



Preterm Nutrition

## CHAPTER 2 : PRETERM NUTRITION



# Effect of Carotenoid Supplementation on Plasma Carotenoids, Inflammation and Visual Development in Preterm Infants

LP Rubin, GM Chan, BM Barrett-Reis, AB Fulton, RM Hansen, TL Ashmeade, JS Oliver, AD Mackey, RA Dimmit, EE Hartmann, DH Adamkin

*Journal of Perinatology.* 2012;32(6):418-424.

*Study funded by Abbott Nutrition.*

**Summary** This study supports the feasibility of adding carotenoids to preterm infant formula and provides important information about the possible effects of carotenoids on inflammation and visual and retinal development.

- This randomized, controlled, double-blind, parallel, multicenter study included 203 preterm neonates aged 1 to 21 days and weighing between 500 and 1800 g. The infants were studied until 40 weeks post-menstrual age, then switched to the corresponding postdischarge preterm formula (either study formula or control formula) group for an additional 10 weeks.
- Infants were randomly assigned to the control formula or an experimental carotenoid-supplemented formula. Infants in the study group received an iron-fortified, milk-based formula supplemented with a mixture of lutein/zeaxanthin, lycopene, and β-carotene. A group of human milk-fed term infants served as a reference group.
- Assessments included analysis of plasma carotenoid levels (primary outcome variable), growth parameters, feeding tolerance, and levels of C-reactive protein (CRP); electroretinography (ERG); and a review of adverse events and morbidity, in particular, specific conditions related to prematurity, including necrotizing enterocolitis, sepsis, intraventricular hemorrhage, bronchopulmonary dysplasia, and retinopathy of prematurity (ROP).
- There were no significant differences between groups in growth or tolerance. Plasma carotenoid levels were significantly higher and plasma CRP was lower among infants receiving supplemented formula, and similar to those seen in human milk-fed infants. Among infants with mild ROP at the point of diagnosis, fewer progressed to severe ROP in the study group. Based on ERG results, study group infants had a significantly greater sensitivity response in rod photoreceptors than the control group.

**Importance** This is the first study of its kind to assess the effect of feeding a carotenoid-supplemented diet to preterm infants. It points to the protective effects of lutein in regard to the health of the premature infant's photoreceptors or retinal development. In addition, this study suggests that carotenoid supplementation may have a role in decreasing inflammation in this population.

Atopic disease  
Bone  
Breastfeeding  
Calcium  
Calories  
Carbohydrates  
**Carotenoids**  
Cognition  
Donor milk  
Fats  
Fortification  
Gastrointestinal system  
**Growth**  
Infection/Immunity  
Iron  
**Lutein**  
Maternal health  
Minerals  
Nucleotides  
Palm olein  
Prenatal  
Probiotics/Prebiotics  
Protein  
**Tolerance**  
Vision  
Vitamins