

# Integrating Lipidomics Data to Identify Novel Lipid Biomarkers for Hyperlipidemia and CVD

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**Abstract**—Hyperlipidemia (HL) is a well known risk factor for CVD and is characterized by increased level of blood lipids. Occurrence of future CVD events are usually detected by elevated level of total cholesterol, triglycerides, LDL-c and decreased level of HDL-c. However, studies have reported that traditional lipid biomarkers sometimes fail to predict individuals at CVD risk. Therefore, there is an urgent need for identification of new lipid biomarkers that along with traditional biomarkers can accurately identify individuals at risk of potential CVD outcomes. For this purpose, lipid profiles under normolipidemic, hyperlipidemic and CVD states were constructed and compared. Since HL may occur due to array of causative factors, a representative lipid profile of HL was prepared by constructing lipid profile each for high fat diet, obesity, Diabetes etc. Each of the lipid profile was analyzed and commonly affected lipids were considered to construct HL lipid profile. CVD lipid profile was constructed by integrating various lipidomics data generated from CVD patients. HL lipid profile displayed that beside traditional lipid biomarkers, specific Glycerolipids, Glycerophospholipids and Sphingolipids were also associated with HL condition. A. Comparative analysis of HL lipid profile with that of CVD revealed a similar trend of lipid alteration in patients with CVD. Thus, lipid moieties belonging to same lipid classes were affected due to hyperlipidemia and CVD. Examining levels of novel lipid biomarkers and incorporating them in regular lipid profile checkup along with traditional lipid biomarkers may improve prediction rate of individuals at CVD risk. However, normal, borderline and high levels of these potential lipid biomarkers are still to be established in different populations.