Smart Contact Lens for Therapeutic Applications

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Technology description

Background

Soft contact lenses could offer an ideal platform for a broad range of devices ranging from medical devices offering ocular pain relief or drug delivery to augmented reality. Unfortunately, until recently, any combination of soft contact lenses with sensors, actuators, or any other semiconductor technology was not possible because current semiconductor processing requires a rigid, planar surface, which is not compatible with the soft, curved shape of a contact lens.

Technology Summary

Researchers at Purdue University have developed a method for attaching sensors and other small devices to the soft, curved, silicone-based structure of a soft contact lens. This cutting-edge technology utilizes semiconducting nanomaterials, as well as metallic and insulating traces, to serve as a thermal actuator, a wireless power supply, and an array of sensors. Purdue researchers have used this new therapeutic contact lens system to unclog meibomian glands, the primary cause of dry eye syndrome, via the controlled application of heat to the clogged ducts. With the ability to combine soft, silicon-based contact lenses with a variety of different semiconductor devices, numerous advanced eye care applications are now possible.

Application area

Treatment of dry eye syndrome
Augmented reality
Flexible ocular medication platform

Advantages

Noninvasive
Appears to be a standard contact to an observer

Improved eye care

Institution

Purdue University

Inventors

Chi Hwan Lee