Nutrient of the Month: Lutein

Lutein has recently gained a place of honor as one of the nutrients highly-respected researcher Bruce Ames, PhD deems a “longevity vitamin” supporting the functions of longevity proteins that regulate cellular aging processes, and could therefore reduce risk for premature aging. Foods containing relatively high levels of this fat-soluble carotenoid antioxidant include paprika, spinach, dandelion greens, cayenne peppers, turnip tops, watercress, swiss chard, collards, mustard greens, chicory leaf, radicchio, kale, rhubarb, bilberries, plums, blackcurrants, avocados, pears, rosehips, kiwi fruit, gooseberries, grapes, apples, raspberries, strawberries, watermelon, oranges, peaches, redburrants, cranberries, tangerines, egg yolks, and fish skin. Lutein is best absorbed in the presence of dietary fats and appears to compete with other carotenoids for absorption, so those concerned about maintaining adequate body levels may also wish to take a supplemental form (again, with some fat) in addition to eating plenty of the above sources.

Where lutein really shines is in the health and function of eyes (especially the retina and macula, so central to long-term vision), particularly considering the popularity of electronic devices that emit phototoxic blue-white light, for which lutein and zeaxanthin are effective filters. Healthy people given lutein and zeaxanthin and exposed to photopic stress showed better visual recovery and greater density of protective macular pigment compared to those receiving placebo. (In fact, exposing growing greens to blue light is a great way to trigger them to produce higher levels of protective pigments like lutein, zeaxanthin, carotenes, and chlorophyll!) Lutein and zeaxanthin are the only carotenoids that concentrate in the macula, and thus are indispensable against potential accumulation of macular damage during aging. Because lutein and zeaxanthin are functionally as well as chemically related, many studies are carried out using both of
these xanthophyll-type carotenoids.

As in the retina, lutein and zeaxanthin are principal carotenoids in brains both young and elderly—perhaps not surprising, since eyes are one of the brain's sensory extensions. Lutein comprises around 59% of total brain carotenoids in infants yet only 31% of those in adults, and brain levels decline significantly during the progression from normal function to mild cognitive impairment, suggesting that it might play a role in neurocognitive development and/or aging. Serum lutein levels were found to relate to better cognitive function in the general population as well as people in their 80s and 100s, and lutein supplementation significantly improved verbal fluency scores (one measure of cognition) in older women. Intelligence could be considered a specialized part of brain function, and higher serum lutein levels further relate to higher measures of intelligence as well as greater volume in the temporal region of the brain (associated with linguistic ability) close to the hippocampus (associated with memory, mood, and the stress response) in cognitively normal adults aged 65-75. Recent research has also explored lutein's brain metabolome (study of lutein metabolites in brain function), and has discovered that lutein plays roles in the metabolism of brain lipids and neurotransmitters as well as maintaining cerebral energy and osmotic homeostasis—quite an array of activities there!

Lutein may also contribute to healthy cardiovascular function. In a study of healthy Chinese subjects, lutein supplementation increased the blood’s total antioxidant capacity while reducing levels of C-reactive protein, an early marker of inflammation, and in Chinese people not yet diagnosed with any heart disease, lutein supplementation reduced the thickness of areas of the coronary artery showing very early signs of potential atherosclerosis. In cells taken from patients with coronary disease, lutein lowered direct production as well as genetic expression of chemical messengers centrally associated with an inflammatory response, including interleukin-6 (IL-6), IL-1β, and tumor necrosis factor-α. IL-6 is an increasingly important predictive marker in cardiovascular disease, and among several carotenoids in this study, only higher levels of lutein and zeaxanthin correlated to lower levels of this cytokine in these patients.

Telomere length helps describe how well our DNA is being protected and how our biological and chronological ages compare—whether our combined genetics, lifestyles, and life events and exposures keep us functionally young or prematurely age us. In healthy aged persons, plasma lutein/zeaxanthin levels independently correlated with longer telomeres, and because telomere length relates to risk for age-related chronic disease, this may reflect one way lutein and zeaxanthin support health at the cellular level. Higher circulating levels or intakes of lutein have been associated with lower risk for certain conditions, though it is important to realize that such findings do not indicate whether lutein actually prevented anything or if its presence merely correlated with some other preventative factor. This excellent 2018 review explains how lutein may contribute to lower risk for illness, but it should also be kept in mind that nutrients and phytonutrients promote healthy function at many levels simultaneously and that it is difficult to tease out the effects of a single one. Because lutein seems so central to long-term visual function and because there are numerous genetic variations that can negatively impact its metabolism, there is growing interest in developing a formal daily intake recommendation for it.
Seventh Annual Thought Leaders Consortium in Washington this year! This region is a gateway to some of the most beautiful landscapes in the US, both on the water and in the mountains. PLUS, there are TWO distinctive metro areas—Seattle (always a classic!) and Bellevue, our up-and-coming tech center. Our conference venue for 2019 is the beautiful Hyatt Regency Lake Washington at Seattle’s Southport. We hope you will join us! Early-bird registration is available for a limited time. Use these links for more information:

Conference Overview >>
Conference Schedule and Speakers >>
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We’ve realized for some time that human well-being and the fate of our planet are intertwined, but never before have we understood how very direct these links are—that in every moment, we are reacting to each social, metabolic, and environmental input according to our experiences and those of our ancestors.

The Anthropocene Epoch is characterized by man’s distinct imprint on ecosystems. While we used to think of allergies as the medical epitome of altered reactivity to the environment, now that the environment itself is rapidly changing, this concept must now broaden to include consideration of mental health, autoimmunity, microbiome composition, vascular function, the stress response, inflammation, and other aspects of biological aging. In 1980, the following words came to us from Friends of the Earth, and they ring true in a new way in 2019: “[H]ealth is a state of complete physical, mental, social and ecological well-being and not merely the absence of disease—personal health involves planetary health.” This recently-published article tells how -omics technologies that stream up-to-the-moment personalized guidance can do more than try to bring human healthspans and lifespans closer together—they help immediately connect human behavior to earthly wellness, to the benefit of both.

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People, Place, Purpose, Planet

The 8th Annual inVIVO Planetary Health conference will take place in Detroit next month—May 15-17. PLMI President Dr. Jeffrey will be speaking alongside an amazing line-up of faculty. Registration is still open if you would like to add your voice to this important global conversation.

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