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Zeaxanthin and lutein, two carotenoid pigments of the xanthophyll subclass, are present in a high concentration in the retina, especially in the macular area. They work as a filter protecting the macula from the blue light and also as an antioxidant and free radical scavenger to reduce oxidative stress-induced damage in the eye. Many observational and interventional studies have indicated that lutein and zeaxanthin might reduce the risk of various eye diseases, especially the age-related macular degeneration. *In vitro* and *in vivo* studies indicated that they can protect various ocular cells against oxidative damage.

Recent studies have shown that, in addition to traditional mechanisms, lutein and zeaxanthin can influence the viability and function of cells through various signal pathways or transcription factors; for example, they can affect immune responses and inflammation, inhibit laser-induced choroidal revascularization and hypoxia-induced accumulation of VEGF in ocular cells, and also have anticancer effects in several malignant tumors, such as uveal melanoma. This special issue will collect the results of recent studies regarding the effects of lutein, zeaxanthin, and relevant carotenoids, such as meso-zeaxanthin and astaxanthin, on the eye in different *in vivo* or *in vitro* experimental models and the results of management of various ocular diseases by these molecules.

Potential topics include, but are not limited to:

- ▶ Chemistry and biochemistry of lutein and zeaxanthin related to their biofunctions in the eye
- ▶ Bioavailability and metabolism of lutein and zeaxanthin related to the eye
- ▶ Absorption, transport, and distribution of lutein and zeaxanthin and related carotenoids especially the levels of these carotenoids in various ocular tissues
- ▶ Clinical measurement of macular pigment optic density in normal individuals and patients with various ocular diseases
- ▶ Epidemiological studies on the food uptake and blood levels of lutein and zeaxanthin and their relationship with the occurrence of various ocular diseases
- ▶ The photophysics and photobiology of lutein, zeaxanthin, and related carotenoids
- ▶ The effects of lutein and zeaxanthin as a filter of blue light and as an antioxidant for protecting various ocular cells against oxidative stress-induced damage *in vitro*
- ▶ Protective effects of lutein and zeaxanthin on experimental animal models with various ocular diseases
- ▶ Effects of lutein and zeaxanthin on ocular immune reaction, inflammation, angiogenesis, and various ocular tumors *in vitro* or in the experiment animal eye models
- ▶ Clinical effects of supplementation of lutein and zeaxanthin on visual performance
- ▶ Clinical effects of supplementation of lutein and zeaxanthin in patients with various ocular diseases, including but not limited to age-related macular degeneration and cataract

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