

## **Zooming in on the Big "Eye-dea" in Retinopathy: Live Imaging Ocular Angiogenesis**

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Retinopathies, which often cause blindness and are characterized by abnormal growth of excessive, leaky and bulbous new blood vessels, include 1) retinopathy of prematurity in premature infants 2) diabetic retinopathy, the main cause of blindness in working-aged Americans and 3) age-related macular degeneration, the most common cause of sight loss in older people. To date, it is not known why the new blood vessels grow in an abnormal manner. During development, blood vessels grow in a well-defined process generating a regularly connected, stable network. In order to develop new drugs against these debilitating diseases, the reason for the disrupted new vessel growth has to be better understood.

The growth of new blood vessels is fundamentally a three-dimensional problem, where cells move and connect throughout the tissue to develop an extensive tubular network. To date no one has imaged this process in its full three dimensions throughout the different layers of eye tissue, as deep imaging techniques were previously unavailable. By comparing diseased and normal tissues using light sheet microscopy, this study will help unravel how and why vessel growth degenerates in retinopathy conditions and provide a new testbed to investigate the effects of new therapeutic targets. We call this observation method the big Eye-dea (Dimensional Environment Analysis) as we for the first time will preserve the real three-Dimensional and normal/diseased tissue Environment of the eye while Analyzing changes in vessel growth with state-of-the-art computational techniques.