

LUTEIN STUDY 1

CRITICAL FUNCTION. . .OPTICAL PROPERTIES



A critical function of lutein involves its optical properties within the eye. One of the primary tissue targets for lutein is the retina, where it accumulates in very high densities in the area serving central vision, known as the macula. Lutein has a yellow coloration. Because yellow pigments selectively absorb high-energy short-wavelength light (which appears blue in color), lutein effectively protects the retina from the region of the light spectrum that can cause tissue damage, and also limits the ability of light to generate free-radical oxygen. The purpose of this 12-week, double-blind, placebo-controlled week, lutein supplementation intervention trial⁶ was to characterize the response dynamics in both blood and retina, for three different daily levels of lutein: 6, 10, and 20 mg, versus placebo. Data regarding subjects' psychological stress and overall health status were also obtained. Twenty-eight healthy subjects, aged 18-25 yrs. participated in this study. Subjects were randomly assigned to study groups: placebo (n = 5), 6 mg lutein (n = 7), 10 mg lutein (n = 8), and 20 mg lutein (n = 8). Every two weeks during the 12-week trial, subjects had phlebotomy performed, and had their macular pigment optical density (MPOD) measured via heterochromatic flicker photometry. Questionnaires evaluating psychological stress levels, overall health status (suboptimal health questionnaire [SHSQ]), and diet were completed at baseline and final visits.

The results were that macular pigment optical density (MPOD) increased significantly in each of the lutein supplementation groups, compared to placebo (which exhibited little to no change throughout the trial). Retinal response was somewhat linear, with greater increases seen in those taking the higher (e.g. 20 mg) dose of lutein. A repeated- measures ANOVA revealed significant increases from baseline were determined for the 6 mg group at the 12-week visit ($p = 0.046$); for the 10 mg group at visits 8, 10, and 12 ($p < 0.001$), and for the 20 mg group at visits 8, 10, and 12 ($p < 0.001$). Cross-sectional evaluation of MPOD vs. psychological stress revealed a significant relationship between the two, such that subjects with higher levels of MPOD tended to maintain a lower psychological stress profile ($r = -0.47$; $p = 0.0087$). After 12 weeks of lutein supplementation, psychological stress levels were found to be reduced significantly in the 10 mg ($p = 0.047$) and 20 mg ($p = 0.032$) groups. The placebo group did not change in this regard. In terms of overall health, subjects' scores on the SHSQ were found to correlate significantly at baseline with MPOD, such that those with higher MPOD tended to have fewer health-related problems (e.g. were sick less often, suffered less from allergies; $r = -$

0.54; $p = 0.002$). After 12 weeks of lutein supplementation, each group exhibited a significant reduction in health-related problems (6 mg: $p = 0.041$; 10 mg: $p = 0.029$; 20 mg: $p = 0.047$). Based on the results of this study, it appears that ingestion of the lutein supplements, at all three levels tested, produces significant response in the retina after only 12 weeks of supplementation. The shapes of the response curves suggests that response is somewhat linear – higher doses result in greater response – but it also appears that, at levels greater than 20 mg, there may be response compression that occurs; a ceiling of dose vs. benefit. Our data do not allow us to directly address this possibility. In terms of systemic / psychological effects, this is the first study to show a relationship between lutein and psychological stress, and overall health.

⁶Stringham J. Effects of three levels of lutein supplementation on macular pigment optical density, psychological stress levels, and overall health. Nutritional Neuroscience Laboratory, University of Georgia. Unpublished. 2016:17 pgs.