

## Nature's Nitric Oxide Effect

### Why the Discovery of Nitric Oxide Won the Nobel Prize

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The discovery of **nitric oxide** function in the human body is one of the most important discoveries in recent medical/scientific history. It is fast becoming one of the most studied molecules ever, with scientific literature growing exponentially. The importance of nitric oxide was made even more evident when three Pharmacologists were awarded the Nobel Prize in Physiology or Medicine in 1998 for their research in nitric oxide. Professor Sten Lindahl of the Nobel Committee stated in his presentation speech, "*Your discoveries concerning nitric oxide as a signaling molecule in the cardiovascular system...has opened new avenues for patient treatment and diagnoses of various diseases.*" <sup>1</sup>

What is nitric oxide and why is it so important? Despite the significance of this molecule, nitric oxide (abbreviated NO) is relatively unknown outside the medical research community. Nitric oxide is a highly reactive gas that is naturally produced in the human body. NO is the most important signaling molecule in the body, and it affects a wide range of physiological functions including circulation, inflammation, and oxygen release in tissues from red blood cells. It plays a significant role in many important chemical reactions. Sadly, most people are deficient in the natural production of NO required to maintain optimal health. With today's fast-paced lifestyle and factors like lack of exercise, poor diet, soil mineral depletion, cigarette smoke and other air pollutants, the need for higher levels of nitric oxide in humans is of critical importance.

Before going any further, however, let's be clear on one thing – nitric oxide it is **NOT** nitrous oxide, the gas administered by dentists to decrease pain during dental procedures. But there are similarities, as in the case of nitroglycerine, often prescribed to reduce the pain of angina because it generates nitric oxide. In both cases, pain is decrease through the nitric oxide effect!

Scientifically speaking, nitric oxide is produced in the body through the process of converting L-arginine (one of the 20 amino acids) into citrulline. L-arginine, the source of NO, is released from proteins and small peptides in the small intestine and is then absorbed, along with other amino acids into the circulation. It is delivered to every cell in the body. Some L-arginine is metabolized for NO synthesis and some is used for protein synthesis. In endothelial cells, the small cells that make up capillaries and line every blood vessel and lymph duct in the body, L-arginine can be converted to NO. This occurs only if the enzyme that makes NO and its co-factors are available in adequate amounts. If the endothelial cell can't take up L-arginine, then NO synthesis will be impaired. Moreover, if atherosclerosis disease is present, oxygen delivery to all cells is impaired. Molecular oxygen is one of the cofactors needed by the enzyme to generate NO from L-arginine. The NO diffuses into the smooth muscle cells that surround the endothelial lining of blood vessels cells causing a biologic chain of events that lead to smooth muscle cell relaxation. This results in more blood flow to the tissues. Tissues that are hypoxic (deprived oxygen) cannot produce as much NO as do normal, well oxygenated tissues. <sup>2</sup>

Perhaps the most important function of nitric oxide is the relaxing of the smooth muscles in the walls of the arterioles, thus allowing blood to flow more freely to vital organs. This promotes optimal heart function by allowing more oxygen, nutrients, vitamins, and growth factors to reach

crucial points in the body. Improved circulation is known to contribute to relief from tension and sore muscles and the pain caused by swelling and accumulation of excess fluids. 2

The production of nitric oxide in the body inhibits and/or reduces inflammation and is vital to proper secretions of endocrine glands (hypothalamus, pancreas, and adrenal medulla). It is also needed to achieve rapid wound healing and the proper formation of bones by reducing bone mineral depletion. Additionally, without NO human reproductive organs can't function properly. It is an essential element for both men and women for healthy sexual arousal and satisfaction. 2

Because diabetic patients produce very low amounts of nitric oxide, an improvement in circulation would likely delay the deterioration of blood flow to organs (kidney, heart, eye, and ulcerations) that ultimately become problematic for diabetic patients. As more oxygen is delivered through the blood, the body's natural infection fighters, the white blood cells, are better able to respond against invaders by naturally secreting NO.

Nitric Oxide is an important regulator of immune cells – the cells that fight infections and viruses. NO aids in the killing of engulfed pathogens (e.g. bacteria) found within the lysosomes of macrophages – the body's natural cleaning system to remove harmful cellular debris, as well as dead cells. When nitrates in food are converted into nitrites, the acidic gastric juice in the stomach generates NO, which kills almost all bacteria that have been swallowed in food.

The mitochondria are the “sites” where fat (both dietary and stored fat) is burned in the body to generate almost all of the energy used by humans. Think of the mitochondria as little fat-burning furnaces. The more mitochondria one has, the more fat can be burned. Research suggests that nitric oxide not only stimulates the creation of new mitochondria, but it may also make each individual mitochondrion larger, which helps to burn even more fat. Increased levels of nitric oxide can be very beneficial for weight loss and thus help prevent many health issues related to being overweight. 2

Clearly, nitric oxide is not only needed to facilitate functions of the human body, but it is absolutely essential to reach optimum health! So how does one increase the level of nitric oxide in order to benefit from this phenomenal effect?

### **Noni and the Nitric Oxide Effect**

Over the last decade Noni (*morinda citrifolia*) has become a worldwide health phenomenon and hundreds of thousands of people from around the world have added their voices to the Polynesians' – that Noni works! But, no one really understood the reasons why it worked – including the Polynesians.

Detailed analysis of Noni revealed the incredible nutrient composition of this remarkable plant. Noni is rich in health-promoting compounds such as antioxidants, phytochemicals and bio-flavonoids. The Noni leaves and roots are sources of complete protein, each having a full complement of essential amino acids. Each part of the Noni plant contains a mixture of key vitamins and minerals including Vitamin C, Vitamin E, Calcium, Magnesium and Zinc.

In 2001 an independent laboratory conducted research on behalf of Enliven International, Inc, a

U.S. based company that sells Noni juice and Noni leaf products worldwide. In endothelial tests in vitro, the research showed that diluted Noni juice produces a nitric oxide effect. It was also found that Noni leaves produced four times the amount of nitric oxide as compared to the diluted Noni juice. By using a proprietary combination of various parts of the whole Noni plant, Enliven was able to create a formula which produces a nitric oxide effect up to 50 times greater than the diluted Noni juice tested! 3

Once Enliven discovered that Noni produces a nitric oxide effect, the true benefits of Noni were finally becoming understood. This finding enabled Enliven to develop a new and potentially life-changing product called **NITRO FX™**, a formula that maximizes the production of nitric oxide in endothelial tests in vitro. NITRO FX™ is concentrated to deliver the real essence of what makes Noni so effective. It utilizes the best parts of the Noni plant and distillates them into a proprietary extract to provide optimal nitric oxide effect. And because NITRO FX™ is non-specific in its formulation, it can help support nitric oxide levels for a wide range of conditions (see above).

The NITRO FX™ formula contains large amounts of natural nitrates and nitrites from the Noni plant. After ingesting NITRO FX™, the nitrates and nitrites are converted into nitric oxide by stomach acid. The nitric oxide then diffuses through the stomach wall and enters the red blood cells, or binds to proteins and is carried to all parts of the body. By supplying naturally produced nitric oxide into the body, NITRO FX™ offers a safe alternative to expensive pharmaceutical, without dangerous side effects or the risk of addictions.

Based on the earlier explanation of “converting L-arginine into citrulline creates nitric oxide”, one might suspect that by simply adding more amounts of L-arginine into their diet would increase the nitric oxide effect in their body. Sadly, this isn't the case, even though several health-related companies have recently jumped on the NO bandwagon by offering products high in L-arginine and claiming a NO boost. The creation of NO is a highly complex process that requires the right enzymes and co-factors be available in adequate amounts. Fortunately, it has been shown that Noni actually has the perfect combination for producing nitric oxide effect, and now with Enliven's NITRO FX™ formula, health-conscience people everywhere can experience a 50 times greater nitric oxide effect.

Today there is growing appreciation of the body's natural abilities to support wellness. The science behind Enliven's Noni products has proven that health begins at the cellular level, a fact that is quickly gaining universal acceptance. There is nothing that affects cells on a more fundamental and broad basis than does nitric oxide, which helps defend, maintain, and protect nearly every cell of the body! Enliven brings the hope of wellness rather than reliance on symptomatic treatments.

As therapeutic strategies aiming to reduce the risk of vascular and other degenerative diseases by increasing the bioavailability of nitric oxide continue to be developed, it appears that Enliven has moved into the front-runner's position.

#### Notes

1. *Presentation Speech by Professor Sten Lindahl of the Nobel Committee at the Stockholm Concert Hall – 1998 December*

2. *Abbas Qutab, M.D., PhD – NITRIC OXIDE-THE MOLECULE OF LIFE – 2006 January*

3. Thomas Burke, M.D., "*Morinda Citrifolia* in vitro Product Evaluation Study"; *Integrated Systems Physiology* – 2001 January