Abstract Submitted
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The mechanics of retinal detachment[1] TOM CHOU, UCLA, MICHAEL SIEGEL, NJIT — We present a model of the mechanical and fluid forces associated with exudative retinal detachments where the retinal photoreceptor cells separate typically from the underlying retinal pigment epithelium (RPE). By computing the total fluid volume flow arising from transretinal, vascular, and retinal pigment epithelium (RPE) pump currents, we determine the conditions under which the subretinal fluid pressure exceeds the maximum yield stress holding the retina and RPE together, giving rise to an irreversible, extended retinal delamination. We also investigate localized, blister-like retinal detachments by balancing mechanical tension in the retina with both the retina-RPE adhesion energy and the hydraulic pressure jump across the retina. For detachments induced by traction forces, we find a critical radius beyond which the blister is unstable to growth. Growth of a detached blister can also be driven by inflamed tissue within which *e.g.*, the hydraulic conductivities of the retina or choroid increase, the RPE pumps fail, or the adhesion properties change. We determine the parameter regimes in which the blister either becomes unstable to growth, remains stable and finite-sized, or shrinks, allowing possible healing.

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Tom Chou
UCLA

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