April 2018 - Mid-Month Bonus Newsletter

Thank you for subscribing to this newsletter from the Personalized Lifestyle Medicine Institute. Enjoy and share this information, which is for educational purposes only and is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Always consult with a qualified healthcare professional when you are in need of advice regarding a medical condition.

In this issue: Nutrient of the Month: Vitamin K; Food for Thought (Video); Resource Spotlight: The US Public Nutrition Diary; PLMI Announcements

Nutrient of the Month: Vitamin K

This essential nutrient was identified and named in the 1930s by Danish researchers who noted that animals given a low-fat diet showed a tendency to bleed and subsequently discovered that leafy plants such as cabbage, spinach, kale, and alfalfa contained a preventive antihemorrhagic factor they called "Koagulations vitamin," now named vitamin K. While best known for activating proteins needed for blood clotting, vitamin K also plays a role in determining the fate of calcium in the body, including whether it ends up strengthening bones or stiffening arteries.

Vitamin K is fat-soluble and occurs in several different forms, each containing a menadione ring and lipophilic side chains. Vitamin K1, found in photosynthetic plants, is also called phyloquinone or phytodaidine while vitamin K2 comprises menaquinones with side chains of varying length (e.g., menaquinone-4/MK-4 or menaquinone-7/MK-7). Most menaquinones are bacterial in origin, but gut flora can convert vitamin K1 into some menaquinones and some foods also provide menaquinones. Though few foods have been tested for menaquinone levels, the US Department of Agriculture’s Nutrient Database provides information on foods’ phyloquinone contents at: http://ndb.nal.usda.gov or at: https://ndb.nal.usda.gov/ndb/nutrients/index—select Nutrient Lists, enter vitamin K into the search field and sort by Nutrient Content. A 2012 study reports that spinach and greens from Brassica family vegetables are the best sources of vitamin K1 while natto is the best known source of MK-7 and some hard and soft cheeses provide MK-9. Like vitamins A, D, and E, fat-soluble vitamin K is better absorbed when ingested with fats, and because humans partially rely on gut bacteria for formation of menaquinones, drugs that affect these bacteria (as well as drugs that directly antagonize vitamin K activity) may impact vitamin K status in the body.

US dietary guidelines for vitamin K are based on data regarding blood clotting and,
considering the incidences of vascular disease and osteoporosis seen in the US population, do not reflect evidence suggesting that functional vitamin K insufficiency is common and showing that higher intakes are needed to optimize bone calcification and arterial elasticity. Vitamin K operates by carboxylating glutamate residues in vitamin K-dependent proteins (VKDPs) to allow them to bind calcium, and at least 15 VKDPs have been identified, including osteocalcin (which helps regulate bone mineralization and remodeling) and matrix Gla protein (MGP), which helps shuttle calcium out of blood vessels. Inadequate vitamin K intakes or the presence of variants in genes coding for these proteins can leave them undercarboxylated, rendering them less active or even inactive in carrying out these crucial duties.

Elevated levels of undercarboxylated matrix Gla protein (ucMGP) have been linked with increased all-cause and cardiovascular mortality, and may be especially important in patients designated lower cardiovascular risk according to classic risk factors. MK-7 supplementation can lower levels of ucMGP as well as those of undercarboxylated osteocalcin (ucOC), even in subjects considered healthy. Both vitamin K1 and K2 forms contribute to bone mineral density and both have been found to lower ucOC levels, with particular benefits from higher MK-4 intakes in reducing bone loss and the incidence of fractures. Data from the Rotterdam Study of men and women aged over 55 years also relate higher vitamin K2 (but not K1) intakes to significant reductions in coronary heart disease mortality, severe aortic calcification, and all-cause mortality in this population. Among peri- and post-menopausal women, higher intakes of vitamin K2 are inversely correlated with coronary artery calcification and incidence of coronary heart disease, and postmenopausal women receiving 180 micrograms MK-7 for 3 years daily showed significant improvements in measures of vascular stiffness.

Like other multi-talented fat-soluble vitamins, vitamin K influences long- and short-term health in ways that may seem unrelated until viewed through the lens of aging. Aging is associated with increased ucOC and ucMGP, and elevated ucOC levels may be predictive of hip fracture in older women. Undercarboxylated Gla-rich protein (another VKDP) has been found in osteoarthritis as well as in skin and breast cancer cells and may relate to microcalcifications in tumors of these and other tissues. In some studies, higher intakes or blood levels of vitamin K have been linked to lower levels of pro-inflammatory markers (like interleukin-6) known to increase during aging, though the significance of this is not known.

---

**PLMI's Food for Thought Video Series**

PLMI President Dr. Jeffrey Bland is a biochemist by training and a recognized expert on human nutrition. Each month he records a video segment for a series he calls Food for Thought, which is an exploration of the ways nutrition and lifestyle factors impact our health and quality of life. In his April 2018 commentary, Dr. Bland discuses the concept of dietary complexity and he highlights data collected from two large-scale prospective cohort studies: the PURE study (involving 18 countries on five continents) and the Japan Public Health Center-based Prospective Study.

Production of the Food for Thought video series is supported by an educational grant provided by Metagenics Institute. PLMI thanks Metagenics Institute for its sponsorship.
Resource Spotlight: The US Public Nutrition Diary

Since 1971, The Centers for Disease Control and Prevention have been conducting population research related to health and nutrition in the United States, collectively called the National Health and Nutrition Examination Survey, or NHANES. These studies examine nutritional status of subpopulations (such as teenagers or those living in certain regions), incidence of diseases, and public health correlates. For example, from this [January 2017 brief](https://vimeo.com/262269511), we learn that the majority of US children consume at least one sugar-sweetened beverage daily, with boys aged 12-19 receiving a mean of 232 calories daily from them. [This report](https://vimeo.com/262269511) shows us that Hispanic adults are the most likely to have low levels of HDL cholesterol and that, population-wide, HDL cholesterol levels among US adults have been dropping since the turn of the 21st century. We can see what percentage of children diagnosed with attention deficit-hyperactivity disorder (ADHD) received prescription medication as well as how many of them had additional mental health disorders. They can also tell us how likely a woman is to have health insurance based upon her marital status, income, race, and education. While the news delivered in these reports is not always good, it is beneficial to know where we are heading as a population in order to make educated decisions about whether that is our intended destination.

Announcements

There is Still Time to Register for PLMI's Spring Conference in Florida

Mastering the Implementation of Personalized Lifestyle Medicine
The Exposome Factor: New Approaches to Assessing and Treating Stress-Related Disorders

May 4 - 5, 2018
Gaylord Palms Resort & Convention Center
Kissimmee, Florida

Click HERE for more information or to register. Contact Annette Giarde with questions or if you need assistance: annettegiarde@plminstitute.org

©2018 Personalized Lifestyle Medicine Institute
All Rights Reserved

Newsletter Team
Jeffrey Bland, PhD - Publisher
Cheryl Kos, ND - Content Developer and Writer
Trish Eury - Content Editor
Annette Giarde - Subscription Manager