Enzyme Injection to Reopen Blocked Ocular Drainage Devices in Glaucoma Patients

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Technology description

Nanoparticles Facilitate Optimal Placement of Mixture; Enzyme Safely Adds Drainage Pores to Scar Tissue

This injection of nanoparticles functionalized with enzymes can reopen implanted ocular drainage devices that have become blocked by scar tissue. More than 3 million Americans have glaucoma. In the past 40 years, surgeons increasingly have used ocular drainage devices to alleviate aqueous pressure in the eye due to the disease. The drainage devices relieve eye pressure by creating a drainage pathway. These ocular drainage devices are surgically placed; excessive post-surgery scarring, when the body forms a fibrous capsule over the implant, can render the drainage pathway useless. Efforts to administer an anti-fibrotic Mitomycin-C at the time of surgery to reduce scarring have so far been ineffective. Researchers at the University of Florida have created a modified enzyme treatment that reduces the amount of collagen and glycosaminoglycan’ s (GAGS) in the fibrous scar tissue. This ultimately creates pores in the excessively scarred eye tissue, allowing the ocular drainage device to, once again, work freely.

Technology

This enzyme treatment method works by administering collagenase and hyaluronidase, inflammatory scar-eating enzymes, to an area near excessive scar formation caused by ocular drainage implants in glaucoma patients. The treatment enzyme can be delivered by injection or be coupled with a magnetic nanoparticle for local delivery, via magnetic field or radiofrequencies. The enzyme will break down the excessive scarring in the eye by reducing the amount of glycosaminoglycan and collagen and causing pores in the scarring tissue. These pores will allow for better diffusion of aqueous fluid and reduce pressure caused by aqueous fluid buildup.

Application area

Enzyme treatment for treating scar tissue blocking ocular drainage devices

Advantages

Controlled localization of medication via magnetic fields, allowing for better targeting of scar tissue
Applied post-operatively, treating only those patients who require it
Can be redone at intervals to maintain surgical implant, avoiding subsequent surgeries

Institution

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