Editorial

The life span in developed countries has been increasing for the last 20 years, and surprisingly this trend is likely to continue its steady increase over the upcoming decades too. The impact of this trend is that the population consists of more elderly people. Since elderly people show a tendency towards age-related eye disorders, modern societies are transferring this major challenge to the ophthalmic community. The major blinding diseases such as cataracts, glaucoma, diabetic retinopathy and age-related macular degeneration are most affected by aging. Even the genetic disorders, such as retinitis pigmentosa, can be considered 'premature aging of the retina' and are affected by aging. Not only the blinding diseases, but also other major diseases such as dry eye or presbyopia, which dramatically affect quality of vision, are affected by aging. Thus, in the aging societies of developed countries, aging is a very important factor in ophthalmology.

Recent advances in the understanding of aging have given us a new way of thinking about the intervention in the aging process. The advances in aging research may be able to provide the chance to interfere with the aging process itself, including that of the eye. One hard evidence comes from calorie restriction (CR) intervention. CR extends the life span in many species. Fortunately CR can also suppress the incidence of age-related diseases such as cancer, diabetes and cardiovascular events, and possibly age-related eye disorders.

In addition to the CR theory, the oxidative stress theory is another important hypothesis that is believed to be involved in aging. According to this theory, we can manage the aging process by controlling reactive oxygen species (ROS). Since the main function of the eye is 'seeing' which is mediated by photoprocessing of the retinal cells, light exposure, especially blue to ultraviolet light, can induce ROS. The production of ROS in the retina is an un-

avoidable event of normal eye function. Also, the ocular surface is exposed to the ambient environment of which oxygen levels fluctuate with each blink and polluted air. Thus, the ROS theory is also a very important consideration.

In this issue focusing on the antiaging approach for eye disorders, there are reviews based on the CR theory and the oxidative stress theory. The first review by Tsubota et al. for dry eye care is based on the two aforementioned theories. The CR-theory-based reviews in this issue point out the importance of mitochondria (paper by Jarrett et al.) and sirtuins (article by Ozawa and Kubota). These issues provide new challenges and are expected to open a very important field in the near future. The oxidative-stress-theory-based reviews comprise evidence from epidemiological studies (by Fletcher), the importance of nutrition (by Agte and Tarwadi), prevention of age-related cataracts (by Beebe et al.) and glaucoma (by Chrysostomou et al.). These reviews offer new and comprehensive information; thus, the readers can obtain a clear picture on how the oxidative control is important for the prevention and treatment of eye diseases from the point of view of aging.

Antiaging research has recently come of age. The practical approach using the fundamentals of aging research is not used clinically yet; however, ROS control, such as supplementation based on the Age-Related Eye Disease Study, is the beginning of the application of ROS control for the age-related disorders. A proper diet, including CR or antioxidant food factors, antioxidant supplements and exercise may become important interventions for the age-related eye disorders. Future developments may include drug intervention in addition to supplements based on the antiaging approach.

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