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Spider Web-inspired Design for Three-dimensional Electronic Devices

A new class of soft contact lenses with integrated electronics enables real-time monitoring and advanced clinical solutions, including on-demand drug delivery, night vision, and augmented reality.

Contact lenses serve as a platform for eye-wearable healthcare solutions with broad envisioned applications such as the relief of ocular pain, promotion of corneal healing, maintenance of corneal epithelial hydration, and on-demand delivery of drugs. Unfortunately, currently available contact lenses serve only either to correct vision problems, or to passively release ocular drug molecules because it is impossible to fabricate any electronics on existing soft contact lenses by exploiting currently available technologies.

Researchers at Purdue University have developed strategies to create a new class of eye-wearable digital healthcare devices. Through the use of access to the body's internal chemistry and the eye's outermost layer, the device will extend the functionality of existing contact lenses to enable real-time monitoring and clinical solutions such as on-demand delivery of ocular drugs, eye-wearable night vision, and augmented reality.

Advantages:

-Extraordinary mechanical adaptability

-Resists wearer's natural behaviors such as blinking, rubbing, pressing, and scratching.

Potential Applications:

-Ocular drugs

-Night vision

-Augmented reality

TRL: 4

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Pharmaceuticals/Computational Drug Delivery & Nanomedicine

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