Microfluid Nanofluid (2014) 16:787
DOI 10.1007/s10404-014-1400-4

EDITORIAL

Foreword

Chao-Min Cheng

Published online: 22 April 2014

How to achieve accurate diagnoses—the first step in both appropriate prevention and treatment of specific diseases—has been a longstanding but interesting issue in medicine. With recent technological advances in multiple research fields such as materials science, micro-/nano-technology, cellular and molecular biology, and bioengineering, much attention is shifting toward the development of new diagnostic tools that address needs not only for high sensitivity and specificity but fulfill economic, environmental, and rapid point-of-care needs for groups and individuals with constrained resources and, possibly, limited training. Microfluidic technologies, in particular, are considered very powerful tools for the diagnosis and monitoring of human diseases. Miniaturized fluidics-based platforms that precisely manipulate tiny body fluid volumes can be used for medical or healthcare diagnosis in a rapid and accurate manner. These microfluidic diagnostic technologies are potentially applicable to different healthcare issues, since they are disposable, inexpensive, portable, and easy to use for the detection of human diseases (e.g., cancers or infectious diseases)—especially when they are manufactured based on low-cost materials such as paper. The purpose of this Special Issue in *Microfluidics and Nanofluidics* is to bridge microfluidic technologies (PDMS-based and paper-based microfluidics) and biology with medicine, focusing more on the applications of microfluidics for point-of-care diagnostics.

We initialized discussions with Prof. Roland Zengerle, the Editor-in-Chief of *Microfluidics and Nanofluidics*, about the organization of this Special Issue during the 2013 IEEE MEMS conference in Taipei—the first time we had the opportunity to discuss this Special Issue face-to-face. The topics regarding point-of-care diagnostics in this Special Issue that we have addressed cover three-dimensional paper-based microfluidics for diagnosis (metabolic assays), the manufacturing of paper-based microfluidics, thread-based microfluidics for monitoring urea nitrogen in whole blood, and an antibody-based paper diagnostic platform, in particular, for the diagnosis of ophthalmologically relevant diseases. This Special Issue also includes several great review articles to further summarize current progress regarding other microfluidic platforms such as droplet-based microfluidics, living systems on chips, microfluidics for screening small molecules, and a EWOD microfluidic system. All of these approaches focus on biomedically relevant applications. Here, we would like to express our deep appreciation to all authors and reviewers. Without their full support, this Special Issue, including the review and original articles, would probably not be published on schedule. This Special Issue may not cover all topics in this emerging field—the development of practical tools for point-of-care diagnostics, but we firmly believe that our efforts have the potential to provide impetus to highly impactful innovations and challenging discussions in relevant academic and commercial communities.

C.-M. Cheng (✉)
Institute of Nanoengineering and Microsystems, National Tsing Hua University, Hsinchu, Taiwan
e-mail: chaomin@mx.nthu.edu.tw