UVLIGHT

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There has been a major media scare about the ocular damage presumably caused by ultraviolet light. Ultraviolet light is said to cause cataracts, harm computer users, reflect from computer screens off of desk top paper into viewers' eyes, cause eye irritation, and lead to macular degeneration.

The concern by the public has been used by eyecare givers and optical shops to push the sales of ultraviolet light protective eyewear. A major supplier of contact lenses has offered a disposable soft contact lens that is

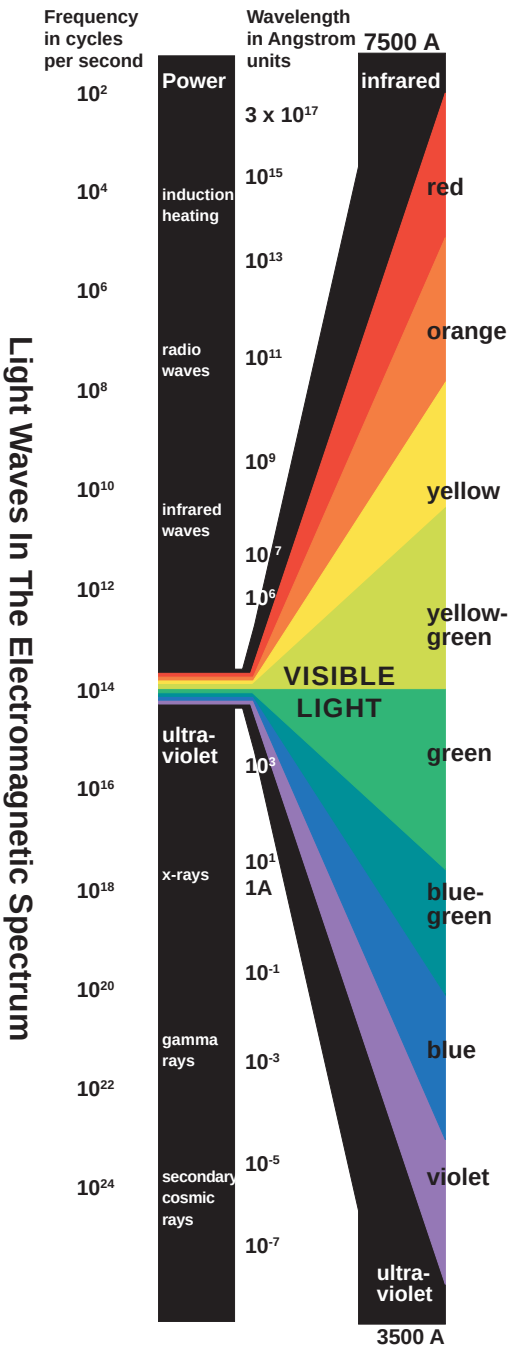
"The first and only disposable lens that protects your eyes from an average of 90% of harmful UV rays."

Maybe it would be informative to understand what light is and the relationship of ultraviolet light to visible light before we succumb to the scare tactics of individuals who want to profit by misleading advertising.

WHAT IS LIGHT?

Light is one form of electromagnetic wave. All electromagnetic waves travel in space at the same speed - the speed of light (or 186,282 miles per second). Electromagnetic waves show a continuous range of frequencies and wavelengths. Frequency is the number of wave crests passing a point in one second. Wavelength is the distance from the crest of one wave to the crest of the next. Electromagnetic wave frequencies run from about one per second to over a trillion-trillion per second. For light, the frequencies are 4 to 800 trillion waves per second. That's rather technical, isn't it? But it is straightforward. The chart at the right should help clarify these details.

Light is visible because all objects receive, absorb, and radiate electromagnetic waves, which can be pictured as electric and magnetic fields vibrating at right angles to each



other and also to the direction in which the wave is traveling.

Gamma rays and X-rays, with wavelengths less than 10 angstrom units, are penetrating radiations that are absorbed very little in passing through solid matter.

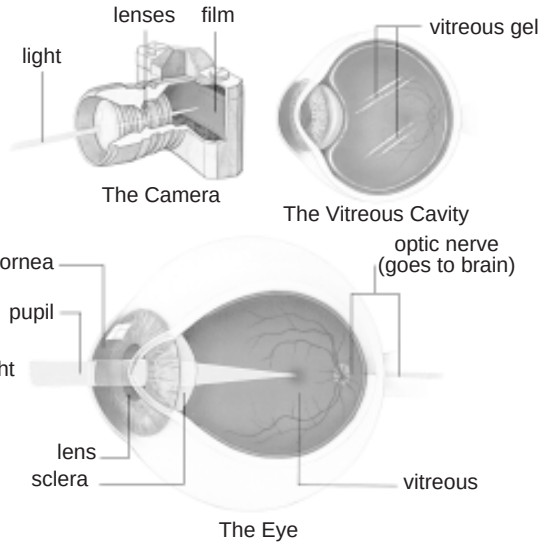
Ultraviolet rays are produced in great quantity by the sun and by special types of lamps. Ordinary glass does not transmit much ultraviolet rays. That is why you cannot tan behind an ordinary window or while you are traveling in your car. We all have had our arm sunburned from being rested on the door of our car when traveling even though our face is not affected. The wavelengths of ultraviolet rays (10 to 3,500 angstrom units) are longer than those of X-rays but shorter than those of light. A bit longer than light are the waves of infrared radiation which we sense as heat.

Visible light is that portion of the electromagnetic spectrum that normally stimulates the sense of sight. The wavelengths of visible light range from 3,500 to 7,500 angstrom units.

So, that's light. And ultraviolet light is an invisible electromagnetic wave that can be measured by instruments and may cause physiological damage in certain instances. What about the newspaper articles that warn us to protect ourselves from the harmful affects of ultraviolet light? There is some truth in it.

CATARACTS

A cataract is when the lens in the eye becomes cloudy. As far as medical science can document, there is *some* established proof that ultraviolet light causes cataracts. One of the studies that has been used to create concern about exposure to ultraviolet light was with older individuals who had been fishermen in the New England area (and, therefore, exposed to a lot of ultraviolet light). This retrospective study showed an increased incidence of a specific type of cataract (cortical) with increased time of exposure to estimated solar ultraviolet light levels. The individual exposures were reconstructed years later and then correlated with estimates of what the solar ultraviolet radiation may have been at the time of the exposure. The cortical form of a cataract is when the peripheral portions of a lens become cloudy. Nuclear (central portion clouding) and subcapsular (clouding just beneath the surface of the lens capsule) showed no correlation with ultraviolet light exposure. In addition, many of the fishermen did not have cataracts; and, furthermore, I see patients in their 80's and 90's who have spent many years working outdoors who do not have cataracts. How can these contradictory findings be explained? It may be individual variation.



Even though the eye is living tissue, it truly functions just like an autofocus camera, and you can compare the parts of a camera to the parts of an eye. A cataract is when the lens behind the pupil becomes cloudy.

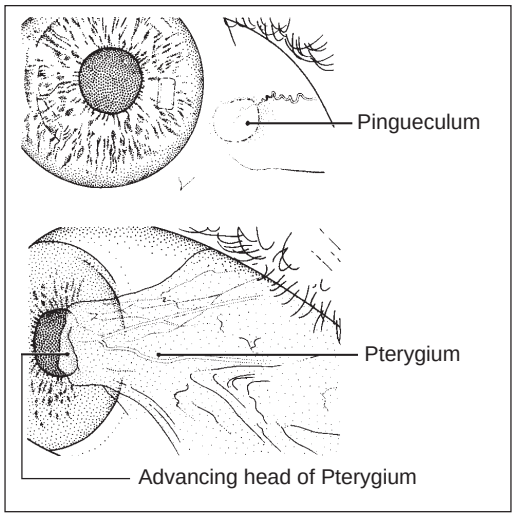
The only scientifically valid method to document the cause and effect of ultraviolet light exposure is to compare a matched population of individuals. This means that you match the individuals' age, sex, occupation, medical status, ocular history, race, geography, and other factors. Then you split the individuals into two groups: one group is exposed to ultraviolet light (naturally or artificially)and the other group is not exposed to ultraviolet light. You would then need to follow these two groups of individuals for many years before the evidence would be scientifically valid.

Of course, there is a concern that we should not wait for the many years to go by before proof is available. Isn't it better to err on the safe side? Why should we let ourselves be damaged when there is a prevention? It is easy to prevent things from happening, but you still have to decide whether the motive is for the safety of the public or for the profit motive.

There are hundreds of articles that document certain types of ultraviolet light biological damage. There are also thousands of articles that document what type of glasses or other protection that can successfully block and apparently prevent ultraviolet light damage. These articles may show that the protection is effective, but they do not prove that damage would have occurred without the protection.

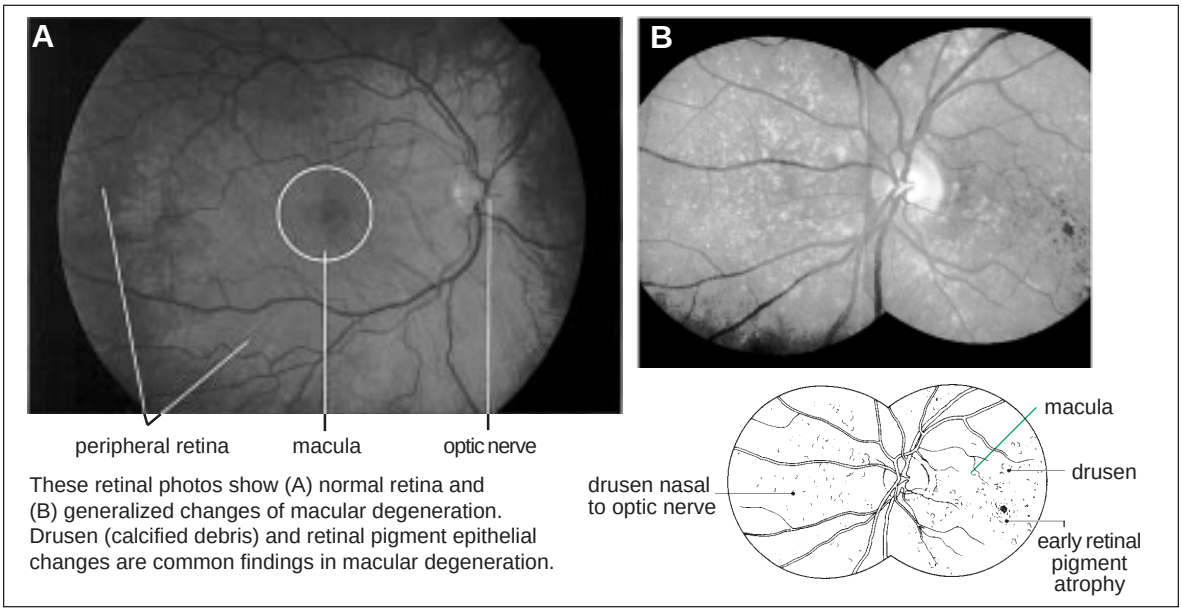
SKIN AND THE OCULAR SURFACE

Obviously, sunlight exposure causes sunburns, tanning, skin aging, and skin cancers. We all know that. Normal sun exposure also increases the incidence and development of pingueculae and pterygia (benign growths on the surface of the eye). It is well-documented that the ultraviolet light component of sunlight is the main contributing factor for these skin and eye effects. In addition, direct exposure to ultraviolet light can cause photokeratitis. This is a temporary inflammation of the cornea that may occur in tanning booth use and with the exposure to reflected ultraviolet light from snow (snowblindness). This is temporary and causes no permanent damage. Furthermore, there is no reliable evidence that ultraviolet light causes any other type of ocular irritation.



MACULAR DEGENERATION

Macular degeneration is a progressive breakdown of the retinal layers and their blood supply in the macular area of the retina. The macula is 2.5 millimeters in diameter and is located about 2.5 millimeters towards the side of your face from the optic nerve. It is the portion of your retina that allows you to see 20/20. As macular degeneration progresses, your central vision becomes blurry and distorted until you are unable to read or see any detail. However, you never go blind with macular degeneration. The peripheral



These retinal photos show (A) normal retina and (B) generalized changes of macular degeneration. Drusen (calcified debris) and retinal pigment epithelial changes are common findings in macular degeneration.

portions of your retina are usually not affected and you can function visually fairly well accept for not being able to see anything clearly when you look directly at it. After that scary explanation, there is absolutely no verified evidence, whatsoever, that macular degeneration is caused by or worsened by exposure to ultraviolet light.

SHOULD YOU TRUST ADS AND THE NEWSPAPER?

Anyone who knows about ultraviolet light also knows that ultraviolet light does not go through glass and that ultraviolet light cannot pass (more than a fe millimeters) through the glass screen in computers. It is unfortunate that there is a marketing advantage to public awareness of a potential health hazard. This brings up the perceived need for ultraviolet protective eyewear. Many optical shops and eyecare professionals encourage patients to purchase ultraviolet light coatings for their new eyewear specifically to reduce their chance of getting cataracts and other eye damage. How far do they go?

A contact lens company offered the following ad and coupon.

"The first and only disposable lens that protects your eyes from an average of 90% of harmful UV rays."

The coupon states this and offers a free pair of lenses on a trial basis. That seems to me to be a statement that any normal person would assume means that (1) ultraviolet light is harmful to your eyes and (2) that these special new disposable lenses will protect your eyes from this damage and no other company offers this health safety feature. At the bottom of this coupon there are two more statements:

"Warning: UV-absorbing contact lenses are not a substitute for protective UV-absorbing eyewear such as UV-absorbing goggles or sunglasses. Persons should continue to use their protective UV-absorbing eyewear as directed.

Note: The effectiveness of wearing UV-absorbing contact lenses in preventing or reducing the incidence of ocular disorders associated with the exposure to UV light has not been established at this time."

Does this warning that there may be no benefit to wearing these special disposable lenses contradict the first statement on the coupon about "protecting your eyes from 90% of harmful UV rays"? It sure does! Unfortunately, due to this type of advertising, several other contact lens manufacturers will offer their own versions of a UV-protecting disposable contact lens. There is not one shred of evidence that wearing a UV-protecting soft contact lens offers any benefit to the eye from ultraviolet light. This advertising is misleading and is a gimic to increase that company's market share of contact lens sales.

I am not saying that there will not be proof of these claims for ultraviolet light damage at some point in time; but there is not any well-documented proof at this time. I do not believe that newspapers should sell papers or that businesses should sell their products by encouraging a false public health concern. Newspapers' articles on health are, first of all, supposed to be helpful by providing well-documented facts to aid the public in caring for themselves. They should not express personal opinions and they should not scare the public into buying products that have a dubious chance of being of any benefit.

Forunately, no one is seriously harmed by these misleading articles and false claims. Unless the loss of money and confidence in the news media is considered harmful.

As a final note, UV protection is beneficial for your skin, for the reduction of irritation of pingueculae and pterygia, for the prevention of tanning booth photokeratitis, and to reduce the development of some cortical cataracts. The evidence is still out for nuclear and posterior subcapsular cataracts, for macular degeneration, and for any benefit from wearing UV protective contact lenses.