

## Editorial

# Circulating biomarkers for cardiovascular diseases: the beats never stop

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Cardiovascular diseases (CVD) remain a major health issue and a grave socio-economic burden, being the No. 1 killer in major industrial countries and the main reason for frequent re-hospitalization<sup>[1]</sup>. In recent years, unmet needs for a distinct cardiovascular risk assessment allowing for standardized guidelines on personalized therapy have led to an intensive research on biomarkers. Even in this post-cTn (cardiac troponin) and post-BNP (B-type natriuretic peptide) era, there are still significant gaps and huge demands for more reliable and innovative methods and tools for diagnosis and evidence-guided management of CVD. Under this context, the basic research and clinical use of biomarkers have gained a tremendous momentum in the past decade. The use of single or multiple biomarkers as reliable and reproducible indicatives of the risk, severity, and progression stage of CVD greatly enhances the diagnostic decision and prognostic ability of emergency department physicians, cardiologists, and cardiovascular surgeons in their routine patient care duties. The prudent utilization of valid biomarkers in clinical practice can reduce time and costs for an accurate diagnosis and proper personalized therapy of CVD patients. As suggested in Figure 1, biomarker testing may play a central role in the evidence-based Cardiovascular Medicine and it can in turn promote the improved clinical outcome, better quality of life, and alleviated socio-economic burden of CVD.

Accordingly, this Special Issue of Acta Pharmacologica Sinica was planned to provide a forum for high quality original research and review articles to showcase the most recent advances in translational research and clinical practices on a wide-spectrum array of conventional as well as novel cardio-

vascular biomarkers. Coverage of this Special Issue encompasses various forms of large or small molecules, such as proteins, peptides, cytokines, microRNAs, and metabolic by-



**Figure 1.** A graphical notion suggesting biomarker testing may play a central role in improvement of cardiovascular risk assessment and reduced time and cost for an accurate diagnosis and personalized medicine that can eventually lead to improved clinical outcome, better quality of life, and alleviated socio-economic burden of cardiovascular diseases.

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products that are released from injured cardiovascular tissues into blood stream during various CVD events.

A total of 18 papers authored by 108 scientists from 15 countries, *i.e.* Australia, Austria, China, Czech Republic, Germany, Greece, Hong Kong (China), Malaysia, Poland, Portugal, Romania, Slovak Republic, Switzerland, United Kingdom, and United States, are accepted and represent a truly global effort for tackling the unsolved issues and new discoveries of CVD biomarkers. These collective efforts have also made the current Special Issue probably the most “international” volume of *Acta Pharmacologica Sinica* in the Journal’s 30+-year history.

This Special Issue covers a variety of pathological types of CVD, including acute myocardial infarction (AMI)<sup>[2-5]</sup>, heart failure<sup>[6]</sup>, aortic aneurysms<sup>[7, 8]</sup>, carotid restenosis<sup>[9]</sup>, pulmonary arterial hypertension (PAH)<sup>[10]</sup>, and cardiac amyloidosis<sup>[11]</sup>. Several review articles provided in-depth analyses on the important diagnostic and prognostic roles of zinc<sup>[12]</sup>, oxylipins<sup>[13]</sup>, and leptin<sup>[14]</sup> in the fundamental cellular signaling and pathogenic processes in CVD and diabetes. Notably, all the 7 original research articles are clinical research on Asian patients with AMI<sup>[5]</sup> or PAH<sup>[10]</sup> as well as European patients with AMI<sup>[2]</sup>, chronic heart failure<sup>[6]</sup>, vascular aneurysm<sup>[7]</sup> or restenosis<sup>[9]</sup>, and stroke<sup>[15]</sup>.

It is noteworthy that 4 review articles<sup>[4, 16-18]</sup> and 2 original research papers<sup>[2, 10]</sup> in this Special Issue are focusing on a cutting-edged topic concerning the potential roles of circulating noncoding RNAs (ncRNAs), which include microRNAs (miRNAs), long noncoding RNAs (lncRNAs) and circular RNAs (circRNAs), in serving as a new generation of biomarkers for CVD. Among these elegant works, Bayoumi *et al.* reviewed the circular noncoding RNAs as potential therapies and circulating biomarkers for CVD<sup>[18]</sup>. The similar topic was also thoroughly analyzed by Zhou *et al.*<sup>[17]</sup> and Stepien *et al.*<sup>[16]</sup>, who provided their own perspectives. Two other papers by Wang *et al.*<sup>[4]</sup> and Song *et al.*<sup>[10]</sup> provided more focused discussions respectively on the use of microRNAs for early detection of CVD such as AMI<sup>[4]</sup> and pulmonary hypertension<sup>[10]</sup>. We wish this panel of 6 articles may help the readers to gain a comprehensive grasp on the upcoming trend of using miRNAs, lncRNAs, and circRNAs as the newest class of CVD biomarkers that will be eventually utilized in the clinical settings considering the above-discussed keen interests and intensive investigations in this research area.

Another highlighted area of discussion in this Special Issue is on the technological and methodological innovations for the CVD biomarker detection. Our invited experts have communicated their original research results using various technologies from advanced chip-based digital PCR<sup>[2]</sup> to 2D-gel analysis<sup>[5]</sup>. They also thoroughly reasoned the needs for multiplex approach to enhance diagnostic accuracy superior to the single biomarker detection<sup>[19]</sup>.

In brief, we believe that these collective efforts will be instrumental for future research and technological development of new CVD biomarkers that can be used for saving lives and improving clinical outcomes in tens of millions CVD patients worldwide. For these meaningful endeavor and noble cause,

we would like to most sincerely thank all of our participating authors and numerous contributing expert reviewers, as well as the Editor-in-Chief (Dr Jian DING), Editorial Manager (Ms. Min-shu WU), Executive Editor (Ms. Qian-rong ZHU), and Handling Editor (Dr Bin-jia ZHANG) and other journal staff for their extraordinary efforts and supports that jointly made this extensive publication endeavor possible.

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