Changes in normal ocular biomeetry and optics with age
Jos Rozema1,2, 1Ophthalmology, Universitair Ziekenhuis Antwerpen, Edegem, Belgium; 2Medicine and Health Science, University of Antwerp, Antwerp, Belgium.

Presentation Description: This presentation gives a general overview of the changes in ocular biomeetry that occur with age. These are rather extensive in infants and gradually taper down to a relatively stable situation for young adults, in which changes are mostly lenticular in nature. As biomeetry also varies widely between individuals of the same age and gender, the extent of normal inter-individual differences will also be discussed.

Commercial Relationships: Jos Rozema, None
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Imaging of age-related changes in lens and ciliary muscle accommodation
Fabrice Manns1,2, 1Biomedical Optics, Bascom Palmer Eye Institute, University of Miami, Miami, FL; 2Biomedical Optics Laboratory, Department of Biomedical Engineering, University of Miami College of Engineering, Coral Gables, FL.

Presentation Description: The crystalline lens continuously grows throughout life. This continuous growth produces changes in lens optical and mechanical properties which contribute to the progressive loss of accommodation with age leading to presbyopia. There are also age-related changes in the morphology of the ciliary muscle which could play a significant role in presbyopia. One of the primary challenges in characterizing the respective contributions of the lens and ciliary muscle to presbyopia is the difficulty in imaging the changes in the shape of the lens and ciliary muscle in vivo during accommodation. In this presentation, we will review recent advances in imaging the accommodative response of the lens and ciliary muscle and their changes with age. We will describe the development of an accommodation biomeetry system that combines two Optical Coherence Tomography (OCT) systems to enable synchronized and dynamic imaging of the interaction between the ciliary muscle and lens, and its application to the study of accommodation and presbyopia. The implications of the findings for the development of surgical procedures to restore accommodation will be discussed.

Commercial Relationships: Fabrice Manns,
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Characterizing changes in intraocular light scatter with age
Thomas J. Van Den Berg, Netherlands Institute for Neuroscience, Royal Netherlands Academy of Arts and Sciences, Amsterdam, Netherlands.

Presentation Description: As light enters the pupil of the eye to form an image on the retina, part of that light is scattered in different structures, such as the cornea and crystalline lens. This causes a veil of light on top of the more or less proper retinal image. Added to this veil is also light back scattered from the fundus, and light diffusely transmitted by the iris and exposed part of the sclera. The scattered light forms part of the functional point-spread-function, in particular its peripheral part, resulting in the visual phenomenon of light perceived to radiate around bright point light sources against a dark background. This perceived light spreading is called straylight, and is quantified by its equivalent luminance value. It increases with aging, and with different adverse conditions, including age related deteriorations such as cataract. The age related increase in light scattering from the eye lens derives from small particle scattering, i.e. particles of about wavelength size, that increase in number with aging and cataract formation. In case the eye lens is replaced by an artificial lens, light scattering much reduces, but is not completely abolished, with some dependence on age. Reasons are under debate. The other mentioned ocular contributors to straylight may add a little age dependence also. Other age-related conditions, in particular several corneal dystrophies, can have large straylight effects. Straylight can be measured precisely on the basis of the equivalent luminance concept using psychophysical techniques. It is the accepted as definition of disability glare since disability glare was found to correspond precisely to the effects originating from straylight. Light scatter can be addressed also optically. In particular backscatter from the cornea and lens have been studied, and found to be age dependent. The relation with functional (forward) light scatter is weak though.

Commercial Relationships: Thomas J. Van Den Berg, Oculus (P)
Age-related changes to visual functions in normal eyes
Allison M. McKendrick. Optometry & Vision Sciences, University of Melbourne, Parkville, VIC, Australia.

**Presentation Description:** This presentation will overview recent evidence for changes to visual function as a consequence of healthy aging. In particular, an overview of both spatial vision and motion perception will be presented. While some of the alterations to visual function can be explained by well known optical alterations due to healthy aging, other aspects of visual performance are neural in origin. This talk will also briefly describe recent evidence from magnetic resonance spectroscopy of visual cortex that links neurotransmitter concentration in the aging brain to certain aspects of visual performance.

**Commercial Relationships:** Allison M. McKendrick, None

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Melanopsin function in patients with ocular disease
Aki Kawasaki1, 2. 1Neuro-Ophthalmology, University of Lausanne, Lausanne, Switzerland; 2Hôpital Ophtalmique Jules Gonin, Lausanne, Switzerland.

**Presentation Description:** Melanopsin-dependent pathways contribute to several nonimage-forming functions in humans and are implicated in many physiologic, cognitive and behavioural responses. This presentation reviews the clinical studies which have evaluated nonimage, light-dependent responses in patients with neuroretinal disease and reports new data on the potential effect of age-related lenticular brunescence on these functions.

**Commercial Relationships:** Aki Kawasaki, None

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