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abstract

Age-related macular degeneration (AMD) is a leading cause of legal blindness in people over 50 years of age in many developed countries. Drusen are yellowish extracellular deposits beneath retinal pigment epithelium (RPE) found in aging eyes and considered as a biomarker of AMD. However, the biogenesis of drusen has not been elucidated. We reported previously that multicellular spheroids comprised of human RPE cells constructed a well-differentiated monolayer of RPE with Bruch's membrane. And the spheroids expressed lipoprotein depositions. We determined that RPE spheroids exhibited drusen formation between RPE and Bruch's membrane with expression of many drusen associated proteins such as amyloid β , vitronectin, apoE and complement components, the expression of which was altered by a challenge with oxidative stress. Artificial lipofuscin-loaded RPE spheroids yielded drusen more frequently. It's suggested that lipofuscin accumulation is likely associated with drusen formation. In the current study, we showed that drusen originates from the RPE. This culture system is an attractive tool for use as an in vitro drusen model, which might help elucidate the biogenesis of drusen and the pathogenesis of related diseases such as AMD.