



IMAGE AWARENESS WELLNESS INSTITUTE

NITRIC OXIDE AND UPBEET™

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DISCOVERY

The first clue to the importance of nitric oxide was mentioned in the medical literature in 1980. Researchers described a relaxation of blood vessels which was dependent upon some substance produced by the inner lining of the blood vessels known as the endothelium. They named this substance endothelium-derived relaxing factor or EDRF.

It was later demonstrated that this substance was nitric oxide. Nitric oxide is also known as nitric monoxide. It is a colourless toxic gas which no one imagined would be important for human health.. The molecule is highly unstable and is a free radical as it has an unpaired electron.

Due to its instability, nitric oxide exists for only a few seconds (a half-life of less than 7 seconds) before it combines with something else and ceases to exist. The brief life of nitric oxide (NO) makes it an ideal signaling molecule between one cell and another. It is also a key signaling molecule within cells. Once the nitric oxide ceases to exist the signaling ceases. Nitric oxide is a gas which can easily move through tissues which makes it a very efficient signaling molecule.

Due to its transient existence, we are dependent upon the body's continual production and effective regulation of nitric oxide to experience the benefits of the molecule. There is no

way to directly ingest nitric oxide and meet bodily needs. It must be synthesized within the tissues.

Nitric oxide is a gas which is manufactured naturally within the body from the nitrates and nitrites found in foods. Foods rich in the precursors to nitric oxide include beets, dark green leafy foods like arugula, kale, Swiss chard, and spinach. Other foods which can contribute to nitric oxide production include citrus, pomegranate, garlic, dark chocolate, and meat. Spinach is the commonly eaten food with the highest content of dietary nitrates. Popeye may not have been all wrong when he popped spinach in his mouth. Unfortunately, cooking destroys the nitrates used to form nitric oxide.

Numerous studies suggest that nitric oxide production in the body is decreased with aging. Other factors that can contribute to deficiency include inflammation, stress, obesity, and high cholesterol levels.

HOW WE GET NO

Nitric oxide is so important that the body has several means of obtain-



ing it. The body has three enzymes which can convert the amino acid arginine into nitric oxide. These enzymes are called NOS which is short for nitric oxide synthase. Each has a letter in front to differentiate it from the others.

eNOS works in the circulatory system enhancing blood flow and dissolving plaque in the arteries. It dilates the blood vessels and prevents platelets from forming clots. The "e" suggests association with the endothelium-- the inner lining of the blood vessels.

nNOS functions in the neurons. It carries messages from one nerve to another. The "n" suggests neuronal or brain cell association.

iNOS functions in the immune system. It is used to produce weapons that the white blood cells can use to kill bacteria, viruses, and cancer cells. It also plays a role in inflammation which is the first step in immune defense against invaders. The "i" suggests association with the immune system and inflammation.

Synthesizing nitric oxide from arginine become less efficient with aging, particularly in sedentary individuals. The body has a backup for NO synthesis through nitrate reductases. The bacteria in the mouth can convert the nitrates in the food into nitric oxide which is swallowed and moves into the tissues. Unfortunately, use of antibacterial mouthwash can signifi-



cantly impair the production of nitric oxide by the beneficial bacteria in the saliva.

Arginine is a semi-essential amino acid which not only plays a role in nitric oxide production but also human growth hormone which also declines with aging. There is one situation in which it is not desirable to supplement the diet with large quantities of arginine. Viruses thrive on arginine. Researchers have suggested avoiding high arginine foods (chocolate and nuts) and arginine supplements when experiencing outbreaks of viral infections such as shingles and herpes simplex. Suppression of the activity of the amino acid is also accomplished with supplementation with the amino acid lysine.

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https://commons.wikimedia.org/wiki/File:Airway_open_in_an_unconscious_patient_because_the_head_is_flexed.jpg

CLUES TO DEFICIENCY

Changes in Vision

Nitric oxide is part of the process which regulates pressure within the

eye (called intraocular pressure). If pressure builds up within the eye it results in deterioration of the vision.

Sore and Inflamed

When nitric oxide levels are low muscle aches and pain can develop due to poor circulation and the accumulation of inflammatory compounds in the muscles.

Low nitric oxide levels in the central nervous system can result in poor regulation of body temperature. There might be a slight increase in temperature and one may feel like there is a very low fever.

Feel Stressed

Stress is an enemy of healthy nitric oxide functioning. As stress persists, blood pressure tends to rise due to reduced levels of nitric oxide production in the circulatory system.

Lethargy and Fatigue

One of the accompaniments of old age is loss of energy. The loss of nitric oxide at any age, but particularly in older individuals, results in fatigue. This is due to poor circulation decreasing delivery of nutrients to cells and accumulation of waste products in cells. Nitric oxide improves the transport of nutrients in the body and is essential for healthy functioning of the mitochondria where energy is produced in the cells.

Poor Recovery Time

After exercise waste products like lactic acid must be removed from muscles and the tissues must be replenished with nutrients. Nitric oxide plays a key role in recovery from physical activity by its activity in improving circulation making it easier to deliver repair materials to cells and to carry away waste products of cell metabolism.

NO AND THE RESPIRATORY TRACT

An article by Martel and associates points out that sinus tissues continual-

ly produce nitric oxide. This dilates the bronchi and lungs improving breathing. The authors go on to state, "Studies indicate that NO may also help to reduce respiratory tract infection by inactivating viruses and inhibiting their replication in epithelial cells."

Mouth breathing is less healthy than nasal breathing because the nasal passages filter out pollution and invaders so they have a less direct path to the lungs. Mouth breathing also decreases the presence of nitric oxide in the respiratory tract resulting in loss of the antimicrobial and antiviral properties of NO.

Martel and associates suggest that nasal breathing and enhancing nitric oxide synthesis may reduce the risk and severity of viral infections including colds, flu, and Covid-19.

Decreased NO synthesis may be associated with increased frequency and susceptibility to respiratory tract infections and may contribute to breathing problems such as asthma.

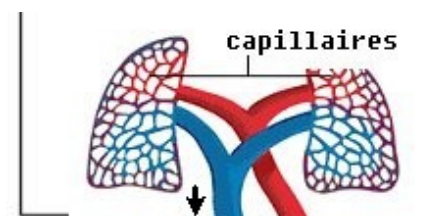
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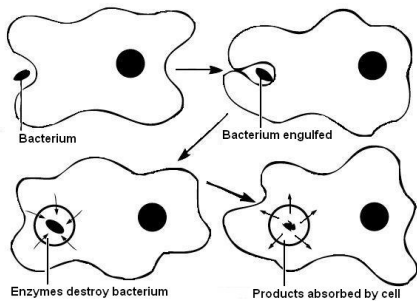
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CIRCULATION

Nitric oxide plays an important role in two major areas of cardiovascular health. The production of nitric oxide causes a relaxation of the muscles around the blood vessels and can play an important role in reducing blood pressure. Nitric oxide also inhibits the tendency of blood platelets to gather together and to stick together promoting clotting.





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IMMUNE FUNCTION

Generation of nitric oxide is a feature of virtually every type of immune cell. Nitric oxide has direct antimicrobial activity against viruses, fungi, protozoa, bacteria, and worms. It can either kill these organisms or inhibit growth and replication. Bogdan writes, “In infectious disease, NO comes into play at all stages and with a diverse spectrum of activities.”

Nitric oxide also plays a role in fighting cancer. It can inhibit enzymes necessary for cancer growth, arrest the growth cycle of cancer cells, directly inhibit the growth of cancer cells, and sensitize cancer cells to chemotherapeutic agents produced by the immune system. The role of NO in inhibiting cancer growth and promoting death of cancer cells was the first function of NO discovered that touched upon immune function.

Nitric oxide can play a role in triggering an inflammatory response when damage or attack by pathogens takes place. It can also play a role in the resolution of inflammation. This is accomplished by its complex regulatory role in the functioning of a wide variety of immune signaling molecules.

One of the ways in which the immune cells kill invaders is through what is called the “respiratory burst.” This involves the production of free radical oxygen and nitrogen compounds which have the ability to destroy the proteins and fats in invading bacteria and viruses. One of the most powerful weapons of the immune cells is peroxynitrite which is a product of nitric oxide metabolism.

The weapons produced as a result of the respiratory burst are so powerful they can actually damage the immune cells themselves which is why it is important to supplement with antioxidants like vitamin C when experiencing an infection. Vitamin C protects the im-

mune cells from damage, but does not protect bodily invaders. One of the highest concentrations of vitamin C in the body is in the white blood cells.

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NERVE AND BRAIN FUNCTION

Nitric oxide plays many roles in the functioning of the brain and nerves. It is involved in passing messages from one nerve cell to another. It plays a role in memory and learning and is involved in the growth of neurons. Nitric oxide also plays a role in sleep.

Brain and nerve cells are among the most biologically active in the body and consequently have requirements for greater quantities of nutrients and oxygen and more effective removal of wastes than most of the other cells in the body. NO plays a critical role in this by improving blood flow to these tissues.

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SUPPLEMENTATION

Nitric oxide is a potent free radical that plays many beneficial roles in the body but more is not always better. Excess or wrong forms of nitrates or insufficient antioxidant intake can cause headache or free radical damage in some people.

It is very easy to throw together a chemical nitrate supplement. Benefit depends upon an adequate quantity of nitrates, digestibility and bioavailability. Food sources of nitrate have proven to best provide the benefits of nitric oxide while minimizing any risk

Reduced production of nitric oxidel leads to vasoconstriction, high blood pressure and the formation of clots (thrombus formation.).

Angina is characterized by pain in the chest and difficulty breathing. Nitroglycerine was first used to treat angina by William Murrell as early as 1876. It can relieve angina pain in minutes. Nitroglycerine helps because it dilates blood vessels due to the fact that it generates nitric oxide. Nitroglycerine can cause a severe allergic reaction and frequently causes headaches, but it illustrates that nitric oxide was improving blood flow before anyone was really aware that nitric oxide could dilate blood vessels and alleviate angina.

Another common circulatory disorder is erectile dysfunction or ED. Viagra enhances the functioning of nitric oxide to produce its benefits.

Maintaining a healthy nitric oxide level not only benefits ED and chest pain but all the tissues of the body dependent upon healthy blood flow. For example, when one goes outdoors the hands get cold. Nitric oxide can go into action directing increased blood flow into the hands to counteract the cold temperature.

Carravas and associates note the following: “There is no doubt that endothelial- and NO-dysfunction is a hallmark of cardiovascular disease, including diseases which are considered as major current public health concerns: hypertension, obesity, diabetes, malnutrition.”

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of free radical generation. Diego dos Santos Baião and associates write, “NO₃ – vascular-effects depend on digestibility and bioavailability (bio-accessibility), and better performances are obtained when NO₃ – intake originates from food matrices compared to NaNO₃ – salt administration.... Beet formulations are easier, attractive, accessible and were the only vegetable shown to be effective in promoting increased systemic NO production at the magnitude necessary to achieve the expected pharmacological effects in individuals presenting cardiovascular disease risk factors.”

The advantage of using beet root as the basis of a formula is that it allows both natural sourcing, but also effective potency in a small serving size. Beets naturally contain betalains — pigments that give beets their red color and are powerful plant-sourced antioxidants reducing risk of oxidative damage.

A good taste is beneficial as a good portion of the nitrate can be produced when the nitrate formula interacts with the bacteria of the mouth. Remember that an oral dose should not be taken after using an antibacterial mouthwash as nitric oxide for-

mation can be dramatically reduced.

NeoLife Upbeet™ is an example of a superior nitric oxide promoting supplement. It contains beetroot, kale and Joseph’s coat which provide dietary nitrates that the body can convert to nitric oxide. It also contains moringa leaves, pomegranate peel and black ginger root which work to stimulate production of nitric oxide inside the body. Black ginger and pomegranate help to enhance the bioavailability of nitric oxide.

UpBeet™ includes research-backed ingredients and delivers 70 mg of dietary nitrates per serving, more than the 60 mg dose shown in research to support heart health.

Nitric oxide supplements do not work like pharmaceutical drugs. The benefits come slowly. dos Santos Baião and associates write, “The aforementioned studies suggest that frequent daily doses up to 6.0 mmol of dietary NO₃ – for long periods of time (≥3 weeks) are required to promote beneficial blood pressure and endothelial function effects, mainly in populations with compromised vascular responsiveness such as hypertensive, metabolic syndrome, obese and older individuals.” In other words, it

may take three weeks or longer to see the benefits that nitric oxide support can provide, especially for those who are older or suffer with health issues.”

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