



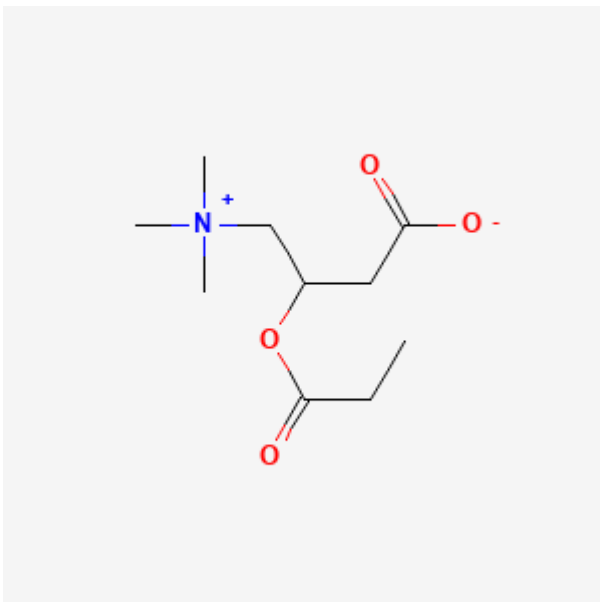
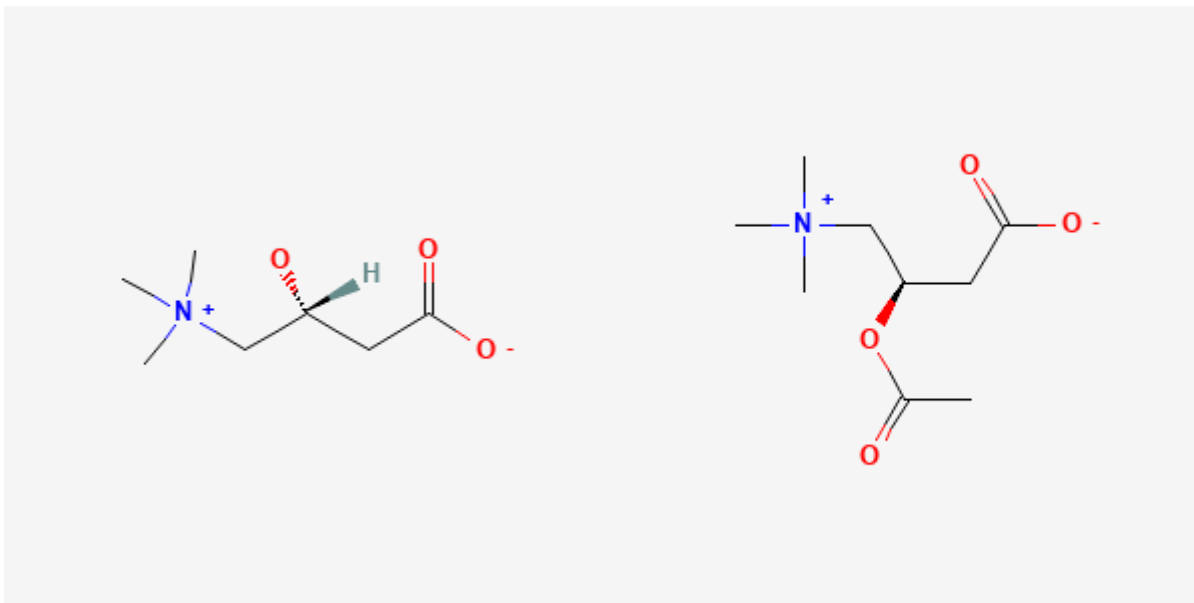
Levocarnitine

Revised: August 17, 2020.

CASRN: 541-15-1; 3040-38-8; 17298-37-2

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Drug Levels and Effects

Summary of Use during Lactation

Levocarnitine and acetyl-L-carnitine (acetylcarnitine) are normal components of human milk that are required for fat metabolism. The body can use only levocarnitine; dextrocarnitine can be an antagonist of levocarnitine. Acetyl-L-carnitine, and propionyl-L-carnitine can be converted to levocarnitine by the body. The bioavailability of levocarnitine is less than 20%, but acetylcarnitine and propionylcarnitine may be higher. These substances have no specific lactation-related uses. Within the normal range of dietary intake, excretion of levocarnitine into breastmilk is relatively constant. Women with carnitine deficiency appear to secrete insufficient amounts of carnitine into their breastmilk for their breastfed infants, who may require levocarnitine supplementation.[1] Preterm infants are often deficient in levocarnitine and require supplementation.[2] No data exist on the safety and efficacy levocarnitine supplementation in nursing mothers or infants without carnitine deficiency. Levocarnitine and its derivatives are generally well tolerated in adults with occasional gastrointestinal upset and restlessness. A fishy odor to the breath, sweat and urine has been reported. Although data are very limited, poor bioavailability might limit absorption by the breastfed infant. It appears unlikely that maternal levocarnitine

supplements during nursing would be harmful to the infant, but until more data are available, it is probably best to avoid levocarnitine supplementation unless it is prescribed by a healthcare professional.

Pasteurization (method not stated) had little effect on the concentration of endogenous carnitine in one study. Pasteurization followed by refrigeration at 5 degrees C for 48 hours reduced the carnitine concentration by about 13%.[3]

Drug Levels

Levocarnitine and acetylcarnitine are normal components of breastmilk, and are transported into milk via organic cation transporters.[4] As of the revision date, no published information was found regarding breastmilk levels following levocarnitine used as a dietary supplement by nursing mothers.

Maternal Levels. A woman diagnosed with carnitine uptake deficiency following the birth of her infant was given oral carnitine 500 mg 3 times daily. This dose failed to increase her breastmilk carnitine concentration, with a persistently low concentration of 3.4 mg/L (21 micromoles/L) before supplementation and after 18 days of supplementation.[1]

The carnitine concentration was measured in the breastmilk of 27 normal mothers who were not taking carnitine as a supplement. Average carnitine concentrations were 10.1 mg/L over the first 21 days postpartum, which was higher than the maternal serum concentration. The concentration decreased by about 50% by postpartum days 40 to 50. No difference in concentration was found between fore- and hindmilk.[3] Another study in normal mothers found a similar average carnitine concentration of 10.6 mg/L.[5]

In a study that followed 37 healthy, nonsmoking mothers who were not taking carnitine as a supplement, carnitine and acetylcarnitine in breastmilk were measured over time. Immediately postpartum, the average milk carnitine concentration was 12.6 mg/L and acetylcarnitine was 5.7 mg/L. From 2 months postpartum to 12 months postpartum, carnitine and acetylcarnitine milk concentrations were lower, in the range of 6.1 to 8.9 mg/L for carnitine and 1.2 to 2 mg/L for acetylcarnitine.[6]

Ten mothers of fullterm infants and mothers of preterm infants (36 weeks gestation or less) provided blood and milk samples for measurement of carnitine at 4 times during the first month postpartum. None were taking carnitine as a supplement. In the mothers of fullterm infants, total breastmilk carnitine averaged 11.7 mg/L at 2 to 3 days postpartum, 11.8 mg/L at 5 to 7 days postpartum, 11.3 mg/L at 2 weeks postpartum, and 10.5 mg/L at 4 weeks postpartum. About one-third to one-half of the carnitine was free carnitine and the remainder was acetylcarnitine. Breastmilk concentrations were about 50 to 100% greater than simultaneous plasma concentrations. The mothers of preterm infants had higher breastmilk carnitine levels, averaging about 12 mg/L throughout the first month postpartum.[7]

Carnitine and acetylcarnitine were measured in the breastmilk of 14 lactating women who were 1 to 10 months postpartum and not taking carnitine as a supplement. The average milk concentration of free carnitine was 5.9 mg/L and of total carnitine was 7.2 mg/L. Maternal dietary intake of carnitine had no effect on breastmilk carnitine concentrations. The authors estimated that an exclusively breastfed infant would receive about 6 mg daily of carnitine from breastmilk.[8]

Infant Levels. A retrospective study of 12,000 (6,000 male and 6,000 female) breastfed neonates in Greece found that carnitine and its various esters in the serum of 3-day-old infants was related to their birth weight. In general, levels of carnitine and its esters increased with increasing birthweight, although the differences between birthweight groups varied by ester.[9]

Effects in Breastfed Infants

Relevant published information was not found as of the revision date.

Effects on Lactation and Breastmilk

Relevant published information was not found as of the revision date.

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Substance Identification

Substance Name

Levocarnitine

CAS Registry Number

541-15-1; 3040-38-8; 17298-37-2

Drug Class

Breast Feeding

Lactation

Complementary Therapies