THE KOREA REGIONAL ISSUE OF MASS SPECTROMETRY REVIEWS

The first research-oriented mass spectrometer installed in Korea was the VG ZAB-E. It was delivered to the Myung Soo Kim's laboratory at the Seoul National University (SNU) in 1987. For his efforts to get this instrument, Kim obtained unfriendly remarks from some colleagues at SNU, because they thought the funding for the instrument should be evenly distributed to the researchers (private communication with MSK). Since then, his love for mass spectrometry has led his group to emerge as one of the key laboratories and he has played a major role in the growth of mass spectrometry research in Korea. Kim has retired this year after 35 years of tenure at SNU. I like to present the first Korea Regional Issue of Mass Spectrometry Reviews to honor him for his contribution to the mass spectrometry field.

When Carlito Lebrilla and Dominic Desiderio invited me as a Guest Editor for this special issue, I thought it was a good opportunity to introduce the research activities related to mass spectrometry and allied topics in Korea. I contacted many of my colleagues to solicit a review on their research. With honor, here I present ten review articles collected from seven universities and three national research institutes in Korea.

This special issue begins with an article by Myung Soo Kim and his co-workers, "Generation of Gas-Phase Peptide Ions and Their Dissociation in MALDI: Insights from Kinetic and Ion Yield Studies," which focuses on the kinetics and mechanisms of MALDI of peptide ions. Then, Oh and Moon present a review entitled "Radical-Driven Peptide Backbone Dissociation Tandem Mass Spectrometry," showing fragment-rich chemistry that enables the peptide/protein sequencing.

The next four articles deal with post-translational modifications (PTMs) of proteins: software for PTM search, glycosylation, tyrosine nitration, and cysteine modifications. Firstly, Na and Paek provide a review on some outstanding issues and recent developments in PTM search software, in "Software Eyes for Protein Post-Translational Modification." Secondly, Ahn, Kim, and Yoo write an article, "Quantitative Mass Spectrometric Analysis of Glycoproteins Combined with Enrichment Methods," which puts emphasis on the enrichment technologies targeting protein glycosylation. Thirdly, a review authored by Yeo, Kim, Kabir, Kang, and Kim, "Mass Spectrometric Analysis of Protein Tyrosine Nitration in Aging and Neurodegenerative Diseases," describes the recent progress in chemical derivatization of nitropeptides for enrichment and quantitative analysis. Lastly, Kim, Ha, Lee, and Lee contribute an article, "Chemistry and Proteomics of Cysteine Modifications in Redox Biology," presenting biological relevance involving reactive oxygen species, possible chemical reactions of Cys residues, and proteomic strategies for their identification.

The other four reviews show the diversity of research topics, which includes multi-functional isobaric tags for peptide tandem mass spectrometry, clinical applications of steroid profiling, nanobio applications of secondary ion mass spectrometry, and developments of FT-ICR methods for petroleomics. Firstly, a review authored by Yoon, Seo, and Shin deals with "Multi-Functional MBIT for Peptide Tandem Mass Spectrometry," which presents the mass-balanced $^{1}H/^{2}H$-isotope dipeptide tag (MBIT) developed for the multiplexed protein quantification and the measurement of ion temperature from the peptide fragment spectra. Secondly, Choi and Chung present a review, "Bringing GC-MS Profiling of Steroids into Clinical Applications," drawing attention to sample preparation techniques and biological function-based biomarker studies in clinical diagnosis. Thirdly, Kim, Shon, Shin and Lee demonstrates in an article, "Probing Nanoparticles and Nanoparticle-Conjugated Biomolecules Using Time-of-Flight Secondary Ion Mass Spectrometry," that the latest TOF-SIMS analyses enable the surface characterization of nanoparticles and surrounding biomolecules by combining different signal enhancing strategies. Lastly, Cho, Ahmed, Islam, and Kim present an introductory review on "Developments in FT-ICR MS Instrumentation, Ionization, Techniques, and Data Interpretation Methods for Petroleomics" for readers having no prior experience in petroleomics.

Finally, my special thanks go to Carlito Lebrilla and Dominic Desiderio for their supports, to all the authors for their contributions, and to all the readers for their interests in this special issue.

Seung Koo Shin
POSTECH, Chemistry
Pohang, Korea

Published online 26 May 2014 in Wiley Online Library (wileyonlinelibrary.com). DOI 10.1002/mas.21434