

H-S-N Complex™



Skin and Joint Support Powder

By David M. Brady, ND, DC, CCN, DACBN & Amy Berger, MS

THIS INFORMATION IS PROVIDED FOR THE USE OF PHYSICIANS AND OTHER LICENSED HEALTH CARE PRACTITIONERS ONLY. THIS INFORMATION IS INTENDED FOR PHYSICIANS AND OTHER LICENSED HEALTH CARE PROVIDERS TO USE AS A BASIS FOR DETERMINING WHETHER OR NOT TO RECOMMEND THESE PRODUCTS TO THEIR PATIENTS. THIS MEDICAL AND SCIENTIFIC INFORMATION IS NOT FOR USE BY CONSUMERS. THE DIETARY SUPPLEMENT PRODUCTS OFFERED BY DESIGNS FOR HEALTH ARE NOT INTENDED FOR USE BY CONSUMERS AS A MEANS TO CURE, TREAT, PREVENT, DIAGNOSE, OR MITIGATE ANY DISEASE OR OTHER MEDICAL CONDITION.

H-S-N Complex™ powder is a powerful blend of nutrients formulated to supply the body with specific proteins, vitamins, and other substrates required to build, maintain, and repair connective tissue. Healthy connective tissue depends on the availability of nutrients that contribute to its physical structure, as well as those that serve as cofactors in the biochemical reactions that regulate tissue anabolism and catabolism. Connective tissue undergoes constant changes; physical trauma, nutrient deficiencies, and the aging process contribute to a loss of structural integrity in skin, bones, nails, hair and joints. These factors may result in slow or improper wound healing; aesthetic changes associated with aging including wrinkles, dry skin, loss of skin elasticity and age spots; as well as more serious conditions such as osteoarthritis.

H-S-N Complex™ powder

- Supports repair and renewal of aging skin
- Contributes to strong, thick hair and nails
- Facilitates wound healing
- Supports maintenance of healthy bones, joints, tendons and ligaments
- May delay the progression of osteoarthritis and exercise-induced joint damage

Collagen and Hyaluronic Acid

H-S-N Complex™ powder is designed to support the formation of collagen, the primary structural component of connective tissue.¹ Collagen comprises up to 70% of the dry mass of cartilage, making it a key factor for healthy joints. Aging of the skin, degeneration of joints, slow wound healing, and other issues affecting connective tissue may result when collagen's breakdown outpaces its synthesis.

Collagen is a structural protein, composed primarily of the amino acids glycine and proline, and the modified amino acids hydroxyproline and hydroxylysine. The formation of the latter derivatives is vitamin C-dependent. The aesthetic changes that skin undergoes are due, in part, to "photoaging" induced by exposure to UV light, resulting in free radical damage to the underlying collagen matrix, leading to fine lines and wrinkles. A chain reaction of lipid peroxidation in cell membranes contributes to a loss of skin structure integrity and hydration capacity, resulting in wrinkled, dry, lax skin. The mechanical properties of skin (e.g., elasticity) are controlled by the density and geometric structure of collagen and elastin fibers, which when damaged cause the loss of their contractile function.

Who may benefit?

- Aging individuals desiring to improve the appearance of their skin
- Those with degenerative joint conditions
- Athletes experiencing above-average wear and tear on their joints
- Patients recovering from physical trauma and tissue damage

H-S-N Complex™ powder also contains ingredients that support the production of hyaluronic acid (HA), a glycosaminoglycan (GAG) found in joints and the skin's dermal layer. In the synovium, HA is responsible for the viscosity, lubrication, and shock-absorbing properties of cartilage and synovial fluid. Rough, dry skin may also be affected by HA, as HA holds water and helps maintain the extracellular space, contributing to skin hydration and elasticity. Age-related decline in epidermal HA has been implicated in decreased skin turgidity and increased wrinkle formation. HA also has a structural role in that it contributes to an extracellular scaffold along which fibroblasts can migrate, as well as regulatory functions in promoting cell proliferation, cell migration, and angiogenesis, all critical for proper wound healing.²

The collagen peptides in this product are derived from the hydrolysis of bovine type I collagen. They are highly absorbable and bioavailable, and are rapidly distributed to connective tissue.³ Studies have demonstrated the beneficial effect of orally supplemented collagen peptides on skin elasticity.⁴ Supplemental collagen hydrolysate (CH) stimulates chondrocytes to synthesize extracellular matrix molecules, which may be beneficial for regenerating joint tissue. The gelatin peptides derived from collagen hydrolysis have been shown to accumulate in cartilage and persist over time.⁵ Several human trials support the benefits of supplemental CH in improving physical function and reducing pain associated with osteoarthritis, as well as in inhibiting bone collagen breakdown when combined with calcitonin in post-menopausal women with osteoporosis.⁶

Collagen hydrolysate has also been shown to improve activity-related joint pain in young athletes. Compared to placebo, oral CH supplementation led to significant improvements in joint pain while standing, walking, lifting, and at rest. In a subgroup that was experiencing knee pain, the beneficial effects of CH were even more pronounced, including during movements where knee strength and mobility are of particular importance, such as running and changing direction.⁷

Additional Highlights

Vitamin C (as Ascorbic Acid): Ascorbate is required for the hydroxylation of proline and lysine to hydroxyproline and hydroxylysine, key constituents of collagen. Vitamin C deficiency results in poor wound healing and easy bleeding, and poor vitamin C status is linked to defects in connective tissue repair.^{8,9} In addition, its antioxidant properties may help reduce the UV light-induced oxidative damage that leads to skin photoaging and hyperpigmentation.

Glutamine: Glutamine stimulates the synthesis of collagen.¹⁰ Cultured human skin fibroblasts incubated with glutamine showed increased biosynthesis of collagen compared to baseline levels. The beneficial effect of glutamine on collagen synthesis may be due to its metabolic intermediates: glutamate and pyrroline-5-carboxylate (P5C), which is reduced to proline. Compared to cells not exposed to glutamine derivatives, cells incubated with glutamate showed up to a 400% increase in collagen synthesis at 12 hours of incubation, and those incubated with P5C showed a 3-fold increase in collagen synthesis at 6 hours of incubation.¹¹

Glucosamine Sulfate: Research supports the use of glucosamine sulfate in attenuating joint degeneration and preventing various age-induced changes in skin.¹² Glucosamine increases collagen synthesis, and N-acetyl-glucosamine is a precursor to HA.^{13,14} Compared to placebo, oral supplementation with glucosamine and adjunct nutrients resulted in significant improvement in both the subjective and objective appearance of fine lines, wrinkles, and roughness of skin in women aged 35-60.^{15,16}

Beyond skin aesthetics, glucosamine is highly effective for supporting joint health. Cartilage contains type II collagen, which provides tensile and shear strength, and aggrecan, a proteoglycan that constitutes nearly 25% of the structure of cartilage. It is responsible for the compressive strength of cartilage, allowing it to distribute weight and decrease friction. The role of glucosamine in the synthesis of HA underlies its efficacy in retarding the progression of knee osteoarthritis.^{17,18} Furthermore, glucosamine stimulates the production of aggrecan and inhibits the matrix metalloproteinases that degrade articular cartilage.¹⁹ Because it contributes to the structural properties of joints, the beneficial influence of glucosamine on osteoarthritis is not merely the result of targeting symptoms, but rather, from actually contributing to the maintenance of the physical structure.²⁰

Aloe Vera (*Aloe barbadensis*): Aloe is well-known for its efficacy in healing damaged skin when applied topically, but it is also effective when administered orally. Oral aloe supplementation in mice with induced wounds along the spinal column resulted in a 62.5% reduction in wound diameter compared to untreated controls.²¹ Cultured human fibroblasts exposed to aloe polysaccharides showed increased levels of hydroxyproline, HA, and collagen synthesis, along with decreased cell injury. Proliferation of fibroblasts exposed to aloe increased in a dose-dependent manner.²²

Supplement Facts

Serving Size 12 grams (approx. 1 heaping tablespoon)

Servings Per Container 30

| Amount per Serving | | % Daily Value |
|--|----------|---------------|
| Vitamin C (as Ascorbic Acid) | 1000 mg | 1670% |
| Biotin | 2500 mcg | 830% |
| Collagen Peptides | 5 g | * |
| Glucosamine Sulfate (as 2KCl) | 1.5 g | * |
| L-Glutamine | 1 g | * |
| Aloe Vera (<i>Aloe barbadensis</i>)(leaf)(200:1) | 250 mg | * |
| Bamboo Extract (<i>Bambusa vulgaris</i>)(stem) | 75 mg | * |
| [standardized to contain 40% silica] | | |

*Percent Daily Value not established.

Other Ingredients: Natural lemon flavor, certified organic stevia leaf extract powder, tapioca dextrin.

Contains shellfish (crab, lobster, shrimp, snails or oysters).



Biotin: Biotin is a required cofactor for carboxylase enzymes involved in fatty acid synthesis, as well as desaturase enzymes employed in the synthesis of eicosanoids that support a healthy inflammatory response. Biotin deficiency has been implicated in hair loss, eczema near body orifices, and severely dry skin.²³ Owing to its role in fatty acid synthesis, biotin may indirectly contribute to the production of sebum, which lubricates and protects skin and hair.²⁴ Supplemental biotin has been shown to support the growth of healthy nails and improve the condition of brittle, thin, and peeling nails, by contributing to the production of keratin, the primary structural protein in nails.^{25,26}

Silicon (from Bamboo Extract): The adult human body contains 1-2g of silicon, making it the most abundant trace element after iron and zinc.²⁷ Evidence suggests silicon may be instrumental for wound healing and bone formation. It is present in all body tissue, but is concentrated most highly in bone, skin, hair, arteries, and nails. In some connective tissues, silicon is bound to GAGs and may play a role in forming cross-linkages between collagen and proteoglycans.^{28,29} Animals fed silicon-deficient diets showed decreased activity of proline-synthesizing enzymes, and decreased total hydroxyproline, leading to aberrations in collagen formation.³⁰ Other animal studies indicate dietary silicon deficiency results in poor bone mineralization and skeletal and connective tissue defects; silicon supplementation may increase osteoblast activity and bone mineralization, and decrease collagen breakdown. Human studies, which included women with low bone mineral density [BMD] and osteoporosis, show that supplemental silicon may help increase BMD and elevate markers for bone formation.²⁹

For a list of references cited in this document, please visit <http://mkt.s.designsforhealth.com/techsheets/H-S-NComplexReferences.pdf>

To contact Designs for Health, please call us at (800) 847-8302, or visit us on the web at www.designsforhealth.com