Test for HDL cholesterol function could transform the way healthcare providers predict risk for heart disease

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A groundbreaking study published today in AACC's *Journal of Applied Laboratory Medicine* shows that a new test could improve diagnosis and treatment of heart disease by measuring how effectively a patient's high-density lipoprotein cholesterol (HDL-C) cleans up arterial cholesterol.

While scientists have yet to fully elucidate how HDL-C—the good cholesterol—protects against heart disease, one of its chief functions is thought to be mediating the removal of cholesterol from blood vessel walls. Recent studies have indicated that the ability of a patient's HDL-C to do this—known as its cholesterol efflux capacity—is a better gauge of cardiovascular disease development than HDL-C levels on their own. This means, for example, that a patient with low levels of HDL-C but optimal cholesterol efflux capacity could be protected against heart disease to a greater degree than a patient with high levels of HDL-C but low cholesterol efflux capacity. However, the standard research procedures for measuring cholesterol efflux capacity involve radioisotope-labeled cholesterol and cultured macrophages, making these methods too complex and time-consuming for use in patient testing.

In this study, a team of Japanese researchers led by Amane Harada, PhD, of Sysmex Corporation and Ryuji Toh, MD, PhD, of Kobe University Graduate School of Medicine have developed a test for HDL-C function that is simple enough for clinical use. With a turnaround time of less than 6 hours, the test determines cholesterol uptake capacity—the ability

of HDL-C to accept additional cholesterol—which the researchers found correlates with cholesterol efflux capacity but is easier to measure. The researchers evaluated the test in 156 patients who had undergone revascularization (such as a stent or bypass) due to coronary artery disease and who had subsequently decreased their low-density lipoprotein—or bad—cholesterol to

If further trials validate this test, in the future, it could enable healthcare providers to use cholesterol uptake capacity in conjunction with HDL-C levels to better predict who is at risk for cardiovascular disease onset or recurrence. This test could also be used to develop new treatments that increase cholesterol efflux capacity and to monitor their efficacy in patients.

"A more efficient enhancement of the atheroprotective functions of HDL may decrease the risk of atherosclerosis and [cardiovascular disease], although it has been difficult to develop therapeutic drugs with the expected effects," wrote Harada and Toh in this paper. "We consider that this can be explained in part by the lack of a convenient assay system to evaluate HDL functionality without complicated or time-consuming procedures. In this respect, our cholesterol uptake assay provides a concise, accurate, and robust system for high-throughput analysis at low cost."

More information: Cholesterol Uptake Capacity: A New Measure of HDL Functionality for Coronary Risk Assessment. *Journal of Applied Laboratory Medicine*, Jun-2017 DOI: 10.1373/jalm.2016.022913

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