HIGH-THROUGHPUT BLOOD BIOMARKER TEST FOR PERIPHERAL ATHEROSCLEROSIS

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Technology Description

Researchers from Mohamed Zayed's lab at Washington University have developed a blood biomarker test for atherosclerosis more accurate than LDL. Circulating levels of Fatty Acid Synthase (cFAS) in the serum correlate to a high degree to severity of peripheral atherosclerosis.

The team discovered that cFAS originates from the liver and is covalently linked to Apolipoprotein B, the major lipoprotein in LDL. In the serum, cFAS fractionates in the LDL fraction, and patients that have elevated serum cFAS also have high levels of FAS in their arterial plaque. Tissue FAS is responsible for making saturated fatty acids, which lead to atheroprogression and vulnerable arterial plaques.
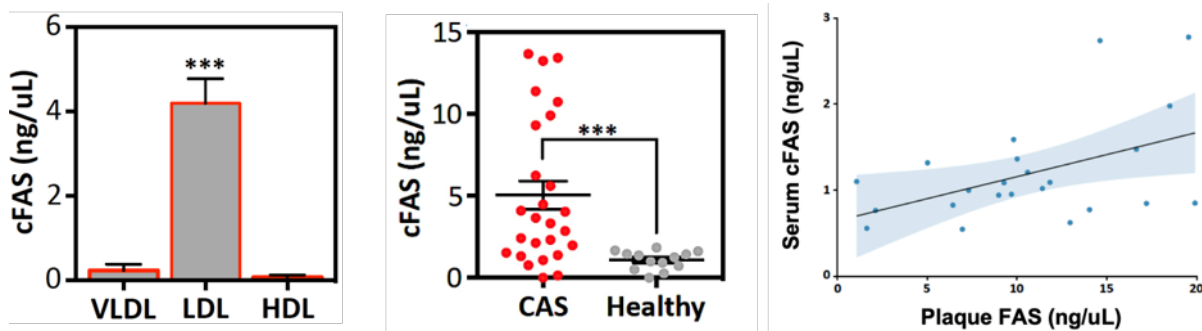
*Patients with high-grade carotid artery stenosis (CAS) showed circulating Fatty Acid Synthase (cFAS) (**A**) is predominately in the serum LDL fractions, (**B**) is elevated relative to healthy patients, and (**C**) correlates to content of FAS in arterial tissue.*

Stage of Research

The researchers have developed this biomarker test into a high-throughput multi-well assay, and have validated in it in over 100 patients. The results have confirmed that cFAS serum content can independently detect peripheral arterial disease with 83% accuracy. Given the catalytic nature of cFAS, ongoing work involves inhibition of cFAS as a way to decrease the risk of peripheral atherosclerosis.

Publications

- De Silva GS, Desai K, Darwech M, Naim U, … Zayed MA. (2019). Circulating serum fatty acid synthase is elevated in patients with diabetes and carotid artery stenosis and is LDL-associated. *Atherosclerosis*, 287:38-45.
- Tay S, De Silva GS, Engel CM, Harroun N, … Zayed MA. (2021). Prevalence of elevated serum fatty acid synthase in chronic limb-threatening ischemia. *Scientific Reports*, 11:19272.

Applications

- Diagnostic indicator of peripheral atherosclerosis
- Stratification of atherosclerosis severity in higher risk patients (e.g. patients with diabetes)

Key Advantages

- Minimally invasive
  - Potential for combination with other diabetic blood tests
- Clinically validated
- Provides opportunity for early therapeutic intervention

Issued Patent: US 11,169,145

Related Web Links: Zayed Profile & Lab