

Plasma carotenoids and diabetic retinopathy

Brazionis L, Rowley K, Itsiopoulos C, O'Dea K.

Department of Medicine, University of Melbourne (St Vincent's Hospital), Melbourne, VIC 3065, Australia.

Diabetic retinopathy increases with duration of diabetes and may be associated with carotenoid status. Carotenoids alter the pro-oxidation/antioxidation balance, and circulating levels depend largely on dietary intake. Lower levels have been reported in diabetes and age-related macular degeneration; however, little is known of the relationship between carotenoids and diabetic complications. Consequently, the purpose of the present study was to evaluate the relationship between plasma carotenoids and diabetic retinopathy. We assessed the carotenoid-retinopathy relationship in 111 individuals with type 2 diabetes in a community-based, cross-sectional study. We photodocumented retinal status and used HPLC to measure plasma carotenoid concentrations. Data for clinical and demographic variables and risk factors for diabetic retinopathy were obtained from 24 h urine and fasting blood samples, and an interviewer-assisted lifestyle questionnaire. We found that the combined lycopene and lutein/zeaxanthin (non-pro-vitamin A (non-PVA) carotenoid) concentration when compared with the pro-vitamin A (PVA) carotenoids (alpha-carotene, beta-carotene and beta-cryptoxanthin) was significantly lower in the retinopathy than non-retinopathy group (OR 1.2 (95% CI 1.0, 1.4) v. 1.6 (95% CI 1.4, 1.7), respectively; $P=0.009$). A higher non-PVA:PVA ratio also predicted a lower risk of diabetic retinopathy, after adjustment for potential confounders (OR 0.33 (95% CI 0.12, 0.95); $P=0.039$). Finally, a higher concentration of PVA carotenoids was associated with greater odds of diabetic retinopathy, after adjustment for risk factors ($P=0.049$). We suggest synergies between carotenoids are implicated in diabetic retinopathy, independent of established risk factors. Importantly, our observations indicate dietary modulation of retinopathy risk may be possible by increasing intakes of lutein- and lycopene-rich foods.

Br J Nutr. 2009 Jan;101(2):270-7. Epub 2008 Jun 13