

# Smart contact lens that can diagnose diabetes and treat diabetic retinopathy

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Delhi: A research team led by Sei Kwang Hahn has invented a smart photonic contact lens and a wearable medical device that can diagnose diabetes and treat diabetic retinopathy. The research is published in the journal *Nature Reviews Materials*. This newly developed device will not only let diabetic patients monitor their blood-sugar level in real-time but also enable medical treatment for retinopathy which is caused by diabetic complications.

Diabetic patients need to measure their blood-sugar level by drawing blood before and after a meal and it is easy to develop complications due to diabetes. This new technology allows the diagnosis of diabetes and treatment of diabetic retinopathy just by wearing 'Smart Light-emitting diode (LED) Contact Lens.

The smart contact lens has an integrated micro-LED and photodetector that can measure glucose concentration in the conjunctival blood vessels by analyzing the NIR light.

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Furthermore, they put their new smart LED contact lenses on rabbit eyes with diabetic retinopathy disease and irradiated light repeatedly for a month. As a result, they confirmed that there was a significant reduction of angiogenesis (production of new

blood vessels) in the retina and verified clinical feasibility of the smart LED contact lens for diabetic retinopathy therapy.

Meanwhile, Professor Hahn and his research team have gained great attention from academics by developing a smart contact lens that can diagnose diabetes by analyzing the glucose concentration in tears and deliver drugs to treat diabetic retinopathy for the first time in the world. Preliminary clinical tests for the developers are expected to be done in the first half of this year.

Based on these results, recently, they also developed a smart wearable medical device that can do highly sensitive analysis on the glucose concentration in sweat and they verified that it could be clinically feasible for diabetic diagnosis. Also, with PHI Biomed company, they developed a blue-tooth system that can send data wirelessly allowing patients to check their diabetic diagnosis results on their mobile phones.

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Professor Hahn who led the research mentioned about his plan in his interview, "We developed a smart LED contact lens that can diagnose diabetes and treat diabetic retinopathy with light for the first time in the world. We are planning to commercialize these smart contact lenses and smart wearable medical devices in collaboration with Stanford Medicine."

**The study, "Multifunctional materials for implantable and wearable photonic healthcare devices," is published in the journal *Nature Reviews Materials*.**

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