Pacific University
Longitudinal Lipofuscin Study

John R Hayes
David Glabe, Len Hua, James Sheedy
Denise Goodwin, Dina Erickson, Lorne Yudcovitch,
Nada Lingel, Tracy Doll, James Kundart, Matthew
Lampa, Beth Kinoshita, Scott Pike

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Hypotheses

• Prospective cohort study to determine if optometry students have increased lipofuscin in the RPE relative to non-optometry students

• Randomized controlled trial to determine if yellow contact lenses inhibit the accumulation of lipofuscin in the RPE
Retinal Pigment Epithelium

*Physiol. Rev.* 85: 845-881, 2005
http://physrev.physiology.org/cgi/content/full/85/3/845
Geographic Atrophy
The most well-researched (and likely primary) autofluorescent component of lipofuscin is A2E, a di-retinal conjugate pyridinium bisretinoid.

A2E appears to form naturally as a by-product of the visual cycle, but its formation is enhanced by light exposure.

The first identified of a series of related compounds.

The cytotoxic properties of A2E and its link with lipofuscin toxicity has been extensively studied.
Autofluorescence

Spaide Filters for Topcon Camera

A2E Oxidizes

Heidelberg

Contact Lens
Subjects

- 57 Optometry students light exposure primarily involved dilated exams learning about the posterior chamber. 39 had photos at Baseline and Follow-up.
- 56 non-optometry students and/or their spouses. 30 had photos at Baseline and Follow-up.
- Optometry students maintained a log of their exposure as practice patients.
Previously

Analysis of covariance baseline FAF as control (p=.03). Groups were set statistically equivalent at the beginning of the semester. The follow-up is the difference in accumulation after one semester. There is a clear dose response effect as second year opt students were exposed to considerably more hours of light exposure. Non-overlapping 84% confidence intervals are significantly different at p<.05.
There was no significant difference between groups at the end of the study ($F_{1,66} = .079$, $p = 0.78$)
May 2010 – May 2011
Topcon Baseline measurements were not correlated with Heidelberg Follow-up measurements so individual differences in luminance were not controlled.
Autofluorescence

Spaide Filters for Topcon Camera

- A2E Oxidizes
- Heidelberg
- New Excitation Filter
- Lipofuscin Emission
- Crystalline lens
- New Barrier Filter
- ICG Excitation
- ICG Emission
- Fluorescein Excitation

Wavelength (nm)
Conclusion

• We failed to reject the null hypothesis
  – There may be no effect of excess light on the accumulation of lipofuscin in optometry students
  – Our measure may not be sensitive enough to detect a real difference in lipofuscin accumulation between groups