

Scientists visualize new treatments for retinal blindness

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A new report published online in *The FASEB Journal* may lead the way toward new treatments or a cure for a common cause of blindness (proliferative retinopathies). Specifically, scientists have discovered that the body's innate immune system does more than help ward off external pathogens. It also helps remove sight-robbing abnormal blood vessels, while leaving healthy cells and tissue intact. This discovery is significant as the retina is part of the central nervous system and its cells cannot be replaced once lost. Identifying ways to leverage the innate immune system to "clean out" abnormal blood vessels in the retina may lead to treatments that could prevent or delay blindness, or restore sight.

"Our findings begin to identify a new role of the [innate immune system](#) by which endogenous mediators selectively target the pathologic retinal vasculature for removal," said Kip M. Connor, Ph.D., a researcher involved in the work from the Department of Ophthalmology at the Harvard Medical School and Massachusetts Eye and Ear Infirmary Angiogenesis Laboratory in Boston, MA. "It is our hope that future studies will allow us to develop specific therapeutics that harnesses this knowledge resulting in a greater visual outcome and quality of life for patients suffering from diabetic retinopathy or retinopathy of prematurity."

To make this discovery, Connor and colleagues compared two groups of mice, a genetically modified group which lacked activity in the innate immune complement system, and a normal group with a fully functional innate immune system. Researchers placed both groups in an

environment that induced irregular [blood vessel growth](#) in the eye, mimicking what happens in many human ocular diseases. The mice that were lacking a functional innate immune system developed significantly more irregular blood vessels than the normal mice, indicating that the complement system is a major regulator of [abnormal blood vessel growth](#) within the eye. Importantly, in the normal mice, scientists were able to visualize the [immune system](#) targeting and killing only the irregular blood vessels while leaving [healthy cells](#) unharmed.

"Knowing how the complement system works to keep our retinas clean is an important first-step toward new treatments that could mimic this activity," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*. "It's a new understanding of how proliferative retinopathies rob us of sight, and promises to let us see the path ahead clearly."

More information: J. Harry Sweigard, Ryoji Yanai, Philipp Gaissert, Magali Saint-Geniez, Keiko Kataoka, Aristomenis Thanos, Gregory L. Stahl, John D. Lambris, and Kip M. Connor. The alternative complement pathway regulates pathological angiogenesis in the retina. *FASEB J.* [DOI: 10.1096/fj.14-251041](https://doi.org/10.1096/fj.14-251041) ; www.fasebj.org/content/early/2014/03/26/fj.14-251041.abstract

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