Editorial

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Back to the Basics of Liquid Chromatography-Mass Spectrometry

Liquid chromatography-mass spectrometry (LC-MS/MS) is widely used in research and clinical areas, and its application is gradually increasing. The main uses of LC-MS/MS in clinical testing include screening newborns, therapeutic drug monitoring, and identifying drugs of abuse and metabolites and hormones [1]. New testing techniques using LC-MS/MS are continuously being researched and developed [2, 3]. Efforts are also being made for standardizing and harmonizing these techniques in clinical laboratories [4].

In practice, reproducing results of mass spectrometric analyses by referring to one or two method development research articles is challenging, mainly because researchers lack background knowledge, and articles often do not include detailed and necessary background knowledge. In this issue, the review article by Rappold [5], written from the author's experience and other literature, will be of great help to researchers working on LC-MS/MS method development. This review article enlists the necessary elements for LC-MS/MS method development, which will aid researchers develop their own methods.

Commercialization of the LC-MS/MS analytical kits for clinical research is in progress, and sophisticated LC-MS/MS equipment can be accessed by fully automating sample pretreatment [6]. However, even for commercialized kits, most pretreatment and analytical conditions must be verified in each laboratory. Since a newly developed method for a novel target is used in its original form, as developed in the laboratory, it is necessary to have the ability to develop the analytical method independently. Such measures will also help solve in-processing problems that may occur in the development and validation of MS methods.

Currently, LC-MS/MS method development is highly dependent on the researcher's experience and is therefore not standardized. To that end, Rappold has provided a valuable and complete account of all aspects of LC-MS/MS method development, including reagent selection, sample preparation, LC and MS conditions, calibration, quality control, and optimization. This review article by Rappold [5] is replete with helpful and practical information for researchers, technicians, and laboratory physicians working with LC-MS/MS.

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AUTHOR CONTRIBUTIONS

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REFERENCES

1. Chae H, Cho SE, Park HD, Chun S, Lee YW, Yun YM, et al. Use of liquid chromatography-tandem mass spectrometry for clinical testing in Korean laboratories: a questionnaire survey. Ann Lab Med 2019;39:447-53.
2. Shin S, Oh H, Park HR, Joo EY, Lee SY. A Sensitive and specific liquid chromatography-tandem mass spectrometry assay for simultaneous quantification of salivary melatonin and cortisol: development and comparison with immunoassays. Ann Lab Med 2021;41:108-13.
3. Choi R, Park HD, Oh HJ, Lee K, Song J, Lee SY. Dried blood spot multiplexed steroid profiling using liquid chromatography tandem mass spectrometry in Korean neonates. Ann Lab Med 2019;39:263-70.
4. Kim HK, Park HD, Lee SG, Chae H, Song SH, Lee YW, et al. Immunosuppressive drug measurement by liquid chromatography coupled to tandem mass spectrometry: interlaboratory comparison in the Korean clinical laboratories. Ann Lab Med 2021;41:268-76.
5. Rappold BA. Review of the use of liquid chromatography-mass spectrometry in clinical laboratories: Part I – Development. Ann Lab Med 2022;42:121-40.
6. Hörber S, Peter A, Lehmann R, Hoene M. Evaluation of the first immunosuppressive drug assay available on a fully automated LC-MS/MS-based clinical analyzer suggests a new era in laboratory medicine. Clin Chem Lab Med 2021;59:913-20.

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