

**Docket #:** S22-355

# **Lens Capsule Drug Delivery Device**

A Stanford researcher has designed an artificial lens capsule as a drug delivery device inserted at the time of cataract surgery, to address issues of extended drug delivery to the eye with minimal complications.

Extended drug delivery to the eye addresses clinical burden as well as non-compliance with eye drop regimens, low ocular absorption with drops, and the risks and burdens of intravitreal injections on patients. There are currently extended release steroid implants for the posterior segment of the eye. Recently, there was a novel drug delivery device for extended anti-VEGF medication, which involved a refillable intraocular reservoir with a diffusion filter to allow for extended release. However, due to the nature of the surgery during implantation, there are side effects including a 2% endophthalmitis rate, 5.2% vitreous hemorrhage, 3.6% conjunctival erosion, and 5.9% conjunctival bleb. This limits clinical adoptability. The lens capsule is a safe space in the eye and has an extensive safety profile for implanted intraocular lenses. Stanford researchers propose using a drug delivery scaffold for implantation in the lens capsule at the time of cataract surgery, which is known as a safe surgery with very low surgical complications. This drug delivery scaffold is used to hold the new intraocular lens at the time of cataract surgery. In addition, it contains a valved drug delivery reservoir with a diffusion filter to allow extended drug delivery. The lens capsule is between the anterior and posterior segments of the eye and will allow for extended drug delivery to the anterior chamber for anterior medications such as glaucoma medication, antibiotics, and steroids. It will also allow extended drug delivery to the posterior chamber with medications targeting the retina, such as anti-VEGF medications, complement inhibitors, tyrosine kinase inhibitors, and chemotherapy medications. The researchers believe that this drug delivery scaffold can use known technology such as extended drug delivery through a refillable reservoir to provide extended drug delivery to either the anterior or posterior chamber of the eye with low surgical complications. The drug delivery scaffold holds the intraocular lens that is implanted during cataract surgery and allows for safe intraocular lens exchange. This may benefit patients desiring an

upgrade of their premium intraocular lens, or for patients with shifting refractions, such as the pediatric population.

### **Stage of Development**

Prototype and designs conceived

## **Applications**

- anti-VEGF and/or anti-angiopoietin 2 pharmaceuticals
- Glaucoma medications
- extended delivery of intraocular antibiotics at the time of surgery to lower endophthalmitis risk
- Complement inhibitors
- anti-inflammatory medications
- ocular inflammation / uveitis

## **Advantages**

- Re-fillable drug delivery reservoir
- Delivery to anterior and / or posterior chamber
- Universal design allows customization for specific molecules
- Allows intraocular lens exchange for new lenses
- Implantation at same time as cataract surgery
- Reduced surgery complications

## **Innovators**

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