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STUDY OF LIPOFUSCIN GRANULES AND MELANOSOMES FROM HUMAN RETINAL PIGMENT EPITHELIUM

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Lipofuscin granules (LGs) accumulate in the retinal pigment epithelium (RPE) cells with age, particularly in patients with hereditary diseases. Photosensitization of LGs with blue light can generate reactive oxygen species. Comparative analysis of LGs fluorescence spectra and fluorescence lifetime in the RPE cell suspensions from cadaver eyes with and without signs of AMD showed a clear difference in fluorescence characteristics at 530-580 nm (excitation at 488 nm). Defined differences in fluorescence properties between chloroform extracts obtained from cadaver eyes with and without signs of pathology hold promise for the future improvement of fundus autofluorescence imaging. There is a significant age-related decrease for melanosomes in the RPE cell due to its biodegradation. Oxidants, such as hydrogen peroxide or superoxide radicals, easily lead to melanin destruction. For example, superoxide radicals lead simultaneously both to decrease of melanosomes amount and concentration of paramagnetic centers of the melanin. We suggested that the age-related loss of melanosomes in the RPE cell is due to melanin destruction in the complex melanolipofuscin granules. Superoxide radicals light-induced by LGs causes the destruction. The accumulation of LGs as source of free radicals along with autofluorescence and loss of melanosomes with screening and antioxidant pigment in the RPE cells with age can lead to photo-oxidative stress that is related to the progression of eye pathologies. The lecture reviews the recent advances in knowledge of the RPE lipofuscin granules and melanosomes.

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