What Is New in *Ophthalmic Research* – Focus on Neoangiogenesis

Effects of the Phosphatidylinositol 3-Kinase Inhibitor in a Mouse Model of Retinal Neovascularization

Yu et al., Beijing (China)

Ophthalmic Res 2008;40:19–25

Angiogenesis is required for different physiologic events such as development, growth, tissue remodeling and wound healing. On the other hand, angiogenesis is involved in pathologies such as proliferative diabetic retinopathy, retinopathy of prematurity, aged-related macular degeneration, tumor growth and so on. Angiogenesis consists of a multistep process involving capillary endothelial cell migration and proliferation. Endothelial cell migration and proliferation is induced by growth factors such as VEGF and FGF. Binding of VEGF and FGF to their respective receptors leads to receptor phosphorylation and subsequent activation of signaling proteins such as phosphatidylinositol 3-kinase (PI3K). The activation of the PI3K pathway is a crucial step in angiogenesis, the inhibitor of PI3K, LY294002, inhibits not only the survival and migration in RF/6A cells but also the retinal neovascularization in a mouse model. Thus inhibition of the PI3K pathway may be an attractive therapeutic strategy for the treatment of various vascular diseases.

Vitreous as a Model Tissue for Study of Early Diabetic Nephropathy

Cohen et al., Philadelphia (USA)

Ophthalmic Res 2008;40:5–9

The development of therapeutic strategies to arrest the pathogenesis of diabetic retinopathy early in its evolution would be aided by animal models in which the disease can be detected early in its course, before the establishment of retinal histopathological lesions. Prompted by this consideration, the authors evaluated the levels of the angiogenic VEGF, the antiangiogenic PEDF and metabolic factors in the vitreous of the genetically diabetic *db/db* mouse compared to nondiabetic control mice. A diabetes-associated imbalance in the ratio of VEGF to PEDF and an increase in the concentrations of lipid peroxide products and type IV collagen were found. Subsequently, this implies the usefulness of vitreous from this diabetic rodent as a model tissue for the investigation of pathogenetic factors and for the assessment of potential therapeutic interventions that might protect against the advancement of the disease to overt retinopathy.

Inhibitory Effect of YC-1, 3-(5'-Hydroxymethyl-2'-Furyl)-1-Benzylindazole, on Experimental Choroidal Neovascularization

Song et al., Seoul (Korea)

Ophthalmic Res 2008;40:35–40

YC-1, 3-(5'-hydroxymethyl-2'-furyl)-1-benzylindazole, is known to inhibit HIF-1 α and tumor angiogenesis. The authors investigated the inhibitory effect of YC-1 on experimental choroidal neovascularization (CNV) with respect to HIF-1 α and VEGF expression. Though both HIF-1 α and VEGF were expressed in CNV lesions in the control group 4 weeks after laser photocoagulation, they could not be detected in the intravitreally YC-1-treated group. There was a significant decrease in fluorescein leakage and the mean CNV thickness in the intravitreally YC-1-treated group compared to the control group. The results indicate that YC-1 may have inhibitory effects on CNV through the blocking of HIF-1 α and VEGF. While the exact role of HIF-1 α in CNV needs more investigation, HIF-1 α inhibitors such as YC-1 might be considered as therapeutic agents for the treatment of CNV.

Antiangiogenic Activity in Tears: Presence of PEDF – New Insights and Preliminary Results

Abdiu and Van Setten, Stockholm (Sweden)

Ophthalmic Res 2008;40:16–18

Increased knowledge about the basic mechanisms of neovascularization has led to an increase in the scientific investigation in this area, with emphasis on the enzymes and growth factors involved in angiogenesis. One factor of interest here is pigment-epithelium-derived factor (PEDF) a 50-kDa protein with antiangiogenic properties. The authors' investigation and findings concerning PEDF in human tear fluid in some healthy individuals highlight the potential of gene engineering in order to design a treatment for topical administration to prevent neovascularization of the cornea. The occasionally rather high concentration of PEDF raises the question of its origin. Although minimal trauma is considered, shedding of surface-bound PEDF from the cornea and conjunctiva during tear collection cannot be disregarded. Furthermore, the lack of detectable amounts of PEDF in most samples with the presently available methods also implies that more sensitive techniques are probably required to further investigate the role of PEDF on the ocular surface.

Uwe Pleyer, Editor-in-Chief