

**CORRESPONDENCE**

**Cataract Surgery With Implantation of an Artificial Lens**

by Prof. Dr. med. Thomas Kohnen, Dr. med. Daniel Kook, Dr. med. Martin Baumeister, Dipl. Ing. Oliver K. Klaproth, Prof. Dr. med. Christian Ohrloff in volume 43/2009

**Preferring Blue Light-filtering Lenses**

The spectral permeability of intraocular lenses (IOL) determines the known “blue hazard” for the retina, which affects the development of age related macular degeneration (AMD). On the one hand, the blue hazard causes irreversible damage to the blue receptors. Further, the yellow lipofuscins that are deposited during the daily partial replacement of the outer segments of the photoreceptors on the retina tend to fluoresce in the blue light. This light energy activates the oxygen that is present, resulting in the formation of highly active, toxic radicals (reactive oxygen species, ROS). These can be warded off only to a degree.

The eye protects itself against UV damage because the lens absorbs UV light and may thus develop a cataract. The age related yellowing of the lens is akin to an increase in the blue protection and makes sense physiologically because with increasing age the risk of retinal damage increases owing to the imbalance of ROS lipofuscins and repair mechanisms.

The blue hazard that is caused by a colorless intraocular lens is clearly in excess of that of a 4 year old child (!) and, because it happens to a retina that is already weakened, it increases the risk of AMD. For the violet and blue spectrum, the blue-filtering intraocular lens imitates the permeability curve of the lens of a 50 year old. Although several questions remain unanswered (1), the blue-filtering lens should be preferred and colorless lenses used only for particular indications.

Further, the permeability curve of sunglasses is crucial for the risk associated with light and the progression of AMD (2, 3). DOI: 10.3238/arztebl.2010.0151a

**REFERENCES**

1. Carson, et al: New approach to evaluate retinal protection by intraocular lenses against age-related lipofuscin accumulation-mediated retinal phototoxicity. *J Cataract Refract Surg* 2008; 34: 1785–92.
2. Hünig S: Optimierter Lichtschutz der Augen: eine dringende Aufgabe und ihre Lösung. *Z prakt Augenheilkd* 2009; 29: 111–6; 197–205.
3. Hünig S: Meine Sonnenbrille; beste Sicht durch dreifachen Schutz. (informatory leaflet) 2009.
4. Kohnen T, Baumeister M, Kook D, Klaproth OK, Ohrloff C: Cataract surgery with implantation of an artificial lens. *Dtsch Arztebl Int* 2009; 106(43): 695–702.

**Prof. Dr. Ing. Dr. h. c. mult. Siegfried Hünig**  
 Institut für Organ. Chemie  
 am Hubland, 97074 Würzburg

**Dr. med. Georg Hünig**  
 Hefnersplatz 10, 90402 Nürnberg, Germany  
 georg.huenig@t-online.de

**Conflict of interest statement**

The authors declare that no conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors.

**In Reply:**

We thank our correspondents for their comments on our article on cataract surgery with implantation of an artificial lens (1).

We agree that because of the spectral transmission attributes of the natural lens, the use of blue-filtering lenses should be the gold standard in the implantation of intraocular lenses, since this variant most closely resembles natural transmission.

However, our findings did not confirm the often quoted benefits for contrast sensitivity (and visual acuity). On the contrary, the perception of colors usually even deteriorates slightly (2).

However, the final proof of AMD prophylaxis, which is also an often mentioned topic in the discussion surrounding blue-filtering intraocular lenses, is currently lacking. An artificial lens with a UV protective filter might also be regarded as offering sufficient protection (3). Further long term studies evaluating the protective effects achieved with blue-filtering lenses are needed in order to be able to draw a scientifically based conclusion (3).

Since the use of yellow blue-filtering intraocular lenses in general does, however, not seem to be associated with great harm and may even be associated with benefits, we agree with Professor Hünig and Dr Hünig’s comments overall.

DOI: 10.3238/arztebl.2010.0151b

**REFERENCES**

1. Kohnen T, Baumeister M, Kook D, Klaproth OK, Ohrloff C: Cataract surgery with implantation of an artificial lens. *Dtsch Arztebl Int* 2009; 106(43): 695–702.
2. Mester U, Holz F, Kohnen T, et al.: Intraindividual comparison of a blue-light filter on visual function: AF-1 (UY) versus AF-1 (UV) intraocular lens. *J Cataract Refract Surg* 2008; 34: 608–15.
3. Cuthbertson FM, Peirson SN, Wulff K, et al.: Blue light-filtering intraocular lenses: review of potential benefits and side effects. *J Cataract Refract Surg* 2009; 35: 1281–97.

**Prof. Dr. med. Thomas Kohnen**  
 Institut/Lehrstuhl: Klinik für Augenheilkunde  
 Theodor-Stern-Kai 7  
 60590 Frankfurt am Main, Germany  
 kohnen@em.uni-frankfurt.de

**Conflict of interest statement**

The University of Frankfurt has received study support for the evaluation of intraocular lenses from Alcon Pharma GmbH, AMO-Germany GmbH, Bausch & Lomb Surgical, Pharmacia Ophthalmics, and Rayner Surgical GmbH.