THORNE VET

NEW PRODUCT

ThorneVet Longevity Complex

A cutting-edge animal health supplement that combines powerful ingredients that beneficially influence the body's longevity pathways and promote healthy aging in companion animals. Its ingredients synergistically balance the body's inflammatory processes, while reducing oxidative stress, in addition to providing key nutritional support for the veterinary cancer patient.

Key Longevity Support Features

- Contains nicotinamide riboside, the most bioavailable and efficient precursor to NAD+, which is necessary for up-regulating the activity of the sirtuin proteins.
- The formula's synergistic combination of polyphenol compounds – resveratrol, quercetin, curcumin, and green tea extract – beneficially influence the longevity pathways that promote healthy aging.
- The carotenoid astaxanthin provides potent antioxidant support.
- Includes the important amino acid taurine – which has been shown to enhance longevity in animals.

QUALITY SEAL nasc NATIONAL ANIMAL SUPPLEMENT COUNCIL NASC MEMBER SINCE 2002

Introduction

Just as in humans, the natural aging of companion animals causes molecular, cellular, and physiological changes in the body – with most of these changes being negative. And although an animal's genetic makeup plays a significant role in aging, non-genetic changes also occur because of the animal's daily environment – changes in the body caused by lifestyle, nutrition, physical activity, obesity, illness, and exposure to pollutants and toxins. These non-genetic changes can contribute as much as 70 percent of the factors that cause adverse expressions of aging. It is these non-genetic changes that allow for multiple pathways of positive interventions that can be implemented to promote and enhance longevity and healthy aging.

Although an in-depth discussion of the body's longevity pathways is beyond the scope of this Product Information Sheet, some understanding of these pathways is helpful to understand how supplementation with specific nutrients can beneficially impact longevity and healthy aging.

For example, cellular energy is produced in the mitochondria in the body's cells. This energy production pathway is critical for every life process – in humans and animals alike. One very important process of this pathway is the production of **nicotinamide adenine dinucleotide** – or **NAD+**. Newly produced **NAD+** in the mitochondria becomes the fuel for the parts of the cell that produce cellular energy. It is because of its supportive role in cellular energy production that **NAD+** is now recognized as having multiple pro-longevity, healthy aging effects.

For example, as the level of **NAD+** increases within the cells, its increase is detected by the **sirtuin proteins** – a family of signaling proteins involved in regulating metabolism. The beneficial activities of the **sirtuin proteins** are dependent on **NAD+** being present – because **NAD+** acts as a co-factor with these proteins. The **sirtuin proteins** undertake multiple beneficial roles, including controlling gene expression, repairing DNA, down-regulating oxidative stress, and making new cells. Conversely, when the activities of the **sirtuin proteins** slow down, it can lead to tissue-specific degenerative events that underlie multiple adverse health conditions related to aging.[1]

The most important of the **sirtuin proteins** is **Sirt1**. **Sirt1** exerts beneficial effects on metabolic pathways, cell survival, cellular senescence (the destruction of worn-out cells), and the body's inflammatory response. In addition, the optimal presence of **Sirt1** is believed to inhibit the progression of pulmonary, neurodegenerative, and cardiovascular disorders.[2]

ThorneVet's Longevity Complex includes the most bioavailable precursor to NAD+ production – Nicotinamide Riboside. Longevity Complex also includes three potent polyphenolic compounds – Resveratrol, Quercetin, and Curcumin – as well as potent green tea catechins, the antioxidant Astaxanthin, and a supplemental amino acid – Taurine. These ingredients work synergistically to up-regulate the activity of the entire sirtuin protein family, with the accompanying benefits from balancing the body's inflammatory processes, promoting healthy aging and longevity, and, in the situation of the veterinary cancer patient, providing substantial support for healing and recovery.

Polyphenol Compounds

Polyphenols are potent bioactive compounds – found extensively in plants – that have multiple health-promoting properties. The benefits of polyphenols include antioxidant activity and immune function support, as well as balancing the body's inflammatory response and the gut's microbiome.[3] **Longevity Complex** incorporates a synergistic blend of multiple polyphenol compounds that balance the body's inflammatory response, boost its antioxidant capacity, promote metabolic health, and, when needed, provide substantial nutritional support to the veterinary cancer patient.

Trans-Resveratrol

Resveratrol – a polyphenol naturally found in grapes, blueberries, red wine, and peanuts – has multiple beneficial bioactivities, including antioxidant, inflammatory response, and immune-support activity, as well as providing nutritional support in cardiovascular and neurodegenerative disorders.[4] Numerous studies show **resveratrol's** importance in promoting healthy aging through suppressing oxidative stress, balancing inflammatory responses, improving mitochondrial function, and up-regulating programmed cell death (apoptosis).[5,6] **Resveratrol** also up-regulates **Sirt1**, which can then exert its many beneficial effects on the multiple pathways noted above – with the end result being enhanced longevity and healthy aging.

Longevity Complex uses **Evolva's Veri-te Trans-resveratrol**, the most biologically active form of **resveratrol**, which is produced by fermentation processes, thus eliminating the use of solvents and increasing the ingredient's purity and potency.

Curcumin

Curcumin is a bioactive curcuminoid that comes from the rhizomes of turmeric, a flowering plant in the ginger family. In addition to being used for thousands of years as a culinary spice, curcumin is also utilized for its many health-promoting benefits. Because curcumin by itself is poorly absorbed in the body, **Longevity Complex** contains **Indena S.p.A's Curcumin Phytosome** – **CurcuVET®** – to ensure the highest bioavailability of this potent curcuminoid. **Indena S.p.A.**, headquartered in Milan, Italy, is the world's leading company dedicated to the identification, development, and production of high-quality, bioactive constituents derived from plants.

Curcumin exerts many beneficial effects across various organ systems in the body. In addition to being a potent antioxidant, **Curcumin** exerts significant benefit in maintaining a balanced inflammatory response in the body.[7] Like its co-ingredient **nicotinamide riboside**, **Curcumin Phytosome** is included in **Longevity Complex** because of its ability to up-regulate the activity of **Sirt1**, thus promoting the body's natural ability to eliminate worn out cells, as well as improving mitochondrial function, enhancing cellular energy production, and reducing oxidative damage.[8]

Quercetin

Quercetin (***saphora japonica***) is a **polyphenol flavonoid** – more specifically a **flavonol** – that is found in many fruits and vegetables, including onions, grapes, berries, broccoli, seeds, nuts, and citrus fruits. More than 6,000 flavonoids have been identified in the plant world – with quercetin being the most abundant one. Like **curcumin**, **quercetin** by itself is not very bioavailable. For this reason, **Longevity Complex** also utilizes **Indena's phytosome technology** to enhance **quercetin's** absorption and bioavailability – **quercetin** is complexed with **lecithin**, a readily absorbed **phospholipid** derived from sunflower. **Indena's** proprietary **phytosome** delivery system results in the enhanced absorption of **quercetin** because as the body is readily absorbing the naturally absorbable **lecithin**, it will also absorb the **quercetin** that is complexed with the **lecithin**. In a human study, **Indena's Quercetin phytosome** demonstrated 20-times better absorption than unbound quercetin.

The beneficial effects of **quercetin** are well documented. **Quercetin** displays potent antioxidant activity, in addition to inflammatory response, immune function, neuro-protective, and anti-aging benefits.[9]

One of **quercetin's** healthy aging benefits is acting as a **senolytic**. As cells age, a process called **senescence** takes place. Normal cells continue to divide until they become worn out and die and are then removed from the body and replaced by new cells – billions of old cells die and are replaced in the body each day. However, during aging, some cells – even though they have stopped dividing – don't die. These useless cells – called **senescent cells** or "**zombie cells**" – are not removed from the body. Some of the same adverse factors that cause free radicals also cause **senescent cells**, which can build up in the body and contribute to chronic health conditions because they secrete inflammatory chemicals that damage healthy cells. Enter **quercetin**. Although the science of **senescence** is still new, it is known that **quercetin** helps remove **senescent cells** from the body – making it a **senolytic**. And, even better, cellular senescence is up-regulated in the presence of **SIRT1**, which **quercetin** helps activate.

By scavenging free radicals, by boosting the activity of the body's natural antioxidants, and by maintaining healthy inflammatory responses, **quercetin** encourages healthy aging and promotes longevity.

Green Tea Extract

Green tea has been consumed for centuries in Asian cultures for its health-promoting properties. Multiple compounds in **green tea** are responsible for its beneficial properties. The flavonoid polyphenols in **green tea** – called catechins – are the most extensively studied. Clinical studies confirm the inflammatory response and antioxidant benefits of **green tea** polyphenols – benefits that are the cornerstone of **green tea extract's** health-promoting properties.

To ensure the highest concentration of standardized catechins, **Longevity Complex** uses **Indena S.p.A's Green Tea Phytosome** (**GreenSelect®**), thus increasing the bioavailability of **green tea's** beneficial bioactive constituents.

Nicotinamide Riboside Malate

As described in the **Introduction**, **nicotinamide adenine dinucleotide** (**NAD+**) is a critical coenzyme necessary to generate cellular energy inside the mitochondria, as well as being an essential cofactor in the metabolic reactions that up-regulate the **sirtuin proteins**. **NAD+** has a positive influence on multiple cellular functions, including metabolic pathways, DNA repair, cellular senescence, and immune cell function. These cellular functions are necessary for maintaining the body's metabolic balance (**homeostasis**) – a key component of healthy aging.[10]

Just as in humans, an animal's **NAD+** level declines with aging, and this change is associated with many age-related adverse health conditions, including cognitive decline, metabolic disorders, sarcopenia (muscle wasting), and frailty. It is now thought that many aging-associated conditions can be slowed down, and possibly even reversed, by maintaining or restoring **NAD+** to an optimal level.[10]

In 2004, it was discovered that **nicotinamide riboside** is a highly efficient precursor of **NAD+** because the least amount of bodily energy is needed to produce **NAD+** when **nicotinamide riboside** is present. Accumulating evidence on the health benefits of **nicotinamide riboside** is being validated by numerous animal and human studies analyzing its positive impact on various cardiovascular, neurodegenerative, and metabolic conditions.[11] Supplementation with **nicotinamide riboside** increases the level of **NAD+** in multiple tissues, concurrent with an increased activity of the **sirtuin proteins**, improved mitochondrial function, and regenerative stem cell potential.[11]

The **nicotinamide riboside** ingredient in **Longevity Complex** is **nicotinamide riboside hydrogen malate**. This ingredient is exclusive to **ThorneVet** and is a unique form of **nicotinamide riboside**. **ThorneVet** sources its **nicotinamide riboside malate** from a European supplier, and **ThorneVet** is the only animal health product company in the United States using this unique form of **nicotinamide riboside** in a companion animal health supplement. **Nicotinamide riboside malate** is **nicotinamide riboside** bound to **hydrogen malate salt**, an organic acid that can also participate in cellular energy production, thus further supporting **nicotinamide riboside's** cellular energy production capability.

Astaxanthin

Astaxanthin, a **ketocarotenoid**, is a potent antioxidant that can cross the blood-brain barrier. **Astaxanthin** has the greatest antioxidant capacity among the 730 known **carotenoids** – more than **beta carotene**, **lycopene**, and **lutein**. **Astaxanthin** is initially produced by microalgae and phytoplankton in the oceans which, after it is consumed, works its way up the food chain to eventually become the source of the deep pink color of ocean fish, like salmon. Due to its unique chemical structure, **astaxanthin** acts as a scavenger of free radicals in the internal membrane layer of the cell, while simultaneously inhibiting oxidation on the outside surface of the cell membrane – effectively protecting both the inside and the outside of the cell membrane.

These characteristics are the main reasons for **astaxanthin's** exceptional antioxidant capacity, which is approximately 10 times more effective than **beta-carotene** or **lutein** and about 100 times greater than **alpha-tocopherol**.[12] In addition to directly inhibiting free radicals, **astaxanthin** indirectly inhibits oxidative damage by activating several beneficial genes linked to longevity and healthy aging. Furthermore, new research reveals that **astaxanthin** enhances the production of new mitochondria.

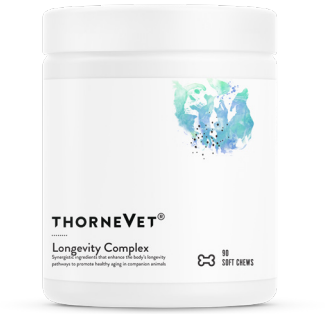
Astaxanthin exerts multiple benefits on the body's longevity pathways; for example, **astaxanthin** beneficially interacts with **Sirt1**, thus promoting longevity by moderating inflammatory responses, reducing oxidative stress, and promoting optimal mitochondrial function.

Longevity Complex uses a superior **astaxanthin** ingredient – from **AstaReal®**. **AstaReal's astaxanthin** is derived from the microalgae ***Haematococcus pluvalis***, a fresh-water unicellular microalgae (like Chlorella and Spirulina); therefore, it is plant-based and vegetarian friendly. **AstaReal's astaxanthin** has been studied in more than 70 published clinical trials. An excellent description of **AstaReal's astaxanthin** ingredient, and its many benefits for health and longevity can be found at **astareal.com/en/astaxanthin**.

Taurine

Taurine, an abundant amino acid in all living organisms, is involved in a wide variety of life processes. Early studies showed that an optimal **taurine** concentration correlated with good health – more recent studies have found the body's level of **taurine** naturally declines with aging. A 2023 study published in *Science* reveals that in both mice and monkeys, **taurine** supplementation improves both life span and health span. Investigations into the mechanisms of action by which **taurine** supplementation improves the health span and life span reveal that **taurine** positively affects several hallmarks of aging. For example, **taurine** reduces cellular **senescence**, protects against telomerase deficiency, suppresses mitochondrial dysfunction, decreases DNA damage, and balances the body's inflammatory response.[13]

There are multiple ways to incorporate Longevity Complex into your pet's health care. ThorneVet's Longevity Complex can be used in preventative fashion to maintain health, promote vitality, and ward off disease. Longevity Complex can also be used as part of a comprehensive protocol in treating metabolic disorders, as well as immune system disorders, including autoimmune diseases and cancer.



Longevity Complex

Synergistic ingredients that enhance the body's longevity pathways to promote healthy aging in companion animals

Cats: 1/2 soft chew 1-2 times daily

1 soft chew per 25 pounds body weight 1-2 times daily

V985-SC / 90 Soft Chews

GLUTEN FREE

PRODUCT FACTS

Active Ingredients per 3-gram Soft Chew:	
Taurine	500 mg
Nicotinamide Riboside Hydrogen Malate	100 mg
Quercetin Phytosome (*Saphora japonica* extract (flower) / Phospholipid complex from Sunflower)	75 mg
Curcumin Phytosome (*Curcuma longa* extract (root) / Phospholipid complex from Sunflower) (CurcuVET®)	50 mg
Green Tea Phytosome (*Camellia sinensis* extract (leaf) decaffeinated / Phospholipid complex from Sunflower) (GreenSelect®)	50 mg
Trans-Resveratrol (Veri-Te®)	40 mg
Astaxanthin (from AstaReal®)	3 mg

Inactive Ingredients (soft chew matrix):
Arabic gum, bacon flavor (vegan), buffered white distilled vinegar, chick pea flour, citric acid, coconut glycerin, coconut oil, guar gum, rosemary extract, sunflower lecithin, sunflower oil, tapioca starch, water.

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