

# DHA AND LUTEIN: NUTRIENTS VITAL TO EYE AND BRAIN DEVELOPMENT



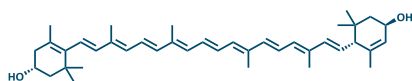
Docosahexaenoic acid (DHA) and lutein are a power team of nutrients, especially during infancy and childhood when visual and cognitive functions are developing rapidly.<sup>1-3</sup>

## What is DHA?



- DHA is a long-chain, polyunsaturated, omega-3 fatty acid<sup>2</sup> that is vulnerable to oxidative damage.<sup>4</sup>
- DHA is typically found in the cell membranes of the brain and eyes, where it helps transmit signals for development and function.<sup>1,2</sup>
- Results from a recent review and meta-analysis showed that omega-3 polyunsaturated fatty acid supplementation (including DHA) in infancy could improve childhood psychomotor and visual development.<sup>5</sup>

## What is Lutein?



- Lutein is a plant-derived carotenoid pigment that can be found in the same regions of the eye and brain as DHA.<sup>6</sup>
- Lutein is known for its protective role in the eye—absorbing potentially damaging light and acting as an antioxidant that can help lessen inflammation.<sup>7</sup>
- Lutein may likewise help protect against oxidative damage in a metabolically-active, rapidly-growing brain.<sup>8</sup>
- Researchers found the amounts of lutein and a related compound zeaxanthin (measured as macular pigment optical density, MPOD) were related to cognitive function.<sup>9</sup> MPOD was positively associated with academic performance in pre-adolescent children, particularly for math and written language.<sup>9</sup>

COMPARED TO OTHER BODY TISSUES,  
THE HUMAN BRAIN AND RETINA  
CONTAIN A HIGH PROPORTION OF DHA.

DHA comprises up to	DHA constitutes up to
<b>25%</b>	<b>70%</b>
of the fatty acids in the brain. <sup>10,11</sup>	of the fatty acids in parts of the eye's retina. <sup>1</sup>

LUTEIN IS LIKEWISE HIGHLY ENRICHED  
IN SPECIFIC REGIONS OF THE EYE  
AND BRAIN.

Lutein concentration in the retina is

**1,000x**

greater than in the blood.<sup>12,13</sup>

LUTEIN LEVELS IN THE INFANT BRAIN  
ARE HIGHEST IN REGIONS ASSOCIATED  
WITH MEMORY, EXECUTIVE FUNCTION,  
VISION, AND HEARING.<sup>14,15</sup>

## HOW DO DHA AND LUTEIN FUNCTION AS A POWER TEAM?



- DHA and lutein overlap in specific regions of the eye and brain, where they work together to modulate development and maintain function.<sup>8,15,16</sup>
- In infants who were exclusively breastfed for the first 3 or more months of life, there was a positive association between motor skill development and breastmilk levels of long-chain polyunsaturated fatty acid and carotenoids.<sup>17</sup>
- Dietary supplementation with lutein and omega-3 fatty acids helped to increase retinal pigmentation and encourage improved visual processing speed, even in young adults with already-efficient visual processing.<sup>18</sup>



# HOW DO DIETARY SHORTFALLS OF DHA AND LUTEIN OCCUR?

For infants and children, DHA and lutein must become part of their regular diet. While DHA can be synthesized from diet-derived fatty acids, it is predominantly sourced directly from the diet.

Infants consume DHA and lutein in human milk of mothers with healthy diets or in infant formulas supplemented with these ingredients.<sup>1,19</sup>

For toddlers and children, DHA and lutein must be supplied through regular foods. Fish such as mackerel, salmon, or trout have relatively high DHA content.<sup>1</sup> The best sources of lutein are leafy green vegetables such as spinach, kale, and broccoli.<sup>7</sup>

Unfortunately, many toddlers and children consume few or no leafy greens and fish in their diets, so they are at risk for low DHA and lutein intake.<sup>20,21</sup>

## FOODS RICH IN DHA

Mackerel, Salmon, Trout, Tuna, Flax seeds, Chia seeds, Walnuts, Soy beans



## FOODS RICH IN LUTEIN

Kale, Spinach, Broccoli, Peas, Avocado, Corn, Egg yolk, Brightly colored fruits



## HOW CAN WE ENSURE THAT CHILDREN GET DIETARY DHA AND LUTEIN?



Breastfeeding mothers can help ensure their babies receive lutein and DHA by eating a complete and balanced diet, including leafy green vegetables and fish. For infants who are not breastfed, consider a formula containing DHA and lutein.



Parents can encourage their toddlers and young children to eat food rich in DHA and lutein.



For children at risk of low DHA and lutein intake, parents can consider providing a dietary nutritional supplement that includes DHA and lutein.

## KEY TAKE-HOME MESSAGES ON DHA AND LUTEIN



- DHA and lutein are vital to normal eye and brain development.
- Young children may not consume enough DHA- and lutein-rich foods to support healthy eye and brain development.
- Research demonstrates that DHA and lutein supplementation can enhance visual, motor, and mental performance.<sup>5,9,17-19,22,23</sup>



Visit [anhi.org](https://anhi.org) or scan this QR code for a digital copy of this resource

1. Calder PC. *Proc Nutr Soc*. 2018;77(1):52-72. | 2. Fang X, et al. *Nutr Res*. 2024;131:1-13. | 3. Buscemi S, et al. *Nutrients*. 2018;10(9):1321. | 4. Borgonovi SM, et al. *Antioxidants (Basel)*. 2023;12(6):1283. | 5. Shulkin M, et al. *J Nutr*. 2018;148(3):409-418. | 6. Koletzko B, et al. *Nutritional Care of Preterm Infants: Scientific Basis and Practical Guidelines*. 2nd ed. Karger; 2021. | 7. Johnson EJ. *Nutr Rev*. 2014;72(9):605-612. | 8. Lien EL, Hammond BR. *Prog Retin Eye Res*. 2011;30(3):188-203. | 9. Barnett SM, et al. *Nutr Neurosci*. 2018;21(9):632-640. | 10. Bjarnadottir A. DHA (docosahexaenoic acid): a detailed review. *Healthline*. Updated July 2023. Accessed July 2025. <https://www.healthline.com/nutrition/dha-docosahexaenoic-acid#what-it-is>. | 11. Calder PC. *Ann Nutr Metab*. 2016;69 Suppl 1:7-21. | 12. Krinsky NI, et al. *Annu Rev Nutr*. 2003;23:171-201. | 13. Landrum JT, et al. *Arch Biochem Biophys*. 2001;385(1):28-40. | 14. Vishwanathan R, et al. *J Pediatr Gastroenterol Nutr*. 2014;59(5):659-665. | 15. Jeon S, et al. *Nutrients*. 2017;9(1):51. | 16. Mohn ES, et al. *PLoS ONE*. 2017;12(10):e0186767. | 17. Zielinska MA, et al. *Int J Environ Res Public Health*. 2019;16(7):1144. | 18. Bovier ER, et al. *PLoS One*. 2014;9(9):e108178. | 19. Long AC, et al. *JAOAC Int*. 2019;102(4):1034-1043. | 20. Wambogo EA, et al. *NCHS Data Brief*. 2020;(391):1-8. | 21. Terry AL, et al. *NCHS Data Brief*. 2018;(321):1-8. | 22. Kuratko CN, et al. *Nutrients*. 2013;5(7):2777-2810. | 23. Derbyshire E. *J Lipids*. 2017;2017:6285218.