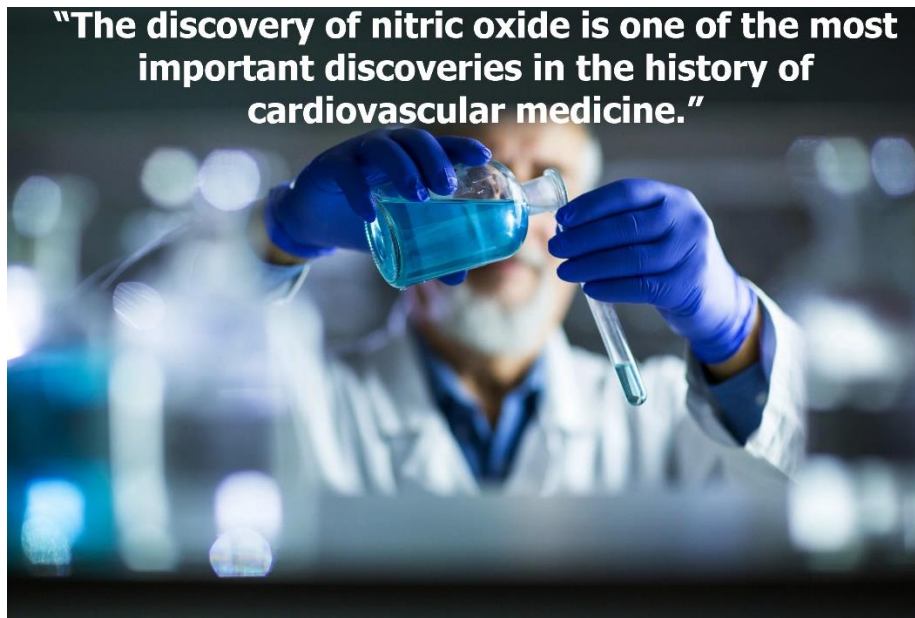


WHAT IS NITRIC OXIDE & WHY SHOULD I CARE



From diabetes to hypertension, cancer to drug addiction, stroke to intestinal motility, memory and learning disorders to septic shock, sunburn to anorexia, male impotence to tuberculosis, there is probably no pathological condition where nitric oxide does not play an important role. Only within the last 25 years was Nitric Oxide discovered as a product of enzymatic synthesis in mammals, there are more than 114,000 scientific papers dealing with this remarkable molecule with most of these published within the last eight years.

Nitric oxide or NO has become one of the most studied molecules in scientific and medical literature. Although only relatively recently was it discovered to be produced in the human body, the chemical properties of NO gas were first characterized in 1772. Indeed, there have been over 140,000 publications on NO, more than half of which have appeared in the last 12 years. NO produced in biological systems has a half-life of less than 1 second and is biologically active in the concentration range from 1-100nM. Another interesting feature is that NO is lipophilic so it can readily permeate biological membranes. The concept of a gas selectively and specifically mediating cell signaling events is unlike the conventional receptor-ligand concepts associated with cell signaling.

These discoveries were so revolutionary that the 1998 Nobel Prize in Physiology or Medicine was awarded to Robert Furchgott, Louis Ignarro, and Ferid Murad for their discoveries of NO as a signal molecule in the vasculature and specifically in the control of blood pressure. In addition to this role, NO is one of the most important signaling molecules in the body, and is involved in virtually every organ system where it is responsible for modulating an astonishing variety of effects.

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NO has been shown to be involved in and affect (just to list a few major examples) neurotransmission, memory, stroke, glaucoma and neural degeneration, pulmonary hypertension, penile erection, angiogenesis, wound healing, atherogenesis, inflammation such as arthritis, nephritis, colitis, autoimmune diseases (diabetes, inflammatory bowel disease), invading pathogens, tumors, asthma, tissue transplantation, septic shock, platelet aggregation and blood coagulation, sickle cell disease, gastrointestinal motility, hormone secretion, gene regulation, hemoglobin delivery of oxygen, insulin signaling and diabetes, stem cell proliferation and differentiation, and bronchodilation. One can then begin to appreciate the many consequences of the loss of the production of nitric oxide.

Cardiovascular disease

Nitric oxide is the most important molecule produced in our cardiovascular system. In fact, loss of the production of nitric oxide is recognized as one of the earliest events in the onset and progression of cardiovascular disease. From high blood pressure, heart failure, coronary artery disease, atherosclerosis, heart attack and stroke, nitric oxide plays an essential role in combatting all these conditions

Immune Function

When our body is invaded by pathogens such as bacteria, viruses, parasites or fungi, our immune system responds by producing massive amounts of nitric oxide acutely to kill these pathogens. The production and regulation of nitric oxide by our immune system can help keep us free from any chronic infections

Cancer

Nitric oxide appears to play a dual role in cancer. Low, physiological levels of NO may contribute to cancer cell growth and proliferation, whereas higher concentrations produced for prolonged periods appear to have anti-cancer properties. There is much focus and current research on understanding how NO effects cancer cell growth.

Nervous system

Nitric oxide is a cell signaling molecule and facilitates communication between cells. In the nervous system, nitric oxide is a neurotransmitter involved in long-term memory and cognition. Disruption of nitric oxide plays a role in many neurodegenerative diseases such as Alzheimer's and Parkinson's Disease.

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Physical Performance

Your ability to generate nitric oxide may predict how well you perform athletically. Nitric oxide not only controls and regulates blood flow to working skeletal and heart muscles but also controls how efficiently your mitochondria generate cellular energy from oxygen. Exercise intolerance in older individuals is due to these people being unable to effectively produce nitric oxide and regulate blood flow to the body.

Think of nitric oxide as a delivery person in your body. It carries important messages between cells, telling blood vessels to relax and widen, helping immune cells fight infections, and allowing brain cells to communicate. Without these messages, many of your body's systems would stop working properly.

The Anti-Aging Benefits of Nitric Oxide

As we age, declining nitric oxide levels contribute to many age-related changes. Maintaining healthy nitric oxide levels may help:

- Keep skin elastic and youthful
- Maintain muscle strength
- Support overall energy levels
- Protect against age-related diseases

Nitric Oxide and Organ Health

Every organ in the human body depends on adequate blood flow. Nitric oxide is the molecule that relaxes blood vessels and allows oxygen and nutrients to reach tissues. When NO is lacking, organs starve. This contributes to:

- Glaucoma and macular degeneration (reduced blood flow to the eyes)
- Alzheimer's and vascular dementia (poor circulation in the brain)
- Heart disease, stroke, and kidney disease (restricted oxygen delivery to vital organs)
- Diabetes and metabolic disorders (disrupted blood vessel function)

By restoring nitric oxide, we restore circulation — and give organs the resources they need to heal and perform.

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A Marker of Health: Plasma Nitrite

When the body produces nitric oxide, it leaves behind a stable byproduct called nitrite. Measuring plasma nitrite is one way to gauge nitric oxide production.

- In healthy people, exercise increases nitrite levels — showing strong NO production.
- In people with heart disease, nitrite does not increase with exercise. This failure is diagnostic for cardiovascular dysfunction.

Age-related changes in blood vessels make this problem worse, which is why older adults are more vulnerable to heart disease.

The evidence is clear and undisputed: nitric oxide is vital for health. Supporting its production through nutrition and lifestyle changes can help prevent disease, improve daily performance, and extend longevity. By restoring nitric oxide, we unlock better circulation, healthier organs, and greater resilience against aging. Small changes—like eating nitrate-rich foods, avoiding mouthwash that disrupts oral bacteria, and exercising regularly—can have a profound impact. With consistent effort, anyone can support nitric oxide pathways and protect long-term health.

This molecule is not just about preventing illness; it is about living fully, aging gracefully, and sustaining energy for life's most meaningful moments.

