Gwangju Institute of Science and Technology
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Professor Euiheon Chung's research team develops optical measurement of glucose in tears with nanoparticle embedded contact lens

☐ GIST (Gwangju Institute of Science and Technology, President Kiseon Kim) Department of Biomedical Science and Engineering Professor Euiheon Chung's research team developed the first device to non-invasively * measure glucose concentration in tears simply through reflected light analysis of contact lens containing nanoparticles that is dependent on glucose concentration.

* non-invasive: medical procedure that causes no break in the skin

◦ Existing blood glucose meters, which require blood collection, can make it difficult to manage diabetes due to insufficient blood glucose measurement because their use can be rejected by patients because of the pain, so professor Euiheon Chung's research team sought to measure glucose in tears using correlation with blood sugar.

☐ The research team developed a spectrophotometric system that can measure the concentration of tear glucose by analyzing the reflective spectrum of contact lenses containing nanoparticles whose reflectance in visible light varies depending on the concentration of glucose.

◦ The research team introduced a technique for predicting the concentration of glucose in tears using contact lenses containing chromophore and glucose oxidase. The color change of the contact lens reacting with the solution was analyzed by

measuring the reflective spectrum, and the wavelength area where the correlation between the reflective spectrum and glucose concentration was prominent through the pre-treatment of the spectra were found and a glucose concentration prediction model was produced.

◦ Furthermore, validity of the measuring device was verified using a diabetic mouse model, and the correlation between blood and glucose concentrations in tears was verified in the mouse model by comparing the normal model with the diabetes model.

□ Professor Euiheon Chung said, "This achievement is significant in that it has shown that the glucose concentration in tears can be measured in a new optical way to predict the glucose concentration in the blood. It is expected that it will be a non-invasive glucose measurement method that can replace the existing invasive measurement method if it is further optimized."

□ This research was led by GIST Professor Euiheon Chung (corresponding author) and conducted by Department of Biomedical Science and Engineering master's student Sooyeon Kim and Hanyang University Department of Bioengineering Professor Dong Yun Lee with support from the GIST Research Institute and the National Research Foundation of Korea and was published on May 19, 2020, in Scientific Reports, a sister paper of Nature.

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