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Gene therapy: A possible cure from diabetic retinopathy

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Diabetic retinopathy (DR) is the most common diabetic microvascular complication, and is the leading cause of severe vision loss among working-age individuals. Nearly all individuals with type 1 diabetes and more than 60% of those with type 2 have some form of retinopathy after 20 years. Neovascularization caused by severe hypoxia is the hallmark of proliferative diabetic retinopathy (PDR), whereas vascular leakage caused by the breakdown of the blood retinal barrier is involved in the pathogenesis of diabetic macular edema (DME). Intravitreal injections of anti-VEGF or steroidal drugs are being used for the treatment of advanced DR, ME and vitreal hemorrhage. However, reinjections are commonly needed, causing substantial adverse effects such as infection and inflammation. Gene therapy offers long-term expression of the transgene thus minimizing multiple and frequent injection requirement. Anti-VEGF agents have continued as the mainstay of treatment to prevent neovascularization and vascular permeability in DR patients, however, there is a distinct subgroup of patients, which do not respond adequately to anti-VEGF suggesting that other factors may play a role. Recent studies suggest that angiopoietins modulate the angiogenesis and pathological neovascularization with or without VEGF. Hence, we have developed an adeno-associated virus (AAV) based gene transfer system to deliver angiopoietins 1, 2 and 4 into a rat model of DR to study their therapeutic potential. Given that angiopoietins are upregulated under hyperglycemic, hypoxic and inflammatory conditions, we believe that angiopoietin therapy can prevent vision loss and blindness.

Biography

Vineeta Sharma completed her PhD in 2010 from All India Institute of Medical Sciences and Post-doctoral studies from University of Michigan and Children's Hospital Oakland Research Institute. She is the Founder and President of Adeno Biosciences, a startup focusing on the development of gene therapy based treatment for metabolic disorders and diabetes. She has published many papers in esteemed journals and is a recipient of many reputed awards.

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