Therapeutic Possibilities of Using an **Oxygen-Metabolism Activator (Solcoseryl®)** by the Systemic and Topical Route in Ophthalmology

Many authors are already interested in the therapeutic use of oxygen. Although its usefulness is recognized, technical difficulties have always restricted wider spread of this practice.

G. Goldmann
L. Liechti [19]
S. Schubert [cited in 19]
B. Batencke
B. Betastoisky [cited in 18] have shown that in the presence of anoxia the blind spot is enlarged.

Bietti
S. Sarsanelli [5]
F. Ferraris
d. de Gasperis [13] have observed that the perimetric deficit in cases of glaucoma improves after the inhalation of oxygen. Bietti

S. Sarsanelli [5] have furthermore shown that the inhalation of oxygen has a beneficial effect on scotoma in strabismic patients.

Oxygen therapy has been attempted, although with little success, in cases of retinal detachment, thrombosis of the central retinal vein, peripapillary degenerative plaques in myopic subjects, and degenerative retinal ta-petum affections, both central and peripheral.

Nowadays, thanks to the sophisticated technical possibilities created by hyperbaric medicine, there has been a new move towards the use of oxygen therapy, particularly in retinal diseases of
vascular pathogenesis. Nizetic [25] has reported slight improvements in vision in retinitis pigmentosa following the administration of oxygen.

The administration of oxygen also plays a part in color vision. Giardino and Pisano [18] claim that inhalation of oxygen increases the amplitude of fusion of retinal images. According to Leonardi [cited in 18], on the other hand, oxygen has a favorable effect on accommodation and convergence; furthermore, oxygen reduces and sometimes removes latent nystagmus revealed by occluding one eye. Bietti and Sarsanelli [5], and later Paliaga [29], have shown the crossing phenomenon on the amblyoscope to be reduced, and sometimes eliminated, in the majority of strabismic patients to whom oxygen therapy was administered.

Mention should also be made of the valuable contribution of German authors, among them Fischer [14], using lanthasol therapy; they point out the usefulness of the maximum quantity of oxygen essential to cellular respiration of the tissues potentiating the transport of gas with the help of metal cations. This concept has also been expressed by Zoldan [48] in the therapy of senile macular degeneration, in simple chronic glaucoma, and in posttraumatic degenerative retinitis.

These principles of the usefulness of oxygen therapy in ophthalmology are indirectly confirmed by the numerous research projects carried out on the heliopathogenesis of anoxia cataract, the authors in question being De Crecchio [12], Caccia et al. [cited in 12], Bellows and Nelson [3], Morone and Citroni [24]. Contrary to the belief of other authors who maintain that the lesions are due to alterations in the osmotic pressure of the aqueous humor, the latter, in particular, attribute the lesions in the crystalline lens to modifications of metabolic factors, while acknowledging the importance of the osmotic and physicochemical factors in producing the alterations in the proteins of the crystalline lens.

Scullica and Catalini [37], using rats subjected to hypoxia in a decompression chamber, reported highly depressed mitotic activity of the lenticular epithelium and in particular marked reduction in the number of prophases.

Oxygen therapy has also been used successfully by Tieri [39] on the cicatrization of corneal wounds, using special lenses with a flow of oxygen. Although all this research has confirmed the usefulness of oxygen therapy through inhalation, topical applications of oxygen have been little used because of the technical difficulties in applying the gas. It is only recently that a drug having a marked activity on cellular oxygen metabolism has appeared on the market; favorable results obtained in some corneal affections have already been reported in a previous paper. These results were confirmed quite recently at Saphar Laboratory in Johannesburg by Dr. Ober-holster who applied the same therapy combined with chloramphenicol in keratitis in ruminants.

On the basis of these concepts we wished to study oxygen therapy with drugs that would increase its metabolism in various structures of the eye. The work was carried out over a period of about 10 years with the collaboration of Solco Basel Ltd., manufactures of Solcoseryl® in ampoules and gel form, and of Prof. Aldo Cecio, Head of the Department of Zoology and Topographical Anatomy of the Faculty of Veterinary Medicine in Naples, who provided us with the equipment for the histological and histo-chemical examinations.