

# Polysialic acid blocks mononuclear phagocyte reactivity, inhibits complement activation, and protects from vascular damage in the retina.

Karlstetter M, Kopatz J, Aslanidis A, Shahraz A, Caramoy A, Linnartz-Gerlach B, Lin Y, Lückoff A, Fauser S, Düker K, Claude J, Wang Y, Ackermann J, Schmidt T, Hornung V, Skerka C, Langmann T, Neumann H (2017) Polysialic acid blocks mononuclear phagocyte reactivity, inhibits complement activation, and protects from vascular damage in the retina. *EMBO Mol Med* 9(2), 154-166.

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## Abstract

Age-related macular degeneration (AMD) is a major cause of blindness in the elderly population. Its pathophysiology is linked to reactive oxygen species (ROS) and activation of the complement system. Sialic acid polymers prevent ROS production of human mononuclear phagocytes via the inhibitory sialic acid-binding immunoglobulin-like lectin-11 (SIGLEC11) receptor. Here, we show that low-dose intravitreal injection of low molecular weight polysialic acid with average degree of polymerization 20 (polySia avDP20) in humanized transgenic mice expressing SIGLEC11 on mononuclear phagocytes reduced their reactivity and vascular leakage induced by laser coagulation. Furthermore, polySia avDP20 prevented deposition of the membrane attack complex in both SIGLEC11 transgenic and wild-type animals. In vitro, polySia avDP20 showed two independent, but synergistic effects on the innate immune system. First, polySia avDP20

prevented tumor necrosis factor- $\alpha$ , vascular endothelial growth factor A, and superoxide production by SIGLEC11-positive phagocytes. Second, polySia avDP20 directly interfered with complement activation. Our data provide evidence that polySia avDP20 ameliorates laser-induced damage in the retina and thus is a promising candidate to prevent AMD-related inflammation and angiogenesis.

## Involved units

[Infection Biology](#) [Peter F. Zipfel](#) [Read more](#)

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## Identifier

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