

HMRlignan

Boost your enterolactone. Boost your health.

**Higher enterolactone
levels in men**

Support prostate health

Improve cardiovascular health



Dietary lignans and men's health.

Few men consume the amount of lignans needed to promote well-being yet lignans offer a range of benefits for men interested in maintaining long term health. Clinical and epidemiological studies point in particular to the role of enterolactone in prostate health and cardiovascular health.

Lignans are phytonutrients, a class of plant compounds known to be beneficial to human health, and they are commonly found in the healthy diet. The primary plant lignans of dietary importance are hydroxymatairesinol, matairesinol, and secoisolariciresinol. A critical aspect of the health benefits of these plant lignans is their conversion in the intestinal tract to human lignan enterolactone.

While dietary precursors of enterolactone such as sesame seeds, whole grains, and fresh vegetables are important parts of a healthy diet, HMRLignan™ (hydroxymatairesinol) offers men the first standardized low-dose precursor of enterolactone in a dietary supplement. Derived from the Norway spruce tree, HMRLignan™ is an easily absorbed and efficient way for men to maintain healthy enterolactone levels in the body.

Hydroxymatairesinol, the dietary lignan found in grains and vegetables.

Although flax is well known as a rich source of lignans, it is not particularly common in the diet. However, a recent study in Finland has established hydroxymatairesinol as the predominant lignan in the bran portion of a



range of common grains in the diet such as wheat, triticale, barley, corn, amaranth, millet, and oats.¹ The target daily intake of lignans from food in order to maintain healthy enterolactone levels is approximately 50 mg per day, but due to the over processing of food and a lower intake of fruits, vegetables, and unrefined grains in the modern diet, most people do not get enough lignans to reap the benefits of this important phytonutrient. In fact, the average intake in the U.S. diet is less than 1 mg per day, well below the levels that research indicates is needed to achieve health benefits.² HMRLignan™ is standardized to contain 80,000 mg/100g of lignans; since the daily dosage needed to raise enterolactone levels is 25 to 50 mg, HMRLignan™ can be easily dosed in one-a-day capsules or tablets or included in new or existing multi-ingredient formulations.

Enterolactone is key to the benefits of dietary lignans.

Conversion of dietary lignans to enterolactone is a key to the health benefits associated with lignans. Enterolactone is the primary circulating human lignan, and it is used as the primary marker for plant lignan intake in studies. Among the dietary lignans, hydroxymatairesinol and matairesinol are directly converted to enterolactone in the intestinal tract.

Secoisolariciresinol, the predominant lignan in flax, is initially converted to enterodiol and then must go through a second conversion process to become enterolactone. Together with lignans such as hydroxymatairesinol, enterolactone has been shown to provide antioxidant and anti-inflammatory protection associated with cardiovascular health benefits.



The benefits of Enterolactone for men.

Prostate health.

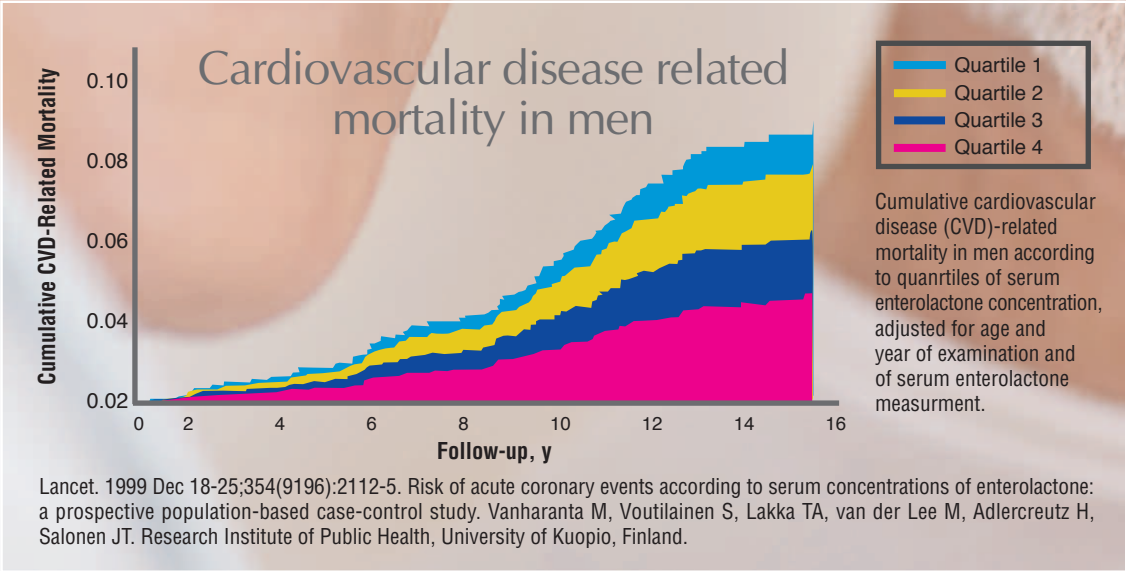
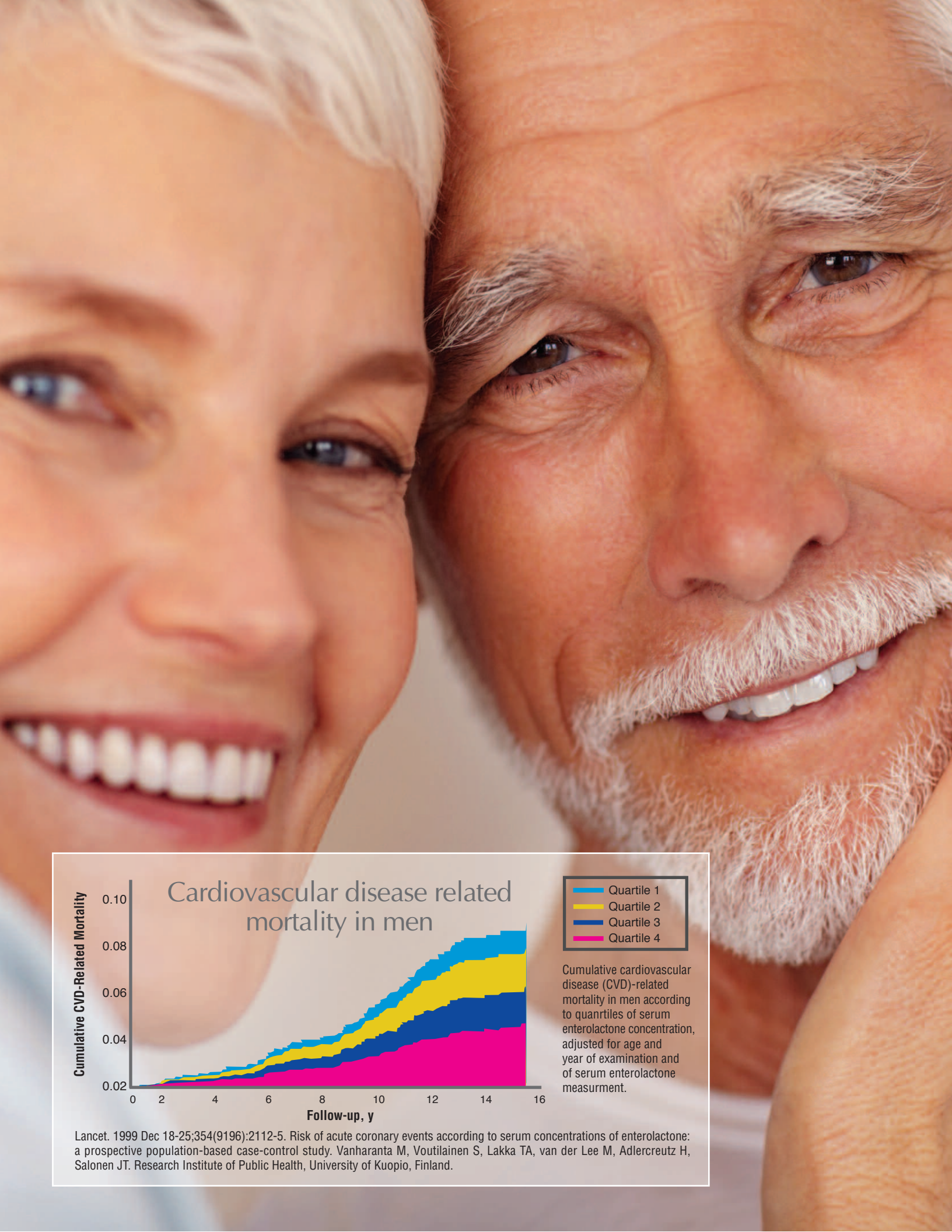
Clinical research shows that enterolactone competes with E2 for the type II estrogen receptor, induces sex hormone binding globulin (SHBG) and plays a role in steroid metabolism and synthesis. It is believed that through these multiple modes of action that enterolactone helps maintain a healthy prostate.

Numerous studies support this role. In 2001, research into the effect of mammalian lignans on the growth of prostate cancer cell lines at the Duke University Medical Center, Durham, found enterolactone to significantly suppress the growth of prostate cancer cells.³ Another study, conducted in Sweden in 2006, measured serum enterolactone in over 2,500 patients and found that higher serum levels of enterolactone were associated with a decreased risk of prostate cancer.⁴ The benefits of enterolactone in prostate health has also been observed in dietary intervention studies. In 2003 the University of Umea, Sweden conducted a randomised controlled short-term pilot study investigating the effect of the consumption of rye bran bread in prostate cancer patients. In the rye group, there was a significant increase in plasma enterolactone, and the apoptotic index increased significantly from 2.1% (SD 1.3) to 5.9% (SD 1.8).⁵

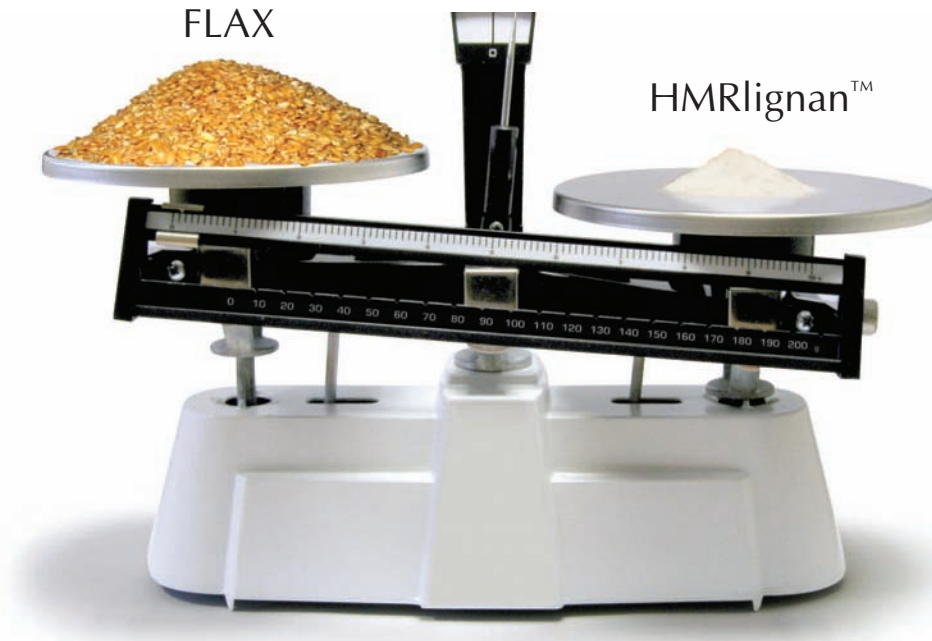


Cardiovascular health.

Dietary lignans and enterolactone have also been found to contribute to cardiovascular health where enterolactone contributes antioxidant action in the blood stream. Increased blood levels of enterolactone have been shown to reduce oxidation of blood lipids and reduce risk of heart disease.^{6,7} Enterolactone is believed to benefit heart health due to a strong anti-inflammatory and free radical scavenger activity. In a heart disease risk factor study in Kuopio, Finland, higher serum enterolactone levels was found to be dose-dependently and positively associated with reduced CHD and CVD-related mortality in middle-aged men.⁸ A nested case-control study, published in the Lancet in 1999, also researched the correlation between enterolactone and risk of acute coronary events. Cases and controls from a cohort of 2005 middle-aged men with no clinical coronary heart disease (CHD) were studied. The research found that men with high serum concentrations of enterolactone had a significantly lower risk of acute coronary events than men with lower concentrations and supported the study hypothesis that plant-dominated fibre-rich food lowers the risk of CHD.⁹



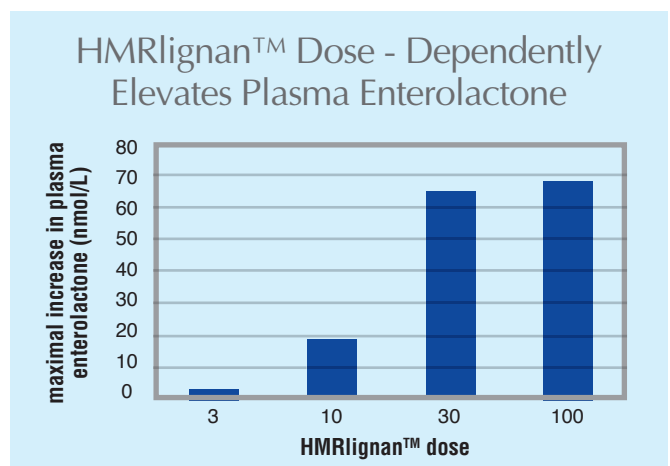
HMRLignan™ - an efficient source of enterolactone production without side effects.



HMRLignan™ is a low-dose, cost-effective method of bringing lignans to a product line. Doses of 25 to 50 mg per day have been shown to increase enterolactone levels more efficiently than other sources of lignans. Alternative sources of flax (such as standardized extracts) are typically dosed at 200 to 250 mg per day, while flaxseed powder studies have used doses from 25 to 40 grams per day. Data from a recent clinical study examining the effects of flax powder (40g/day) showed that 50% of individuals experienced abdominal distension or bloating. The results of a similar study using doses of 25 to 50 mg of HMRLignan™ reported that there were no side effects such as gas or bloating.

Safety.

Safety studies with HMRLignan™ have demonstrated that dosages as high as 1350 mg/day are safe and have not been associated with adverse events.





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About Linnea

From its headquarters and manufacturing facility in Locarno, Switzerland, Linnea specializes in the manufacture of botanical extracts and phytochemicals, and is a leading supplier to the pharmaceutical, dietary supplement and cosmetic industries. The company is a joint venture company between Dr. Willmar Schwabe (Germany) and Ipsen (France). HMRlignan™ is a proprietary, patent-protected product manufactured by Linnea SA. The company's U.S. office, Linnea Inc., is located in Easton, Pennsylvania.

Linnea SA

Via Cantonale, 6595 Riazzino (Locarno) Switzerland

Phone: +41 91 850 5050

Linnea Inc. USA

435 McCartney Street, Easton, PA 18042

Phone: 888-253-0044

