The Guardian

Blue light from phone screens accelerates blindness, study finds

Light from digital devices triggers creation of toxic molecule in the retina that can cause macular degeneration

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Scientists say they have found how blue light from smartphones, laptops and other digital devices damages vision and can speed up blindness.

Research by the University of Toledo in the US has revealed that prolonged exposure to blue light triggers poisonous molecules to be generated in the eye's light-sensitive cells that can cause macular degeneration - an incurable condition that affects the middle part of vision.

Blue light, which has a shorter wavelength and more energy compared with other colours, can gradually cause damage to the eyes.

Dr Ajith Karunarathne, an assistant professor in the university's department of chemistry and biochemistry, said: "We are being exposed to blue light continuously and the eye's cornea and lens cannot block or reflect it.

"It's no secret that blue light harms our vision by damaging the eye's retina. Our experiments explain how this happens, and we hope this leads to therapies that slow macular degeneration,

such as a new kind of eye drop."

Macular degeneration, which affects around 2.4% of the adult population in the UK, is a common condition among those in their 50s and 60s that results in significant vision loss.

It is caused by the death of photoreceptor, ie light-sensitive cells, in the retina.

Age-related macular degeneration is the leading cause of blindness in the US and while it does not cause total blindness, it can make everyday activities such as reading and recognising faces difficult.

Photoreceptor cells need molecules called retinal to sense light and trigger signalling to the brain, enabling us to see.

The researchers found that being exposed to blue light causes retinal to set off a chain of reactions that leads to toxic molecules being created in the photoreceptor cells.

Kasun Ratnayake, a PhD student at the University of Toledo who was involved in the study, said: "If you shine blue light on retinal, the retinal kills photoreceptor cells as the signalling molecule on the membrane dissolves.

"Photoreceptor cells do not regenerate in the eye. When they're dead, they're dead for good."

The researchers found that introducing retinal molecules to other cell types in the body, such as cancer cells, heart cells and neurons, caused them to die off when exposed to blue light.

They also noticed that blue light alone or retinal without blue light had no effect on cells.

Karunarathne said: "The retinal-generated toxicity by blue light is universal. It can kill any cell type."

The scientists found that a molecule called alpha-tocopherol, a natural antioxidant found in the eye and body, stops the cells from dying but fails to offer any protection to the ageing population or those whose immune systems have been suppressed.

Karunarathne said: "That is when the real damage occurs."

For those wanting to protect their eyes from blue light, Dr Karunarathne advises wearing sunglasses that can filter both UV and blue light outside and avoiding browsing on mobile phones or tablets in the dark.

The research is published in the journal Scientific Reports.

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