

News & Comments

Scientists Created a Self-Plugging Microneedle for Drug Delivery

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Scientists have developed a microneedle that enables drugs to be delivered to the retina while preventing infection at the injection site.

Ultrathin needles are coated with a drug and topped with hydrogel plugs. The device releases the drug when inserted and sticks around in the eye for a while before biodegrading. Once injected the plug swells to cover and seal off the hole caused by the needle. According to Advanced Healthcare Materials, it has so far performed well in preclinical tests.

Though it might sound gut-wrenching certain diseases need a careful injection of drugs into the eyes. It does not just look horrific but if there are chances of error, then things can get seriously wrong. For instance, endophthalmitis - is a bacterial infection caused by bacteria entering the hole where the needle entered. And the risk of infection and injury to eye tissue increases with every injection given. Infections, as well as tumours, can creep inside through the newly formed hole and spread.

According to Dr Ali Khademhosseini, a co-author of the study, "This novel method of drug delivery can reduce the risk of needlestick injuries in treating serious eye diseases."

An intravitreal injection places the drug into the vitreous (the jelly-like fluid that fills the eyeball) and is called an intravitreal injection. Rather than using multiple injections that can cause infection, the team developed an ultrathin microneedle that actually stays in the eye and eventually degrades.

Microneedles are equipped with hydrogel plugs that seal the holes made and release medicine slowly into the eye area. The needle length can even be adjusted by doctors to better target drugs to the retina.

Despite the promising results, self-plugging microneedles are still a long way off from being used in clinical practice. To begin with, more animal studies must be conducted, followed by human clinical trials.

KEYWORDS

Drug delivery, eye diseases, microneedle, medicine, injections, hydrogel, needles

