

### Comparison of Vitamin E Isoforms Among Plasma, Breast Milk, and Dietary Intake Measure of Mother-Infant Dyads

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**Objectives:** Vitamin E is a fat-soluble nutrient with four isoforms:  $\alpha$ -,  $\beta$ -,  $\delta$ -, and  $\gamma$ -tocopherol. These isoforms differentially modulate inflammation and are related to important perinatal outcomes such as preterm delivery and Apgar scores. Understanding the dietary consumption of these isoforms and their respective prevalence in biological samples is an important component to optimize nutritional recommendations. The purpose of this study is to compare tocopherol isoform proportions among maternal, cord, and neonatal plasma; maternal breast milk; and maternal dietary intake.

**Methods:** Samples of maternal breast milk and maternal, cord, and neonatal plasma were obtained within 1 month following delivery for maternal-infant dyads ( $N = 17$ ) from the neonatal intensive care unit. Maternal dietary intake was assessed using the Harvard Willett Food Frequency Questionnaire. Relative proportions of  $\alpha$ -,  $\delta$ -, and  $\gamma$ -

tocopherol in each sample type were measured and median tocopherol concentrations were compared using Kruskal-Wallis tests. A  $p$ -value  $< 0.05$  was statistically significant.

**Results:** Total tocopherol concentrations were significantly different across sample groups ( $P < 0.001$ ). Concentrations were highest in maternal serum, followed by neonatal serum, maternal breast milk, and umbilical cord serum. In all samples,  $\alpha$ -tocopherol had the highest relative proportion, followed by  $\gamma$ - and  $\delta$ -tocopherol, respectively. Compared to all biological samples, the dietary intake proportion of  $\gamma$ -tocopherol was significantly higher ( $P < 0.001$ ), while the proportion of  $\alpha$ -tocopherol was significantly lower ( $p = 0.04$ ).

**Conclusions:** We observed significant differences in tocopherol concentrations across related biological samples, with maternal plasma containing the highest concentration and umbilical cord plasma the lowest. Mothers also consumed significantly higher percentages of  $\gamma$ -tocopherol than those found in both their plasma and breast milk. This suggests that proportions of individual tocopherol isoforms are influenced by factors other than dietary intake. Additional research should explore these associations in a larger cohort and analyze the effects of supplementation on tocopherol concentrations.

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