Cleveland Clinic Innovations

PRODUCT
Citrulline as a CVD risk biomarker

INDICATION
Cardiovascular disease, MACE

VALUE PROPOSITION
Increased levels of free citrulline are predictive of elevated cardiovascular disease risk.

DEVELOPMENT STAGE
Approach validated in human study.

INTELLECTUAL PROPERTY
Issued Patent (EP2409157B1) (UK, France, Germany)

RELATED PUBLICATIONS
Tang, W H Wilson et al. "Diminished global arginine bioavailability and increased arginine catabolism as metabolic profile of increased cardiovascular risk." Journal of the American College of Cardiology vol. 53,22 (2009): 2061-7.

CONTACT INFORMATION
Saqib Sachani
Associate Director, Business Development and Licensing
sachans@ccf.org
216.672.1913
IDF# 2021-134

Citrulline as Marker of Cardiovascular Disease Risk

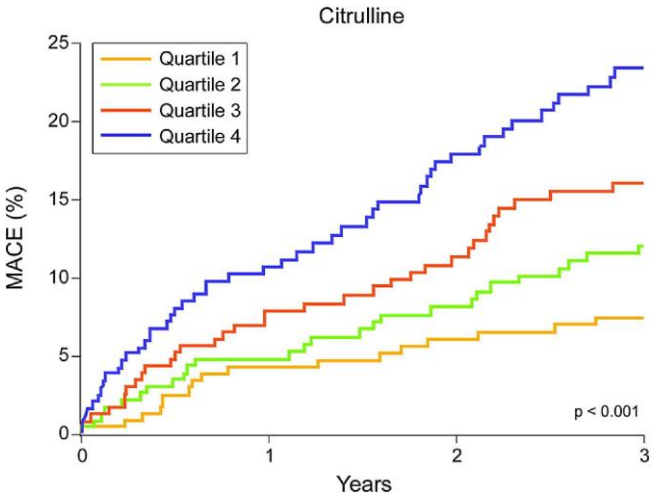
Inventors: Stanley Hazen, MD, PhD, Zeneng Wang, PhD
Cell Biology, Cardiovascular Medicine

UNMET NEED

Cardiovascular disease (CVD) is a major public health problem, accounting for roughly one third of all deaths in the US each year. Methodologies already exist to monitor near-term CVD risk of patients and to direct medical intervention, but the ability of these methods to predict the probability of developing CVD on longer time horizons is limited. Additionally, many CVD complications occur in patients with seemingly low or moderate risk profiles underscoring the limitations of current diagnostic tools. This highlights the need for additional biomarkers or risk assessment markers that can better identify those at risk over the long-term, across both low-risk and high-risk population groups.

SOLUTION

Cleveland Clinic researchers have identified an association between free citrulline levels in blood and risk of experiencing a major adverse cardiac event (MACE). Results can allow physicians to stratify patients for CVD risk to guide treatment decisions and/or to monitor ongoing treatments. Free citrulline levels are measured in blood, serum, plasma, or urine to stratify and monitor patients for longer-term CVD risk. This allows physicians to identify high CVD risk patients early to initiate/modify treatment and decrease risk of MACE. These findings were independent of traditional cardiovascular risk factors, renal function, and markers of inflammation.



Kaplan-Meier Survival Analysis for Patients With 3-Year Incidence of MACE According to Citrulline Quartiles.