

A “Smart” Contact Lens May One Day Diagnosis Diabetes; Treat Retinopathy

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A research team from a private research university in Pohang, South Korea, has developed technology that allows diagnosis of diabetes and treatment of diabetic retinopathy (<https://dlife.com/diabetic-retinopathy-causes-symptoms-diagnosis-and-treatment/>) just by wearing a “smart contact lens.”

The researchers believe the technology, will vitalize the wearable diagnostic and therapeutic devices marker for diabetes worldwide.

Professor Sei Kwang Hahn and his research team, including his Ph.D. student, **Geon-Hui Lee**, invented the “Smart Light-emitting diode (LED) Contact Lens, and a wearable medical device that can diagnose diabetes and treat diabetic retinopathy.

Their new research results on photonic diagnosis and photonic therapy of diabetes are published online in the journal, *Nature Reviews Materials*, in collaboration with the research group led by **Zhenan Bao** from the Department of Chemical Engineering at Stanford

University and **David Myung** from Stanford Medicine Ophthalmology.

What Did They Invent?

The research team successfully developed a smart contact lens with integrated micro-LED and photodetector which can measure glucose concentration in the conjunctival blood vessels by analyzing the NIR light.

With this development, they succeeded in being able to diagnosis diabetes.

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.

This newly developed device will not only let patients with diabetes monitor their blood-sugar level in real-time but also enable medical treatment for retinopathy which is caused by diabetic complications.

Hahn and his research team have also gained great attention from the academic world 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.

Preliminary clinical tests for the developers are expected to be done in the first half of this year.

On the basis of these results, recently, they have 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.

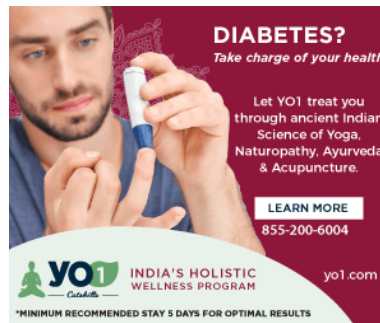
Also, with PHI Biomed company, they developed a blue-tooth system that can send data wirelessly allowing patients to check their diabetic diagnosis results on their mobile phones.

Hahn, said he and his team are planning on commercializing these smart contact lenses and smart wearable medical devices in collaboration with Stanford Medicine in the future.

Pohang University of Science & Technology.

1. Pohang University of Science & Technology. (Jan 10, 2019). No need to draw blood — smart photonic contact lens

for diabetic diagnosis and retinopathy treatment. EurekaAlert! Retrieved from <https://www.eurekaalert.com/puos-nnt011020.php>



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