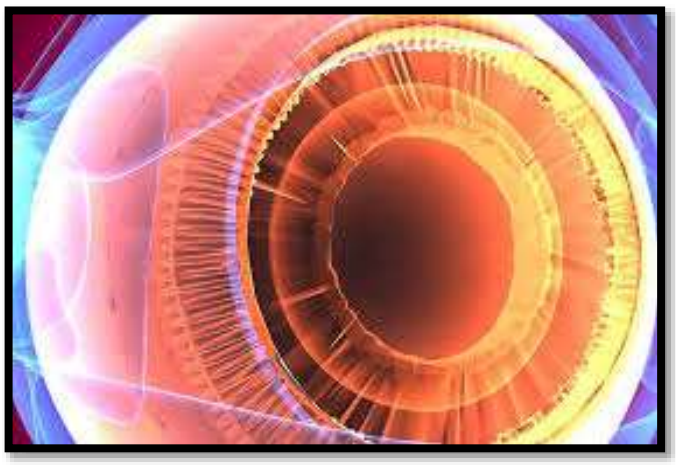
Potential therapeutic effects of Molecular Hydrogen against Retinal degeneration

KYK Hydrogen Water | 1,500 PPB of DH | KYK Co., Ltd. (South Korea)

Retinal degeneration (RD) is a heterogeneous group of inherited retinal dystrophies that characterized by the progressive photoreceptor apoptosis. Current therapeutic strategies against RD include the gene therapy, nutritional supplements, antiapoptotic therapy, retinal transplantation, retinal prostheses, and stem cell therapy. However, the therapeutic effects of the aforementioned approaches remain unsatisfactory, owing to the complexity of etiology and the chronic cycle of pathological progression. It has been shown that the ROS plays a pivotal role in caspase-independent photoreceptor apoptosis in RD. This notion is further supported by the fact that multiple antioxidants have been successful in effectively suppressing photoreceptor degeneration in RD models. Given the potent scavenging ability of hydrogen, it is reasonable to hypothesize that exogenous supplementation of hydrogen can ameliorate oxidative stress in RD and act as a therapeutic strategy to retard or prevent the photoreceptor degeneration.



Excessive exposure to light can induce the formation and accumulation of ROS in retinas and eventually results in the photoreceptors' apoptosis. Hitherto, two independent studies have found that saturated hydrogen saline can protect the retina from light-induced damage by attenuating the oxidative stress. Investigations using the electron microscope found that the hydrogen treatment could protect the cellular organelles of the photo receptors against the light induced injury. To some extent, the microstructure results verify that hydrogen can penetrate the membranes and then enter the nucleus and mitochondria. Moreover, the retinal malondialdehyde concentration, a presumptive marker of lipid peroxidation, is significantly reduced by hydrogen therapy, indicating that the protective effects of hydrogen could be ascribed to its antioxidant properties. The encouraging findings based on the phototoxic models verify the efficacy of hydrogen to arrest photoreceptor degeneration and cast light on the discovery of a novel therapeutic to prevent the retinal damages in age-related macular degeneration or retinitis pigmentosa.