

WWW.IOVS.ORG

**IOVS**

November 2006

Volume 47/11

Pages 4659-5136

## New Light on Human Zonular Architecture

An accurate anatomical description of the zonule, which suspends the lens, is vital to better understand the mechanism of accommodation and help design new strategies to correct presbyopia. According to the current description, the zonular bundles run straight from the ciliary body to the anterior, posterior, or equatorial lens capsule. Using environmental scanning electron microscopy and a technique to image the stretched zonule, Bernal et al. (p. 4708) demonstrate that, contrary to this description, the majority of posterior zonular fibers insert into the anterior hyaloid membrane. This relationship between the posterior zonular fibers and the anterior hyaloid membrane suggests that there are differences in the mechanism and function of the anterior, equatorial, and posterior zonular bundles. ■

## “Intracaptors” Bind VEGF Intracellularly

Singh et al. (p. 4787) developed a novel molecule, known as an intracaptor, to bind vascular endothelial growth factor (VEGF), a key molecule in the formation of blood vessels, which is involved in corneal transplant rejection, macular degeneration, diabetes, and cancer. Unlike current anti-VEGF therapies, intracaptors are able to bind VEGF within cells. The authors show that intracaptors targeting VEGF can induce the regression of abnormal blood vessels which occur in corneal injury and that this process involves death of blood vessel cells and intracellular stress responses. ■

## A New 3D Monitor-Based Random-Dot Stereotest

A new random-dot stereotest using a 3D display and infrared oculo-graphy has been found by Breyer et al. (p. 4842) to objectively assess stereopsis in children older than 3 years. Compared to the Lang I stereotest, the positive predictive value of the new test is 0.96 (95% CI, 0.79–0.99), the negative predictive value is 0.94 (95% CI, 0.78–0.99), and the overall accuracy is 0.95 (95% CI, 0.85–0.99). If applicable to preverbal children, the new test may permit study of the development of stereovision under natural conditions since no glasses are necessary to see the stimuli. The new test may

also prove to be useful for the objective measurement of the sensory outcome following the treatment of ophthalmic disorders in the pediatric age group. ■

## IL-6 in Staphylococcal Microbial Keratitis

Hume et al. (p. 4926) examined the effect of the absence of IL-6 in a *Staphylococcus aureus* mouse microbial keratitis model. In infected eyes it was observed that, in the absence of IL-6, pathology and bacterial numbers were greater than in wild-type mice. With the addition of recombinant IL-6, a decrease in numbers of bacteria in IL-6-treated eyes was found. IL-6 has great potential to be a broad spectrum adjunct therapeutic as it is also effective during *Pseudomonas* infection. ■

## Measurement of Retinal and Choroidal Vascular PO<sub>2</sub> In Vivo

An optical section phosphorescence imaging system was utilized by Shakoor et al. (p. 4962) to investigate oxygen tension (PO<sub>2</sub>) changes in the retinal and choroidal vasculatures due to visual stimulation in rats. Retinal arterial and capillaries PO<sub>2</sub> increased significantly in response to light flicker. Retinal arteriovenous PO<sub>2</sub> difference during flicker was significantly greater than the difference before flicker. Retinal arterial PO<sub>2</sub> decreased significantly with increased distance from the optic nerve head, while the retinal venous PO<sub>2</sub> remained relatively unchanged. Measurement of changes in the chorioretinal vasculature PO<sub>2</sub> can potentially advance the understanding of oxygen dynamics in challenged physiologic states and animal models of human retinal diseases. ■

## Wide Spectrum of Retinal Disease Expression in *BBS1*

The Bardet-Biedl Syndrome (BBS) is an autosomal recessive disorder characterized by retinal degeneration and systemic manifestations. To date, eleven BBS genes have been identified but the rapid increase in known genotypes has not been matched by a parallel increase in detailed studies of human phenotype. Azari et al. (p. 5004) defined the retinal phenotype in patients with *BBS1*. A wide spectrum of retinal disease expres-

sion was present. Mildest disease was a subtle maculopathy with relatively limited peripheral retinal dysfunction. Moderate disease showed retina-wide rod more than cone dysfunction and, often, a negative electroretinogram. The severe retinopathies retained only markedly impaired central or peripheral islands of function. Retinal disease severity differed in family members, was independent of age, and was not explained by genotype at a recently reported epistatic locus. ■

## TNF-Receptor p55: A Main Target for Anti-Angiogenesis Treatment in the Retina?

Tumor necrosis factor  $\alpha$  is one of the major cytokines in inflammation and apoptosis. Kociok et al. (p. 5057) investigated the influence of the receptors TNF-Rp55 and TNF-Rp75 on retinal development in a mouse model of oxygen-induced retinopathy. Retinal vascularization as well as retinal mRNA expression of VEGF, angiopoietin 1 and 2, and platelet-derived growth factor were examined from postnatal day 6 to 20. Both receptor-deficient mouse strains demonstrated similar retinal development and vascularization under normoxic conditions, although gene expression was changed markedly. Oxygen treatment resulted in a significantly reduced vascularization in Rp55<sup>-/-</sup> but not Rp75<sup>-/-</sup> on P20. Thus, inhibition of TNF $\alpha$  via TNF-Rp55 can clearly alter retinal development and angiogenesis. ■

## RPE as a Potential Source of Photoreceptors

Photoreceptors lost due to aging, light damage, or genetic changes cannot be replenished, leading to inevitable visual impairments. Liang et al. (p. 5066) coaxed cultured RPE cells to transdifferentiate towards photoreceptors through ectopic expression of proneural gene *neuroD* and then grafted the transdifferentiating cells into the developing chick eye. The authors observed continued transdifferentiation, including the synthesis of red opsin. Perhaps more significantly, transdifferentiating cells integrated into the photoreceptor cell layer of the host retina and emanated axonal arborization into the outer plexiform layer. This study raises the possibility of exploring RPE transdifferentiation as an alternative in photoreceptor cell-replacement studies. ■