Researchers find UV sensitivity in wide range of mammals

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(Phys.org) —Biologists Ron Douglas and Glen Jeffery of City University and University College in the U.K. have upended the notion that few mammals are able to see in ultralight. In their paper published in *Proceedings of the Royal Society B: Biological Sciences*, the two describe how they examined the eyes of a myriad of donated dead animals and found that a wide variety of them had lenses which allowed UV light to pass through.

Humans are not able to see radiation lying in the ultraviolet range—the lenses in our eyes block out such UV light, preventing us from seeing what might be right there in front of us: patterns on flowers for example, or urine stains from a passing rodent. Scientists believe evolution has disabled UV sensitivity in our eyes in an attempt to improve our acuity.

Up until now, it has been assumed that most other mammals have lenses similar to ours, preventing them from seeing UV light as well. In this new effort the research pair show that is not the case at all as many other mammals appear to have at least some ability to see UV light.

To learn more about how other animals see, the researchers asked for donations of dead animals from zoos, veterinarians, animal shelters etc. They received a huge variety, each of which had their eyes extracted. The researchers shone different lights through the lenses of each and measured what came out the other side. To their surprise they found a large percentage of the animals, all mammals, did not have UV blocking lenses which meant, at least theoretically, that they could see at least some UV light. The list included animals such as cats, dogs, okapis, ferrets and hedgehogs. This suggests that our pets can see things we don't, which might help explain their sometimes odd behavior.

That's not the whole story though—there is more to seeing UV light than what passes through the lens—prior research has shown that most mammals don't have visual pigments in the back of the eye that are sensitive to UV light, which suggests that even animals that allow UV to pass through their lines, still don't see UV light reflected back from the environment. But that might not be true either. More recent research has found that that other media in the eyes of some animals (such as the cornea) is sensitive to UV light as well, which might allow a type of sensitivity to UV light that isn't really understood. Clearly more research will need to be done to discover which mammals can see in UV and to what degree.

More information: The spectral transmission of ocular media suggests ultraviolet sensitivity is widespread among mammals, *Proceedings of the Royal Society B* rspb.royalsocietypublishing.or … nt/281/1780/20132995

Abstract

Although ultraviolet (UV) sensitivity is widespread among animals it is considered rare in mammals, being restricted to the few species that have a visual pigment maximally sensitive (λmax) below 400 nm. However, even animals without such a pigment will be UV-sensitive if they have ocular media that transmit these wavelengths, as all visual pigments absorb significant amounts of UV if the energy level is sufficient. Although it is known that lenses of diurnal sciurid rodents, tree shrews and primates prevent UV from reaching the retina, the degree of UV transmission by ocular media of most other mammals without a visual pigment with λmax in the UV is unknown. We examined lenses of 38 mammalian species from 25 families in nine orders and observed large diversity in the degree of short-wavelength transmission. All species whose lenses removed short wavelengths had retinae specialized for high spatial resolution and relatively high cone numbers, suggesting that UV removal is primarily linked to increased acuity. Other mammals, however, such as hedgehogs, dogs, cats, ferrets and okapis had lenses transmitting significant amounts of UVA (315–400 nm), suggesting that they will be UV-sensitive even without a specific UV visual pigment.

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