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Blue Light and Macular Degeneration

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In many primate studies, blue light has been shown to cause a photochemical reaction that produces free radicals in the RPE and the rods and cones. Researchers believe that these free radicals interact with the high oxygen and lipid content in human rod and cone tips to produce abnormal chunks of metabolized waste that cannot be properly processed by the RPE, clogging up the macula's maintenance system and producing dry macular degeneration.

Melanin, the substance that gives eyes their color, protects the macula by trapping light rays so they don't reach the macula and cause damage. People with fair skin and blue or light-colored eyes may be particularly susceptible to macular damage by blue light because they have less melanin in their irises. Their blue eyes transmit up to one hundred times as much light to the back of the eye as dark colored eyes do. Additionally, when the light reaches the choroid and RPE of people with fair skin and blue eyes, there is less melanin there to absorb the radiant energy, leaving these tissues more vulnerable to light damage. Can blue light rays cause macular degeneration? Can you reduce your risk by protecting your eyes from blue light? The answer is maybe.

Although the laboratory studies on animals seem nearly unanimous, the real world studies on people have produced conflicting results. Some studies positively link macular degeneration with any kind of light exposure, other studies have found a weak correlation between macular degeneration and blue light exposure, and yet a third group of studies has found no correlation at all between macular degeneration and sunlight. One Australian study concluded that the problem is not total sun exposure, but exactly how sensitive you are to the sun. It hypothesized that people who have plenty of melanin and don't tend to burn easily are at less risk for macular degeneration than people who burn easily or are bothered by sun glare. This study also concluded that people with blue irises are at increased risk for ARMD. These results, which have not been replicated or confirmed, do not allow me to state absolutely that blue light

contributes to the development of macular degeneration, but it is certainly plausible. Based on the possible benefit, I recommend wearing blue blockers, especially if you have fair skin and blue or light-colored eyes, if you have any other risk factors, or if you spend lots of time in bright sunlight, or on water, sand, or snow, which reflects sunlight. Alternatively, wear a sun visor when you are outside.

Blue Light and Blue Blockers

Unlike UV light, blue light is visible to us. Blue light waves are what makes the sky, or any object, appear blue. Blue light waves are also very short and scatter easily, so a great deal of the glare we experience from sunlight also comes from blue light. Since we can't see UV light, we also can't see the lens filter used to protect us from UV rays. Conversely, since we can see blue light, we can also see blue blockers, the lens filters that block blue rays. Blue blockers do not act like regular sunglasses. They appear tinted, but they do not reduce overall light or make the world look darker. They alter the appearance of blue and green colors and reduce glare, but they don't affect the way other colors appear. In fact, they may even improve color contrast. Because of these characteristics, blue blockers were very popular a few years ago as sports glasses. Many people with macular degeneration find them particularly helpful regardless of their health benefits, because they reduce glare indoors and outdoors while keeping the world bright and visible.

The color that blocks blue is yellow, so blue blockers must contain a yellow tint. Optical shops usually offer a dark, amber lens to provide yellow tint in regular sunglasses. There are ready-made "NOIR" sunglasses that block blue and UV light with a variety of tints, including light yellow, dark yellow, amber, and plum. People with macular degeneration usually prefer dark yellow or plum. NOIR glasses are available as clip-ons, and both NOIR and Eschenbach offer large plastic frames that fit over your regular glasses. You can also ask your local optical shop to make you a pair of UV and blue blocker glasses or add blue blockers to your existing glasses. Remember, blue blockers will make your lenses look darker, but they won't make the world look that much darker.

For further information, see "[Artificial Lighting and the Blue Light Hazard](#)" in the MD Support Library.

Editor's note: Dr. Mogk's book may be ordered from Amazon Books through the [LowVis Bookstore](#) on the [MD Support web site](#)