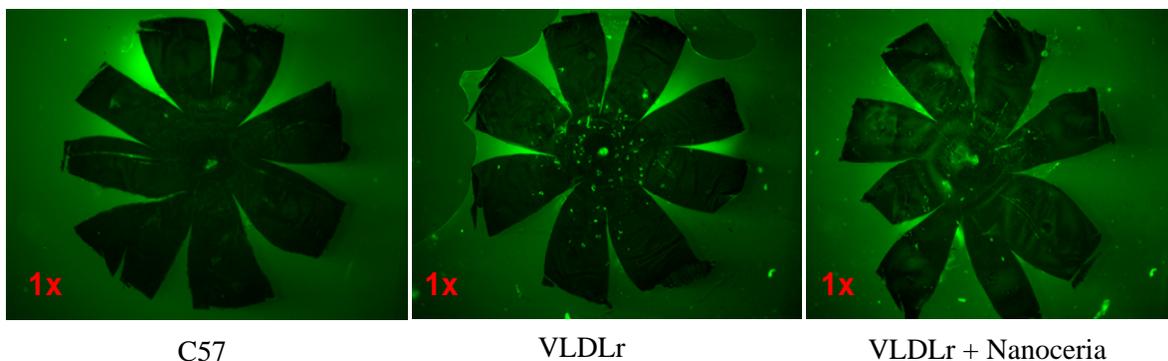


Nanoparticles for Healthy Eyes

Diabetic retinopathy, glaucoma, and age-related macular degeneration (AMD) are major blinding diseases for which the etiology is not completely known and for which no cure exists. For inherited retinal degeneration, there are now almost 200 genes and chromosomal loci that have been identified as being causative. Irrespective of the cause or primary mutation, all of these diseases are thought to share a major common event. This event is “oxidative stress” as a result of a chronic or acute rise in toxic molecules called Reactive Oxygen Species (ROS).

Inorganic cerium oxide nanoparticles (nanoceria) are anti-oxidants that mimic the activities of protective enzymes by destroying ROS. A team of researchers led by Sudipta Seal at the University of Central Florida has hypothesized that, because ROS represent a node common to many of these blinding diseases, they also represent an “Achilles’ heel” that can be specifically targeted using ROS-scavenging nanoceria. To test this idea, the researchers have used a mouse model for AMD that exhibits retinal defects similar to those found in patients with AMD. Researchers compared the number of retinal lesions that occurred in AMD mice that were and were not treated with nanoceria. Result analysis indicates that the nanoceria prevent about 85 percent of the damage to the retina. This finding should be directly relevant to human diseases and suggest that the nanoceria will preserve vision and prevent blindness.



The left image shows the back of the eye of a normal pigmented mouse (C57) as seen through the microscope. The green background around the eye is the reflection of the light source. In the center image from an AMD mouse (VLDLr), bright green dots appear where illicit blood vessels have caused lesions and damaged the visual cells in the retina. The right image shows an example of the mice that, 3 weeks previously, had been injected with the nanoceria and have greatly reduced numbers of these lesions (VLDLr + Nanoceria).

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Patents and other steps toward commercialization:

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Patent 7,504,356: Nanoparticles of cerium oxide having super oxide dismutase activity - W. Self, S. Seal, 2009.
Company Formation: NTIOX

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