

The Endothelium

L. Schmetterer

*Clinical Pharmacology, Biomedical Engineering and Physics, Medical University of Vienna,
Vienna, Austria*

The vascular endothelium is a key regulator of vascular tone and systemic blood pressure. In the eye substances that are produced in the endothelium such as nitric oxide (NO), endothelins and prostaglandins play a key role in the control of blood flow to the ocular tissues. Moreover, it has been shown that a variety of ocular vascular diseases are associated with alterations in the balance of the production of endothelium-derived vasoconstrictor and vasodilator substances. This makes the endothelium a major target for the treatment of eye diseases associated with ischemia and/or hypoxia. In the present talk the focus will be directed towards the endothelin system and towards the NO system. Endothelins are very potent vasoconstrictors. They act as paracrine modulators of vascular tone and local overproduction induces pronounced vasoconstriction. Endothelins have been implicated in the pathogenesis of various ocular diseases such as glaucoma, retinal venous occlusion and diabetic retinopathy. Recent studies have shown that blockade of endothelin receptors can induce pronounced vasodilatation. Nitric oxide on the other hand is a very potent vasodilator with a very short half life time in tissue. An increase in local NO can be achieved by several pharmacological approaches including the administration of NO donors or very high doses of the NO substrate L-arginine. The implications for the treatment of ocular vascular disease will be discussed.