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Age-related changes of ocular regions of wistar albino rats

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Background: Aging is a biological phenomenon that involves an increase of oxidative stress associated with gradual degradation of the structure and function of the retina. Gender differences and subsequent deterioration of retinal cell layers is an interesting topic, especially because there is no published work concerning it.

Methods: One hundred and twenty male and female Wistar albino rats ages 1, 6, 18, 30, and 42 months (n=20 equal for male and female) were used. At the time interval, retinae, cornea,ciliary organ and optic nerve were investigated by light and transmission electron microscopy (TEM), assessments of neurotransmitters, antioxidant enzymes (catalase, superoxide dismustase and glutathione s transferase), caspase-3 and -7, malonadialdhyde, and DNA fragmentation.

Results: Light and TEM observations of the older specimens (30 and 42 months) revealed apparent deterioration of retinal cell layers, especially ganglion and nerve fibers, nuclear, pigmented epithelium, and stacked membranes of the photoreceptor's outer segments. Cornea, ciliary organ and optic nerve showed different pattern of degenerative phases. Males were highly susceptible to aging processes. Concomitantly, there was a marked reduction of neurotransmitters and antioxidants enzymes and an increase of lipid peroxidation and DNA damage.

Conclusions: We conclude that aging contributed to an increase of oxidative stress resulting from damage of mitochondria in retinal cells, a decrease of the antioxidant enzyme system, and an increase of markers of retinal cell death.

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