

Dr Hiroyuki Sumi discovered nattokinase as part of his research into naturally occurring thrombolytic enzymes, enzymes with the ability to dissolve blood clots which are associated with heart attacks and strokes.

Nattokinase is a serine proteinase class of enzyme produced by the *Bacillium subtilis natto* bacteria, when cultured on soybeans. Natto varies widely in the concentration of nattokinase enzyme, but typically has about 40 fibrin units per gram wet weight. Each Daily Nattokinase capsule has 1000 FU of activity, or about the equivalent of 25 grams of fresh natto. It is important to obtain authentic nattokinase because many enzyme products claim nattokinase activity but are from different sources which have not been subjected to clinical testing to prove efficacy in people. Most enzymes are not suitable for oral use because they are either digested just like other proteins in the intestine, or because they are not able to be absorbed and delivered to the site in the body where they are needed. Daily Nattokinase is fully active and bioavailable, the highest quality nattokinase product on the market.

**Dosage:** Two capsules per day of Daily Nattokinase provides the optimal dosage of nattokinase for most people. Higher doses may be indicated for some individuals, but we suggest using higher doses under professional supervision only.

**Active Ingredients:** Nattokinase is an extract of soybeans fermented with the bacteria, *Bacillium subtilis natto*. Daily nattokinase is NAK-SD and has been fully tested by the Japan Bio Science Laboratory Co. Pyrazine is another enzyme in natto and present in Daily nattokinase in variable amounts, but Daily nattokinase is only standardized for nattokinase activity and no claims are made for pyrazine activity. Natto normally contains fairly large amounts of vitamin K, but this is removed from Daily nattokinase since too much vitamin K has the potential to increase blood clots. However, vitamin K is a very important nutrient and should not be eliminated from the diet.

**Inactive Ingredients:** Inactive ingredients (excipients) present in Daily Nattokinase are used to keep the active ingredients in an easy-to-use and accurately measured dosage form. .

**Vegetarian Capsules:** Size 4, made from plant derived cellulose.

**Microcrystalline Cellulose:** A source of hypoallergenic dietary fiber made from the pulp of evergreen trees. Used to increase the bulk of the capsule and protect the active enzyme.

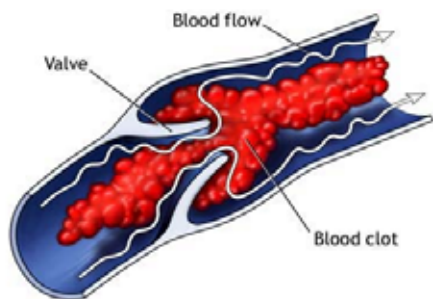
**Description:** Daily nattokinase is a dry powdered supplement in a two piece vegetarian capsule. The capsule has an "off white" color and is smaller than most encapsulated supplements. Each bottle contains 60 capsules (a 30 day supply). Daily Nattokinase is packaged in a white HDPE bottle with an inner freshness seal and an outer tamper-evident band.

**Precautions:** Persons with allergies to soybeans should not use nattokinase, since it is extracted from fermented whole soy beans. Furthermore, anyone who is using blood thinners or have blood clotting disorders should not use nattokinase except under the direction of a physician. Some dietary supplements when taken at high doses may also act as blood thinners (ginkgo biloba, vitamin E). Caution should be observed when using nattokinase with any food or supplement with blood thinning activity. If easy bruising or nose bleeds become more common when using nattokinase, such symptoms should be regarded as indicative that the dose should be reduced or its use discontinued.

# Protecting Circulation with Enzyme Nutrition

Improper blood clotting or failure of clots to properly dissolve can lead to serious health consequences. Deep vein thrombosis is a condition in which a blood clot forms, most often in the deep veins of the legs. Such a clot can break free and travel to the heart or lungs where it can prove fatal. Blood clots in the brain can cause disastrous strokes with death or permanent impairments or be so small that they are not even noticed, but lead to a gradual but progressive dementia. Impaired blood flow due to improper clotting has also been suggested to cause or exacerbate hypertension, fibromyalgia and other chronic disorders.

**Clotting** Blood clotting is a complex process, that is typically a response to injury. Initially when there is an injury such as a cut, the blood flow is immediately slowed to the area of the injury by vasoconstriction. Blood platelets then become activated and aggregate to form a loose platelet plug. To assure the stability of the platelet plug, a fibrin mesh is formed to trap the platelets and hold the plug together. Finally the blood clot is dissolved by the action of plasmin. Normal blood clotting is necessary to preserve life when injuries occur. Improper clotting can occur, however, when blood flow is impeded by excessive and prolonged pressure on blood vessels (acting similarly to vasoconstriction or from other events that are not well understood that initiate blood clotting. Blood clots have the potential to cut off circulation to essential organs and to break loose and cause life threatening occlusions in the heart and brain.



nattokinase is less restricted blood flow due to removal of small clots in the capillaries. Blood pressure tends to rise when blood flow is restricted and the

heart must pump against resistance. Nattokinase is also believed to act as an angiotensin converting enzyme (ACE) inhibitor<sup>8</sup>.

**Stroke** Since nattokinase can improve circulation it is natural to ask if it can prevent strokes caused by blood clots. Currently we are not aware of any studies or evidence for this, although it makes sense. Of course a serious stroke is a medical emergency and home remedies are not an appropriate treatment, however small mini-strokes are known to cause progressive chronic brain impairment and maintaining a

healthy circulation should help maintain long-term brain health.

**Longevity** Some people have suggested that nattokinase may prolong life. It is interesting that natto, the food from which nattokinase is derived, is a commonly eaten food in Japan, which has the longest lifespan of in the world (80.91 years, CIA Fact Book 2002). While the association is not proof that nattokinase increases the lifespan, it is certainly an interesting association. Certainly good circulation is important for everyone and when combined with a healthy lifestyle should contribute to a long and healthy life.

**Nattokinase Absorption** Nattokinase is a naturally occurring food enzyme that breaks down the fibrin that holds clots together. Nattokinase is very similar to plasmin, the enzyme that the body makes to dissolve clots. Therefore, nattokinase supplements the activity of plasmin in the body, but also seems to increase plasmin activity<sup>12</sup>. Most enzymes are digested (they are proteins) when taken orally and never have enzyme activity in the body. Nattokinase, however, has been demonstrated to be absorbed as an active enzyme in rats<sup>3</sup>. Both natto and nattokinase isolated from natto have been demonstrated to fibrinolytic activity in humans, whereas supplementing with boiled soybeans had no effect<sup>1</sup>. Natto is a common food in Japan<sup>4</sup> and the recent research on natto and nattokinase support its use as a traditional functional food with cardiovascular benefits.

**Air Travel** Thrombosis is a serious hazard of long distance travel involving extended periods of inactivity and sitting. An Italian study evaluated the effectiveness of nattokinase for preventing the development of edema and deep vein thrombosis during long flights in 186 subjects<sup>5</sup>. All subjects were considered high-risk for developing thrombosis. The subjects were randomly divided into 2 groups which did not differ in age, gender, or thrombosis risk and supplemented with either nattokinase or a placebo. Veins were scanned in all subjects using ultrasound to detect preexisting thrombosis before and after flight. There was no thrombosis observed in the group given nattokinase, but the placebo group experienced a 5.5% incidence of deep vein thrombosis and 2 subjects had superficial thromboses. Edema was decreased (-15%) in the nattokinase group, but increased (+12%) in the placebo group.

**Hypertension** Natto has long been known to reduce blood pressure in spontaneously hypertensive rats<sup>6</sup>. New evidence is emerging to suggest that nattokinase may reduce high blood pressure in humans as well, and has been reported to lower systolic and diastolic blood pressures by 11 and 9.7%, respectively<sup>7</sup>. One possible explanation for the blood pressure lowering effect of

**Fibromyalgia** Fibromyalgia is a musculoskeletal syndrome characterized by pain and tenderness throughout the body. Although the etiology of fibromyalgia is poorly understood, one theory is that poor circulation due to the formation of small blood clots in the capillaries of muscle tissue deprive the muscle of oxygen resulting in pain and inflammation. Accordingly, nattokinase has been used as a treatment for fibromyalgia and initial reports suggest it is highly effective.

## References

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