

TECHNOLOGY BRIEF

Title: Mertk as a Serologic Biomarker for Coronary Artery Disease

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STV Reference: IR 2418

Problem or Unmet Need

Coronary artery disease (CAD) is the leading cause of death worldwide, being the most common cause of sudden death. The severity of CAD in a patient is directly related to the degree of obstruction by atherosclerotic plaques which block the lumen of the coronary arteries. Conventionally, evaluating the severity of these plaques requires invasive diagnostic imaging by coronary angiography; thus, there exists a need for less invasive methods of evaluating CAD. Moreover, serum CAD biomarkers can provide novel methods for CAD screening as well as monitoring progression of the disease.

Details of the Invention

This technology involves the use of a cleaved, soluble form of Mertk, a tyrosine kinase, as a serum biomarker for CAD and its severity. In CAD, vulnerable plaques contain an expanded lipid-laden necrotic core which is prone to rupture (thus causing thrombosis and myocardial infarction); in this lipid core, there are high levels of invading macrophages which have accelerated apoptosis & defective phagocytic clearance (efferocytosis). Defective efferocytosis is crucial for necrotic core formation. Mertk is a tyrosine kinase receptor for the phosphatidylserine-binding protein Gas6, which bridges apoptotic cells to phagocytes, and is highly important for phagocytic clearance of lipids in macrophages that are found in the necrotic cores of atherosclerotic vulnerable plaques. In dangerous plaques, Mertk is cleaved to soluble Mer, which may explain defective efferocytosis. Soluble Mer can be measured in human plasma. Thus, high levels of soluble Mer in the plasma may be positively correlated with the vulnerability and severity of atherosclerotic plaques in CAD and thus can be used as a biomarker for CAD.

Applications:

- Use as a diagnostic serum biomarker
 - Screening patients for CAD
 - Quantitative evaluation of CAD severity
 - Monitoring and progression of CAD over time
- Use as a therapeutic target
 - Therapeutic Drug decreasing Mertk activity to treat/prevent CAD

Advantages:

- Novel CAD biomarker
 - Mechanism-based in terms of vulnerable plaque formation, the key contributor to CAD
 - Quantitative measure of CAD severity
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Patent Status: Patent Pending

Licensing Status: Available for Licensing and Sponsored Research Support

Publications: [Thorp et al. Mertk receptor mutation reduces efferocytosis efficiency and promotes apoptotic cell accumulation and plaque necrosis in atherosclerotic lesions of apoe^{-/-} mice.. Arterioscler Thromb Vasc Biol. 2008 Aug;28\(8\):1421-8.](#)

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