the American College of Sports Medicine, has a B.S. degree in Sports Medicine, a B.A. degree in Fitness Management, and a M.S. degree in Exercise Science. He has served as a nutrition consultant for elite-level athletes in a variety of sports, including professional triathletes, members of the Utah Jazz of the NBA, and the US Ski and Snowboard Association during the 2002 Winter Olympic Games.

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Nrf2 & YOU

The Nervous System Breakthrough

The Proven Science Behind Nrf2’s Protection of the Brain and Nervous System

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The Toll of Neurodegenerative Disease

Aging is characterized by a progressive decline in the efficiency of cellular function and the increased risk for disease and death – not a happy future! At the very heart of the aging process is the balance between cellular stressors and our ability to maintain biochemical balance and avoid cellular damage in the face of those stressors. The “free radical theory of aging” suggests that reactive oxygen molecules (free radicals) produced during cellular energy metabolism have damaging effects on all cells and across all tissue in the body – causing cumulative damage over time that ultimately results in aging, dysfunction, and death.

Each of our cells has a built-in system of defense to protect from damage by cellular stressors – called the Nrf2 pathway (see sidebar). In the aging (healthy) brain, as well as in the cases of several neurodegenerative diseases, there is a dramatic decline in the body’s ability to mount a robust defense

against cellular stressors, which increases the vulnerability of the brain and the entire nervous system to damage. For example, oxidative damage to the DNA and cell membranes has been detected at levels more than 10 times higher in the brains of Alzheimer’s disease patients and 17 times higher in the brains of Parkinson’s disease patients compared to healthy subjects.

Brain neurons and nerve cells are comprised of lipids (fats) that are highly susceptible to attack by free radicals. High levels of damaged fatty acids (damaged proteins) have been identified in aging brains and associated with cognitive deficits. In the brain, such damage to fatty acids and proteins is known to set off an immune/inflammatory response that often leads to further cellular damage when prolonged. Elevated levels of inflammatory cytokines leads to a vicious cycle of further cellular damage that propagates through a chain reaction across tissues.

The Science Behind Nrf2's Brain & Nervous System Benefits



Natural plant-derived bioactive compounds (phytonutrients) have been shown to exert both antioxidant and anti-inflammatory effects in brain tissue. For example, Nrf2-activating phytonutrients such as EGCG from green tea, curcumin from turmeric, and quercetin from onions are known to reduce amyloid plaque accumulation (Alzheimer's) and increase regeneration of dopamine fibers (Parkinson's), suggesting a general neuro-protective benefit. Indeed, population studies have shown a dramatic protective effect of diets high in fruits/vegetables and healthy oils (Mediterranean and Okinawan diets) on risk for dementia, Alzheimer's, and other neurodegenerative diseases.

Although the range of brain and nervous system diseases is varied with distinct pathologic features, there is considerable scientific evidence to support oxidative stress as a common pathogenic mechanism in many neurological conditions. Oxidative damage occurs early in virtually all nervous system disorders, including chronic conditions such as Alzheimer's, Parkinson's, Multiple Sclerosis, and ALS (amyotrophic lateral sclerosis), as well as acute brain injury such as stroke and traumatic brain injury (TBI, including concussions), suggesting that oxidative stress plays a prominent role in disease progression. Nrf2 activation is disrupted in many nervous system disorders and brain levels of protective

antioxidant enzymes (superoxide dismutase, catalase, glutathione, etc) are typically reduced in neurodegenerative disorders as well as during normal aging. For example, neurons with low Nrf2 activity are more susceptible to oxidative stress, but cellular damage can be reduced through Nrf2 activation. In both Alzheimer's disease and Parkinson's disease, researchers from the University of Pennsylvania and University of Pittsburgh (J Neuropathol Exp Neurol. 2007 January; 66(1): 75-85) have described an insufficient and disrupted activation of the Nrf2 pathway in neurons located in the areas of the brain affected by the disease process.

One important study has shown that a specific blend of phytonutrients ("Product 5x") can significantly increase levels of superoxide dismutase and catalase in human subjects (Free Radic Biol Med. 2006 Jan 15;40(2):341-7). Conducted at the Webb-Waring Institute for Cancer, Aging and Antioxidant Research at the University of Colorado in Denver, the study showed that natural activation of the Nrf2 pathway increased superoxide dismutase by 30% and catalase by 54%, while reducing cellular damage by an average of 40% within 30 days. Importantly, the typical age-related increase in cell damage completely disappeared after supplementation with "Product 5x" – so much so that a 78-year old subject had similar (low) levels of cellular damage to that of a 20-year old subject (indicating a dramatic cellular anti-aging effect).

Other studies (Free Radic Biol Med. 2009 Feb 1;46(3):430-40) have shown that the ingredients in "Product 5x" work synergistically to provide superior antioxidant benefits compared to the sum of the effects from its individual ingredients. Together, the patented blend of "Product 5x" ingredients was found to have a 2–4 fold synergistic effect on increasing glutathione, a powerful antioxidant and scavenger of free radicals.

In a recent study funded by DARPA (Defense Advanced Research Projects Agency of the United States Department of Defense), "Product 5x" was found to induce Nrf2 and protect brain cells of rats subjected to the stress of high altitude. Results showed that the Nrf2 blend was effective in supporting a healthy response to "leaky" blood vessels in the lungs and the brain. "Product 5x" was found to induce Nrf2 at a higher degree than the other agents (prescription drugs for treating altitude sickness) and reduce cerebral vascular leak by an impressive 62%.

Finally, these and other recent scientific findings have linked Nrf2 activation not only to an elevated antioxidant capacity, but also to increases in other types of protective proteins, such as brain-derived neurotrophic factor (BDNF – a brain protein associated with stimulation of neuron growth and with anti-depressive effects).

What Is Nrf2?

Nrf2 is an internal cellular protein that serves as a "master regulator" of the body's stress response. You might think of Nrf2 as a "thermostat" within our cells that senses the level of cellular stress and turns on internal protective mechanisms.

Interestingly, while we know that there are numerous Nrf2-inducers in the natural world, we also know that specific combinations of ingredients can maximize gene expression in hundreds of genes associated with superior health of tissues and organs throughout the body.

With age, Nrf2 levels and activation decline – leading to reductions in levels of internal protective enzymes and increases in markers of cellular stress. Three important factors are proven to increase both Nrf2 protein levels and activity—exercise, diet high in brightly colored fruits/vegetables and Nrf2-activating phytonutrients.

More information about Nrf2 activation for improved health can be found in the Deadly Antioxidants book and at www.ShawnTalbot.com

One specific blend of 5 herbs ("Product 5x") has been patented for its demonstrated effects in reducing oxidative and inflammatory stress. The 5-ingredient blend (containing extracts of ashwagandha, bacopa, green tea, milk thistle, and turmeric) has been studied in dozens of peer-reviewed studies at universities around the country and published in some of today's most prestigious scientific journals. These studies show how this specific blend helps to activate Nrf2 and the body's own protective mechanisms, resulting in an average reduction in cellular stress of as much as 40 percent within thirty days.

How Can Nrf2 Protect Your Brain and Nervous System?

- Reduce amyloid plaque accumulation
- Increase regeneration of dopamine fibers
- Protect lipids in brain and nerve cells
- Inhibits free radical damage/oxidative stress
- Slows inflammatory stress in brain and nerve cells
- Enhances integrity of blood vessels in brain
- Increases activity of protective proteins, such as brain-derived neurotrophic factor (BDNF)