Novel system invented for preventing cardiovascular diseases, non-invasively

November 29 2021, by Zhao Weiwei

Credit: Hefei Institutes of Physical Science, Chinese Academy of Sciences

Cardiovascular diseases (CVDs) are the leading cause of death globally. Monitoring of lipid in patients with coronary heart disease (CHD) is important for decreasing the incidence of cardiovascular events. The traditional indicator, Low-density lipoprotein cholesterol (LDL-C), is prone to false positives in specific conditions, while invasive routine blood lipid detection fluctuates with the influence of diet, exercise,

weight.

Therefore, a method that can be used for long-term lipid management is urgently needed.

A novel detection system, featuring on rapid and non-invasive detection of skin cholesterol, was successfully developed by a collaborated team from Hefei Institutes of Physical Science, Chinese Academy of Sciences and University of Science and Technology of China, which can be used for long-term lipid management of CVDs.

"Just put your hand on, and the system will tell you the cholesterol data," said Prof. WANG Yikun, who led the team, "As Cholesterol is one of several types of fats (lipids) that play an important role in your body, we can track your fats in this simple way."

Skin cholesterol fluctuates less in a short period of time. Their invention, now in clinical application, can assess cholesterol content in skin which has a close relationship with atherosclerotic CVDs.

The detection system contains detection reagent and detection device. This reagent, which relates to a fluorescent group, can specifically bind to skin cholesterol. The amount of binding reagent on skin surface is positively correlated with the content of cholesterol. After combining with skin cholesterol, the test site is irradiated with excitation light with a specific wavelength, and the fluorescence spectrum can be inverted to the information of skin cholesterol content. In this way, the skin cholesterol is easily obtained.

This non-invasive system may potentially be used for long-term monitoring of blood lipid levels in CVDs, providing innovative detection methods for drug evaluation and blood lipid management in patients with cardiovascular diseases.

The research result has been published in *BioMedical Engineering OnLine* and *Lipids in Health and Disease*.

More information: Jiacheng Lai et al, Non-invasive skin cholesterol testing: a potential proxy for LDL-C and apoB serum measurements, *Lipids in Health and Disease* (2021). DOI: 10.1186/s12944-021-01571-0