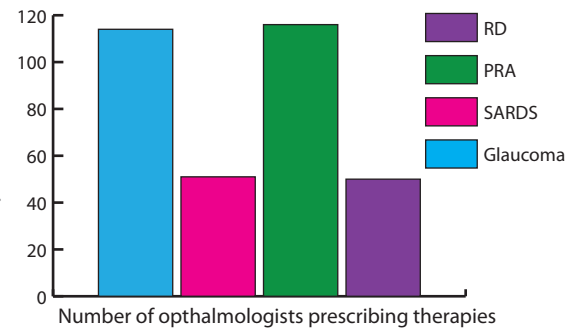


There is growing usage and evidence in nutritional supplementation in cases of ocular oxidative stress

“The majority of surveyed board-certified veterinary ophthalmologists previously prescribed a presumed neuroprotective therapy at least once in the last five years in dogs with degenerative retinal and optic nerve diseases.

Hopper RG, Montiani-Ferreira F, da Silva Pereira J, Fritz MC, Ruggiero VJ, Sapienza JS, Kato K, Komáromy AM. Presumed neuroprotective therapies prescribed by veterinary ophthalmologists for canine degenerative retinal and optic nerve diseases. *Vet Ophthalmol.* 2021 May;24(3):229-239. doi: 10.1111/vop.12878. Epub 2021 Mar 7. PMID: 33682296; PMCID: PMC8137575.



“Dietary antioxidants are likely to be important in retarding cataractogenesis in older animals and in humans. Work on companion animals could provide a valuable stepping stone between rodent-based laboratory work and human interventional studies.”

Williams, D.L. (2006), Oxidation, antioxidants and cataract formation: a literature review. *Veterinary Ophthalmology*, 9: 292-298. <https://doi.org/10.1111/j.1463-5224.2006.00498>

“It was found that antioxidants effectively inhibit the progression of immature cataracts.”

Park S, Kang S, Yoo S, Park Y, Seo K. Effect of oral antioxidants on the progression of canine senile cataracts: a retrospective study. *J Vet Sci.* 2022 May;23(3):e43. doi: 10.4142/jvs.21275. Epub 2022 Mar 17. PMID: 35466599; PMCID: PMC9149495

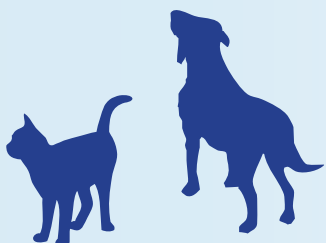
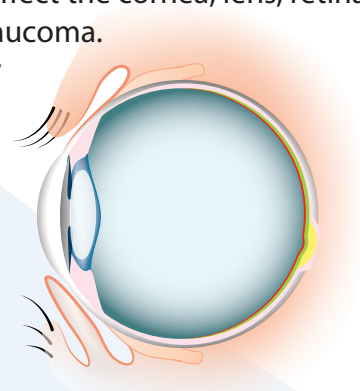
“Antioxidants not only increased retinal function measured by scotopic and photopic ERG recordings, but also decreased the refractive error change in dogs fed the antioxidant supplements compared with dogs fed the control diets. This suggests that even in healthy dogs with normal eyes, a better retinal response can be obtained with antioxidant supplementation.”

“Antioxidant supplementation as demonstrated may be beneficial and effective in the long-term preservation and improvement of various functions of the canine eye.”

Wang, Wei & Hernandez, Jerome & Moore, Cecil & Jackson, Janet & Narfström, Kristina. (2016). Antioxidant supplementation increases retinal responses and decreases refractive error changes in dogs. *Journal of Nutritional Science.* 5. 10.1017/jns.2016.5.

“Oxidative stress is an important pathomechanism of ocular degenerative diseases. Oxidative stress in the body is regulated by antioxidant mechanisms. Antioxidant imbalances can affect the cornea, lens, retina, and optic nerve and cause such diseases as KC, cataracts, AMD, and glaucoma. Using antioxidant biomarkers, patients with a low antioxidant capacity can be identified, and antioxidant supplementation can be used for disease prevention, delay, or treatment.”

Hsueh, Y.-J.; Chen, Y.-N.; Tsao, Y.-T.; Cheng, C.-M.; Wu, W.-C.; Chen, H.-C. The Pathomechanism, Antioxidant Biomarkers, and Treatment of Oxidative Stress-Related Eye Diseases. *Int. J. Mol. Sci.* 2022, 23, 1255. <https://doi.org/10.3390/ijms23031255>



Antioxidants specifically highlighted for ocular health include:

Anthocyanins

Derived from bilberry (*Vaccinium myrtillus*)

1) UTILISATION

Supporting treatment of the mesopic and scotopic vision.

Support vision in low light levels where problems arise due to loss of rhodopsin in an ageing retina.

2) COMPOSITION

Flavonoids are powerful antioxidants found in bilberries. They help neutralising the free radicals,

Flavonoids from bilberries can protect blood vessels from oxidation and inflammation.

Flavonoids are known to have an effect on the permeability of vascular capillaries.

Among the bilberry flavonoids we find the proanthocyanins and the anthocyanins.

Bilberries also contain catechin, a natural phenol and antioxidant.

3) EFFECT ON THE EYE

The bilberry extracts participate in the regeneration of the purple of the retina (rhodopsin) :

- Improved visual acuity.

- Protection against the negative effects of daylight.

4) CONCLUSION

Bilberry has strong antioxidants which participate in:

- Improving the visual acuity.

- Improving the protect against several age related eye pathologies.¹

1. Chu W, Cheung SCM, Lau RAW, et al. Bilberry (*Vaccinium myrtillus* L.) In:

Benzie IFF, Wachtel-Galor S, editors. Herbal Medicine: Biomolecular and Clinical Aspects.

2nd edition. Boca Raton (FL): CRC Press/Taylor & Francis; 2011. Chapter 4.



Lutein and Zeaxanthin

Derived from marigold (*Tagetes erecta*)

1) UTILISATION

Lutein and the co-carotenoid Zeaxanthin are well indicated for preservation of vision and in particular block blue light from underlying structure of the retina.

2) COMPOSITION

Lutein and zeaxanthin are two xanthophylls pigments belonging to the class of carotenoids.

These carotenoids are not synthesized by organisms and must be ingested.

Origin: green leafy vegetables such as spinach and kale, egg yolks.

3) EFFECT ON THE EYE

Lutein and zeaxanthin are found in high levels at the level of the eye's crystalline lens and retina.

The principal roles of these yellow pigments are the filtering of the blue light, harmful for the retina,

Additionally they are antioxidants, this particularly matters in an environment where strongly oxidizable polyunsaturated fatty acids are in high concentration.

4) CONCLUSION

There is also epidemiological evidence that increasing lutein and zeaxanthin intake lowers the risk of cataract development.^{1,2}

1. Brown L, Rimm EB, et al. A prospective study of carotenoid intake and risk of cataract extraction in US men. *Am J Clin Nutr.* 1999 Oct. (study on 36 600 men).

2. Chasan-Taber L, Willett WC: A prospective study of carotenoid and vitamin A intakes and risk of cataract extraction in US women. *Am J Clin Nutr.* 1999 Oct. (study on 77 400 women).



Vitamin E

Many studies have highlighted how vitamin E, along with other compounds that possess free-radical destroying abilities, protects the eye lens of dogs and slows down the progression of cataract formation.

Selenium

A powerful antioxidant, plays a crucial role in overall health. It supports the immune system. Specifically for the eyes, selenium helps protect the lens.

