



Research Topic

Biomarkers and Sensing for Cardiovascular Diseases

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About this Research Topic

Despite decades of efforts, cardiovascular diseases (CVDs) and related heart failure continue to be the leading cause of morbidity and mortality globally and have a progressively increasing prevalence. It is increasingly recognized that CVDs must be detected early in order for medical intervention to be effective. Achieving the goal of early detection of CVD requires specific prognostic biomarkers for early CVDs detection and sensing technologies capable of sensitively detecting the biomarkers in various biological samples. Therefore, discovering novel biomarkers and developing unique sensor technology platforms and devices for biomarker detections play a central role in early identification and medical intervention of CVDs and potential heart failure.

One of the major challenges to early detection of CVDs and potential heart failures is the limited predictive value of current disease biomarkers used in clinical diagnosis, such as cardiac troponin and B-type natriuretic peptide. Although they are well-established serum biomarkers for the clinical detection of CVDs and heart failure, the biomarkers typically report a heart condition that readily reaches acute decompensation leading to cardiac failure. Thus, there is a significant gap between clinic needs and the prediction value that biomarkers can offer. Filling the gap requires both novel prognostic biomarkers and innovative detection tools, which rely on new knowledge and discoveries from medicine, biology, engineering, material sciences, and interdisciplinary researches and novel sensing platforms developed at various

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and developments of novel sensing platforms and ultra-sensitive assay technologies bring in new perspectives on the biomarkers that are informative with regard to early diagnosis of the various stages of CVDs.

This Research Topic aims to present and discuss the most recent breakthrough in cardiovascular biomarker research and assay technology developments, which may potentially impact biomedical research and clinical diagnosis in the area of CVDs. Potential topics include but are not limited to the following:

Biomarker research and discovery aiming to identify individuals with high risk for CVD, to diagnose subclinical and clinical disease status, to predict progression and recurrence, and to monitor treatment response to various cardiovascular diseases, including acute myocardial infarction, coronary artery disease, artery disease, aortic disease, acute/chronic venous disease, hypertension, etc. The biomarkers include but are not limited to

- Protein biomarkers
- Extracellular vesicle/exosome and microRNAs biomarkers
- Cell free DNA (cfDNA), DNA methylation, and epigenetic biomarkers
- Metabolic biomarkers
- Imaging biomarkers

Sensing technology research aiming at improving specificity and sensitivity for biomarker detection using novel assay platforms with unique and versatile features, such as

- Wearable
- Portable and POC capable
- Nano design
- Systems Biology
- Machine learning

Keywords: Biomarkers, Cardiovascular Diseases (CVD), Sensors, Assay device

Important Note: All contributions to this Research Topic must be within the scope of the section and journal to which they are submitted, as defined in their mission statements. Frontiers reserves the right to guide an out-of-scope manuscript to a more suitable section or journal at any stage of peer review.

26 publications

Submission Deadlines

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05 September 2021 Manuscript

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