

Choline is the Key - To Lifelong Health Benefits for Women

VitaCholine®

Balchem's VitaCholine is the premier brand of choline, an essential nutrient for all human life stages. Choline is critical to the healthy structure and function of the human body and plays multiple roles:

- **Building Block** – it is an integral part of cell development, maintenance and genetic regulation
- **Messenger** – as acetylcholine, it speeds messages in the brain and to the muscles
- **Metabolic Defender** – it helps prevent fat accumulation in the liver by moving it out for conversion into energy

Adequate choline intake is fundamental to good health, but **90% of people** do not get sufficient choline through diet alone. Prolonged choline deficiency can result in muscle damage and an accumulation of fat in the liver¹, making it vital for people to get their daily requirements via dietary choices.

Choline: A Healthy Mom and Baby

Do you know one thing that moms have in common with choline? They both do their best to ensure a successful pregnancy and a healthy baby. In fact, **VitaCholine was chosen as the source of choline** for a Cornell University study on dietary choline intake during pregnancy². This research, led by Dr. Marie Caudill, will help inform how to optimize mother and child nutrition and well-being. Increased choline intake during pregnancy may:

- **Ease the baby's response to stress** by lowering cortisol (the stress hormone) levels
- **Improve placental function** and decrease the risk of preeclampsia
- **Enhance the availability of DHA** to the developing embryo and fetus

On a fundamental level, choline is part of each and every brain cell so you can imagine just how important it is during prenatal development!



Choline: A Boost for Baby Brains

Choline continues to benefit babies after delivery, especially since the brain is still undergoing rapid development following birth. By helping to construct millions of additional neural connections in the memory center of the brain, choline may improve lifelong memory. Immediately after a baby is born, choline levels are many times higher than the levels found in a typical adult. For moms who are breastfeeding, it is critical to maintain high choline levels as breast milk is a vital source of choline for infants. The importance of choline is recognized by worldwide health and regulatory bodies, which require choline as part of infant formula.

Choline: 'Fuel' for Active Girls

As young girls mature through childhood and teenage years, choline remains important to physically active girls who engage in athletics. Studies have found that when choline is depleted, the body can break down cell membranes found in muscle tissue to ensure adequate choline supply to the brain. For young athletes, muscle loss can be devastating when they are looking to push the limits of physical exertion on the court, field, ice or gymnasium. Choline also helps maintain the nervous system during intense exercise and drives the continued activation of muscles, thus potentially increasing endurance.

Choline: Energy for Busy Moms

More and more moms find themselves balancing a full-time schedule both at work and at home, which can be exhausting. Choline is also critical to maintaining energy, both as a primary provider of fuel and by supporting metabolic processes that serve as secondary modes of energy production. In the role of 'metabolic defender' for the body, choline transports fats out of the liver and delivers them as fuel for conversion into energy. Also, by complementing and compensating for B vitamins, choline lowers blood levels of homocysteine, a pro-oxidant generally considered to be detrimental to cognitive and cardiovascular health. Finally, choline supports additional pathways for energy generation by facilitating the metabolism of both creatine and carnitine.

Choline: Health After Menopause

After menopause, women's bodies and their needs for various nutrients are significantly impacted by estrogen levels. Estrogen is an important aid in choline synthesis in the body, making dietary requirements for choline even higher in post-menopausal women. In the later stages of life, when women face potential declines in cognitive, cardiovascular and liver health, they can ill afford to be deficient in a nutrient that is important in all three areas. Also, many older women are on anti-folate medications such as methotrexate, which can dramatically increase choline demand. Since both folate and choline aid in homocysteine metabolism, the need for choline grows since it must step in as the central agent of managing plasma homocysteine levels.



VitaCholine®: For a Healthier You

The VitaCholine product line consists of a range of high quality choline salts which can be easily added during manufacturing to help fortify foods and beverages, infant formula and dietary supplement products. These are just a few of the benefits that VitaCholine can bring to your products:

- Six structure-function claims in the U.S.; three in the E.U.
- Proven quality and safety
- Broad regulatory acceptance worldwide
- Stable from processing through finished product
- Flavorless and highly bioavailable
- Compatible with other nutrients
- SQF II, Kosher certified, and Halal certified

VitaCholine: Essential Nutrition for Every Woman

¹ Zeisel and da Costa, Nutrition Review, 2009

² Marie Caudill bio page, Cornell website, <http://www.human.cornell.edu/bio.cfm?netid=mac379>



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