

This information is provided as a medical and scientific educational resource for the use of physicians and other licensed health-care practitioners ("Practitioners"). This information is intended for Practitioners to use as a basis for determining whether to recommend these products to their patients. All recommendations regarding protocols, dosing, prescribing, and/or usage instructions should be tailored to the individual needs of the patient considering their medical history and concomitant therapies. This information is not intended for use by consumers.

CellGuard-NR™ is uniquely formulated to support cellular repair, antioxidative status, and healthy aging.* This formula contains clinically relevant amounts of Niagen®, a form of nicotinamide riboside chloride (NR), resveratrol as Veri-te™, and pterostilbene. NR is a pyridine nucleoside form of vitamin B3 (niacin) and is a building block of nicotinamide adenine dinucleotide (NAD+).¹

CellGuard-NR™ provides 300 mg of nicotinamide riboside chloride as Niagen®, 200 mg of resveratrol as Veri-te™, and 50 mg of pterostilbene. Together, these nutrients help support a healthy cell cycle, a healthy response to oxidative stress, cellular repair, and healthy aging.* CellGuard-NR™ may be ideal for individuals concerned with healthy aging, those who need support for antioxidative status, and those who may require support for healthy cellular repair, function, and regeneration.*

Ingredient Highlights

- Provides 300 mg of Niagen®, a form of nicotinamide riboside chloride for optimal cellular health*
- Includes synergistic compounds to support antioxidative status and cellular maintenance*
- 200 mg of resveratrol as Veri-te™ containing >98% trans-resveratrol, a product of fermentation
- 50 mg of pterostilbene to support cellular repair and regeneration*
- Gluten-free, dairy-free, and soy-free
- Non-GMO

Nicotinamide Riboside (NR) and NAD+

NAD+ is found in every living cell and is essential to many important cellular processes, which includes energy production in the mitochondria. NAD+ is involved in more than 500 chemical reactions in the human body, including reduction-oxidation reactions, most anabolic and catabolic reactions, fatty acid beta-oxidation, glycolysis, tricarboxylic acid cycle, and the synthesis of cholesterol, steroids, and fatty acids.² Biosynthesis of NAD+ is derived from tryptophan or salvage pathways from one of its four precursors: nicotinamide riboside (NR), nicotinic acid, nicotinamide, and nicotinamide mononucleotide (NMN). Synthesis of NAD+ from tryptophan requires eight steps, whereas synthesis from NR to NAD+ requires two or three steps, depending on the salvage pathway, with NMN as an intermediary.²

Silent information regulators (Sir), such as Sir2, are histone deacetylases that require NAD+ to perform their enzymatic activity.³ There are seven sirtuins in mammalian cells, which play a variety of roles in cellular function, including energy homeostasis, cell cycle, and apoptosis. Sirtuins (SIRT) are NAD+-consuming enzymes, and NAD+ acts as a SIRT activator. NAD+ substrates, such as NADH and nicotinamide, act as inhibitors of SIRT.^{4,5} Increasing NAD+ levels have been shown to activate SIRT1 to mitigate some of the age-related effects and other downstream effects of reduced SIRT1 activity, such as mitochondrial function.⁶ These may also mediate inflammatory and stress responses, and support cardiovascular and neurological function.⁷

Supporting NAD+ status in the body may aid healthy aging.* Animal and human studies have found a potential association between advanced age and significantly lower levels of NAD+.^{8,9} Studies have found an association between NAD+ deficiency and type 2 diabetes, Alzheimer's disease (AD), other neurodegenerative disorders, cardiovascular disease, and various other age-related diseases.⁹⁻¹⁴

Supplementation with NR has been shown to improve mitochondrial function, SIRT activity, and increase NAD+ levels in multiple tissues.² NR does not induce flushing and has been regarded as a favorable NAD+ precursor.² In both animal and human populations, twice-daily doses of 1,000 mg of NR were shown to significantly increase whole blood levels of NAD+ and promote NAD+ metabolism.²

In a clinical study, supplementation with 1,000 mg of NR for 9 days was shown to increase blood levels of NAD+ in healthy volunteers.¹ An 8-week double-blind, randomized controlled clinical trial explored the impact of NR supplementation on blood NAD+ levels at varying doses. NR as Niagen® was administered at 100 mg, 300 mg, and 1,000 mg dose levels. Within 2 weeks, significant increases in whole blood NAD+ levels were 22%, 51%, and 142%, respectively. No dose-dependent adverse events or incidences of flushing were reported.¹⁵

Benefits*

- Promotes cellular repair and maintenance
- Helps support healthy aging
- Promotes healthy antioxidative status
- Supports healthy cell regeneration
- Helps promote healthy metabolism of NAD+ in the body

Supplement Facts

Serving Size 2 capsules
Servings Per Container 30

Amount Per Serving	% Daily Value
Nicotinamide Riboside Chloride (NIAGEN®)	300 mg *
Trans Resveratrol (Veri-te™)	200 mg *
Trans-Pterostilbene	50 mg *

* Daily Value not established

Other Ingredients: Cellulose (capsule), microcrystalline cellulose, dicalcium phosphate, vegetable stearate, quillaja extract.

NR and Aging

The presence of senescent cells and neuroinflammation have been associated with many age-related illnesses, such as Alzheimer's disease (AD).¹⁶ Neuroinflammation has been linked to reductions in NAD⁺ levels during the natural aging process.¹⁷ An animal study explored the impact of NR administration on mouse models of AD. Increases in NAD⁺ levels were observed.^{16,17} Decreases in the number of senescent cells and pro-inflammatory cytokines, interleukin (IL)-6, IL-1 β , and tumor necrosis factor-alpha (TNF- α) were also reported.^{16,17}

An animal study involving NR administration showed improvements in motor deficits and attenuation of neuronal loss in the presence of Parkinson's Disease (PD).¹⁸ NR has also been shown to play a supportive role in the presence of neurodegenerative diseases, including AD and other age-related illnesses.¹⁹

A randomized, controlled, crossover clinical trial explored the efficacy of NR supplementation on skeletal muscle NAD⁺ metabolomics in aged men. Twelve men with a median age of 75 years were randomized to a placebo or a treatment arm consisting of daily supplementation of 1,000 mg of NR for 21 days. NR was shown to increase skeletal muscle NAD⁺ and decrease certain pro-inflammatory cytokines, including IL-6, IL-5, IL-2, and TNF- α .²⁰

Resveratrol as Veri-Te™

CellGuard-NR™ features Veri-Te™, which contains >98% trans-resveratrol. Resveratrol (trans-3,4',5 trihydroxystilbene) is a polyphenolic molecule found in grape skin, berries (such as blueberries and raspberries), and peanuts. It is known for its role in supporting a healthy response to oxidative stress and inflammation, and for its support of cardiovascular and metabolic functions within the human body.²¹

Resveratrol has been shown to activate SIRT1, to help the body's response to oxidative stress, to increase hippocampal neurogenesis, and to inhibit amyloid-beta expression.^{22,23} An animal study involving the administration of resveratrol observed attenuation of the progression of amyloid-beta in the cortex and activation of adenosine monophosphate-activated protein kinase.²⁴ Resveratrol has been shown in animal and laboratory studies to downregulate pro-inflammatory cytokines, such as IL-1 β , IL-6, IL-17, and TNF- α .^{21,24,25}

Resveratrol supports many of the body's systems in the presence of age-related changes. A crossover study involved daily supplementation of 125 mg of resveratrol in postmenopausal women and found a significant 33% improvement in overall cognitive performance in the treatment group as compared to a placebo.²⁶ The study also reported improvements in cerebrovascular function and improved verbal memory in women over the age of 65 years.²⁶

A randomized, year-long, clinical trial involved individuals with mild-to-moderate AD. The study began with 500 mg of daily supplementation with resveratrol; dosing increased by 500 mg increments every 13 weeks up to 1,000 mg twice daily. Resveratrol was observed to cross the blood-brain barrier.²⁷ At week 52, declines in the Alzheimer's Disease Cooperative Study Activities of Daily Living Scale were attenuated in the treatment group as compared to a placebo.²⁷

A randomized, placebo-controlled trial evaluated the efficacy of resveratrol supplementation on bone health in postmenopausal women without overt osteoporosis. After 12 months of daily supplementation with 150 mg of resveratrol, improvements in bone density, T-scores, and hip fracture risk were reported as compared to a placebo.²⁸ Resveratrol may also support skin health and age-related skin changes. It has been shown in studies to improve elasticity, moisture content, total wrinkled area, and total wrinkle volume.²⁹

Pterostilbene

Pterostilbene is structurally similar to resveratrol. This highly bioavailable molecule has been shown to support antioxidative status, a healthy inflammatory response, and healthy cellular function.³⁰ It has been shown to activate SIRT1 activity.²⁴ It also increases superoxide dismutase and glutathione activation through the nuclear factor erythroid 2- related factor (Nrf2) signaling pathway.²⁴

Pterostilbene has also been shown to play a protective role in high glucose-induced oxidative injuries through the activation of Nrf2 in hippocampal neuronal cells.²⁴ Animal and laboratory studies indicate that pterostilbene may downregulate certain pro-inflammatory agents, including IL-1 β , IL-6, IL-18, TNF- α , and vascular endothelial growth factor.²⁴ It has also been shown to help attenuate hypoxia-reoxygenation injury in cardiomyocytes.²⁴

Recommended Use: Take 2 capsules per day with a meal or as directed by your health-care practitioner.

For a list of references cited in this document, please visit:

<https://www.designsforhealth.com/api/library-assets/literature-reference---cellguard-nr-tech-sheet-references>

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Healthcare practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage.

NIAGEN® is a registered trademark of ChromaDex, Inc. Patent: See www.ChromaDexPatents.com
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*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

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