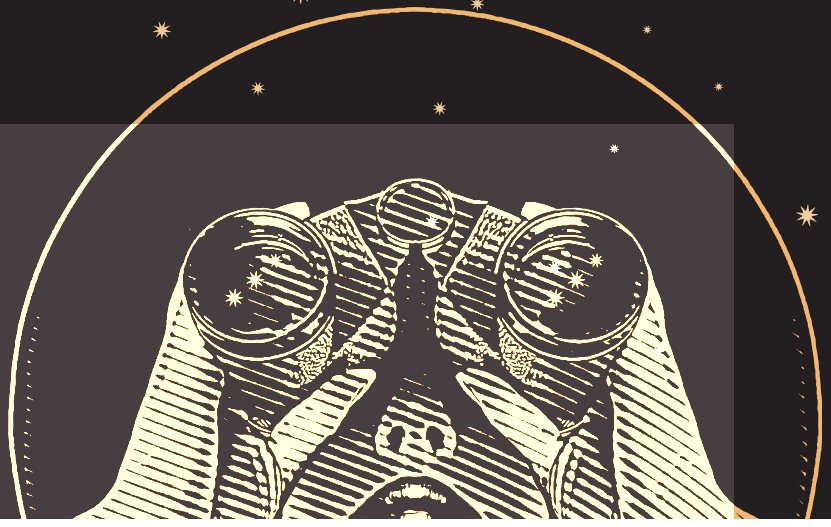
IN THE PIPELINE

New therapeutics and drug delivery systems are in the works.



3T OPHTHALMICS

An episcleral implant in development by 3T Ophthalmics is designed to be inserted under the conjunctiva and provide a sustained release of medication for up to 2 years, according to the company. The implant can carry multiple drugs, and several devices can be implanted if needed. In a study of the 3T device in rabbit eyes,[1] investigators concluded that transscleral drug delivery was a suitable route to provide direct drug delivery to the ciliary body and ocular tissues involved in glaucoma and aqueous humor dynamics.

1. De Carvalho RAP, Gum GG, Fife TM, et al. Pharmacodynamics and pharmacokinetics of anti-glaucoma drugs after selective episcleral drug delivery. *Invest Ophthalmol Vis Sci.* 2009;50(13):5969.

3T Ophthalmics

http://3tophthalmics.com

AERIE PHARMACEUTICALS

Aerie Pharmaceuticals is developing a sustained-release injectable implant that contains a Rho kinase inhibitor to provide reduction of inflammation of the optic nerve for a period of 6 months, according to the company.

https://aeriepharma.com

ACUSTREAM (KEDALION THERAPEUTICS)

The AcuStream device is designed to deliver topical drugs to the eye in a precise and accurate manner that enables an 80% reduction in dose compared with standard drops, according to Kedalion Therapeutics. In a single-day, single-dose phase 1 study conducted in 2018,[1] 18 patients (36 eyes) were randomly assigned to receive either a 30 µL dose of latanoprost using standard eye drops or a 9 µL dose of latanoprost using the AcuStream technology. Investigators found a statistically similar reduction in IOP was achieved with 70% lower dose of drug when using the AcuStream compared with standard latanoprost drops.

1. Kedalion Therapeutics presents data from AcuStream studies at the Ophthalmology Innovation Summit (OIS) [press release]. April 2018. Kedalion Therapeutics. https://kedalionthera.com/2018/04/12/kedalion-therapeutics-presents-data-from-acustream-studies-at-the-ophthalmology-innovation-summit-ois/. Accessed July 1, 2020.

For insights into the **iDose (Glaukos)** and **OTX-TIC (Ocular Therapeutix)** drug delivery devices, see pg 36.

GLAUKOS
Ocular Therapeutix™

DIOPTER CORP.

The Diopter Corp. drug delivery system uses existing contact lens technologies combined with a patented drug-eluting process and approved drugs to treat a variety of diseases. In animal trials, the contact lenses were imbedded with three medications and left on the animals' eyes overnight. The company reported that the drugs' IOP-lowering effects lasted longer than conventional eye drops, suggesting less frequent administration may be possible.

MAN-01 (MANNIN RESEARCH)

Mannin Research is developing a unique set of molecules to treat vasculature-related diseases, such as primary open-angle glaucoma, pediatric glaucoma, cystic kidney disease, and inflammation. Its lead product, MAN-01, is a novel small-molecule eye drop for the treatment of primary open-angle glaucoma, according to the company.

http://mannin.ca

GB-401 (GRAYBUG VISION)

GB-401 is a depot formulation of a proprietary inactive prodrug ester of a beta-adrenergic receptor inhibitor, injected intravitreally as infrequently as every 6 months to reduce IOP in patients with primary open-angle glaucoma. Graybug expects to submit an investigational new drug application for GB-401 in the second quarter of 2020 and to initiate a dose-escalating phase 1/2a trial of GB-401 in patients with primary open-angle glaucoma in the second half of 2020, according to the company.

https://graybug.com

LIPTIDE (NANOGENICS)

LipTide is a peptide-lipid molecule that can carry drugs to the back of the eye to act directly on the optic nerve after being injected under the conjunctiva. In conjunction with the LipTide delivery system, Nanogenics is developing a glaucoma product, ECP-105, to be administered to increase bleb survival and decrease scarring in vivo to improve the success of trabeculectomy.

https://nanogenics.co

PUNCTAL PLUG DRUG DELIVERY SYSTEM (MATI THERAPEUTICS)

The Punctal Plug Drug Delivery System is compatible with different types of molecules and can potentially be used to address a range of ocular diseases and conditions, according to Mati Therapeutics. The device is designed to be placed in the punctum in a simple office procedure performed by an ophthalmologist or optometrist. The technology will comprise a proprietary punctal plug designed to be retained for the desired treatment duration and a proprietary drug delivery core that can be tailored to deliver a range of therapeutic agents over different time periods. Two formulations have entered clinical trials: latanoprost for glaucoma and olopatadine for allergy relief.

http://www.matitherapeutics.com

LATANOPROST FA SR OCULAR IMPLANT (POLYACTIVA)

PolyActiva's drug-polymer conjugate technology enables site-specific drug delivery from medical device components such as implants, films, or fibers. The company's glaucoma implant, Latanoprost FA SR Ocular Implant, is designed to provide a constant daily therapeutic dose of latanoprost for at least 30 weeks. The implant is administered in office at the slit lamp using a custom administration device. In 2019, the company reported that a phase 1 study had demonstrated that the latanoprost implant was safe and well tolerated and provided treatment for 6 months before biodegrading.[1]

1. PolyActiva completes recruitment in key phase 1 glaucoma implant safety study. Six-month treatment period demonstrated [news release]. PolyActiva. July 23, 2019. https://polyactiva.com/wp-content/uploads/2019/07/PolyActiva-Phase-I-completion-release-FINAL.pdf. Accessed July 1, 2020.

https://polyactiva.com

WATCH IT NOW | NEW HORIZONS IN DRUG DELIVERY

Arsham Sheybani, MD, and Jacob Brubaker, MD, join Dose & Delivery host I. Paul Singh, MD, to discuss new options in glaucoma drug delivery.

DOSE & DELIVERY

eyetu.be/htyex

QLS-101 (QLARIS BIO)

QLS-101 is a potassium channel modulator that lowers IOP by causing vasodilation of vessels distal to the trabecular meshwork, thereby reducing distal outflow resistance and lowering episcleral venous pressure. As a vasodilatory agent, QLS-101 is able to improve flow through vessels distal to the trabecular meshwork and significantly lower episcleral venous pressure and improve overall distal outflow, according to Qlaris Bio. QLS-101 has shown efficacy in lowering IOP across multiple preclinical animal species, including mice, rabbits, dogs, and nonhuman primates, as well as in human eye explants, and it has been demonstrated to be well-tolerated with no observed hyperemia, the company said. QLS-101 is currently in preclinical studies in preparation for an investigational new drug application and anticipated entry into human clinical trials.

QLARIS BIO

https://qlaris.bio