A High Throughput Biochemical Fluorometric Method For Measuring HDL Redox Activity

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SUMMARY

UCLA researchers in the Department of Medicine have developed a method of screening for the functional properties of high-density lipoprotein (HDL) in the blood that may serve as a more accurate risk indicator of cardiovascular disease.

BACKGROUND

Cardiovascular disease remains the number one cause of death for both men and women in the United States. According to a 2011 study by the Center for Disease Control, approximately 600,000 people die of heart disease in the United States every year, which is 1 in every 4 deaths[i]. HDLs and cardiovascular disease show an inverse correlation. However, growing evidence suggests that higher HDL levels are not always beneficial since HDL can become dysfunctional. Current methods of HDL testing only indicate the overall levels in the blood and say nothing about their size, density, composition, and functionality. All of these properties are associated with atherosclerosis, and the ability to measure them could become a great tool for diagnosing cardiovascular risk.

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INNOVATION

Dr. Theodore Kelesidis, Dr Srinu Reddy and Dr. Otto Yang have invented a method of measuring the functionality of HDLs by measuring their redox activity using the Amplex Red fluorochrome. This reproducible assay has a 96 well format, making it inexpensive, rapid, and suitable for high throughput screening applications. This invention can be used both in cardiovascular disease research to better understand the relationship between HDL redox activity and atherosclerosis, and in clinical settings as a tool for measuring cardiovascular risk in patients. This technology has the additional potential to be used in AIDS research, as there are also studies that correlate dysfunctional HDL with HIV[ii].

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[ii] Theodoros Kelesidis, Otto O. Yang, Judith S. Currier, Kaveh Navab, Alan M. Fogelman, and Mohamad Navab. HIV-1 infected patients with suppressed plasma viremia on treatment have pro-inflammatory HDL. Lipids in Health and Disease. 2011 10:35

APPLICATIONS

▶ Clinical cardiovascular disease diagnostic tool
▶ Research cardiovascular disease diagnostic tool
▶ HIV research
▶ Research on diseases with systemic inflammation and oxidative stress (e.g. autoimmune diseases)

ADVANTAGES

▶ More accurate indicator of cardiovascular risk
▶ Inexpensive
▶ Rapid
▶ Scalable/high-throughput

STATE OF DEVELOPMENT

▶ The assay has been fully developed and tested, with current work involving testing multiple patient populations and using the assay to study HDL function.

PATENT STATUS

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