# Effects of Antioxidants on ARPE-19 Cells When Subject to UV A Light

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UV light damages every ocular structure including the cornea, lens, and the retina. Although anterior structures of the eye absorb 99% of UV light, some UV radiation does reach the retina. Cumulative damage from UV light is believed to be one of the causes of Age-Related Macular Degeneration. Retinal pigment epithelium (RPE) cells, located between the retina and choroid (layer of blood vessels), are particularly sensitive to oxidative stress because they absorb excess light and have high oxygen tension. These RPE cells normally function to regulate the flow of nutrients, act as a recycling station for the photoreceptor cells, which have to regenerate daily, and prevent oxidative damage. Antioxidants are known to scavenge free radicals which accumulate because of oxidative stress. UV light is known to cause oxidative stress. I studied the effects of two antioxidants, Beta-carotene and mesobiliverdin (MBV), to see whether they can protect from UV damage or help repair UV damage. RPE cells were subject to UVA light from a nail lamp with and without the antioxidants. UV light from the lamp was between 365-405 nanometers, mimicking UV from sunlight which has a wavelength ranging from 100-400 nanometers. I found that when the cells were subject to UV light, even though a higher percentage of UV-exposed cells had abnormal morphology and cell death, there was enhanced growth when antioxidants were added. Beta-carotene worked better for the prevention of damage and mesobiliverdin worked better as a regenerative agent.

**Awards Won:**