

Editorial

Updating the Section Bioanalysis/Clinical Analysis to Advanced Separation Science in Biomedical Research and Clinical Applications

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Biomedical research has undergone profound changes in recent years, driven by advances in analytical technologies that enable the investigation of increasingly complex biological systems. Modern studies in molecular biology, biochemistry, pharmacology, and translational medicine rely heavily on a broad range of separation methods, both for the pre-analytical preparation of samples and for their subsequent instrumental analysis [1–3]. These studies contribute significantly to our understanding of the biochemical mechanisms underlying disease and support the identification of therapeutic targets, the development of new medicines for identified targets, and the discovery of clinically relevant biomarkers [4,5].

At the same time, separation science has become an indispensable component of clinical laboratory practice. Advanced chromatographic, electrophoretic, mass spectrometric, and sample preparation technologies are increasingly used to improve disease diagnosis, therapeutic monitoring, and patient stratification, thereby contributing to the development of personalized medicine and evidence-based clinical decision-making [5]. The growing importance of these methodologies has expanded the role of separation science from a purely analytical discipline to a critical driver of innovation in both biomedical research and clinical analysis.

In response to these developments, we have revised the scope and title of the section formerly known as “Bioanalysis/Clinical Analysis”, which will now operate under the title “Advanced Separation Science in Biomedical Research and Clinical Applications.” This change reflects the evolving scientific landscape and provides greater clarity regarding the section’s focus and mission.

The original Bioanalysis/Clinical Analysis section successfully accommodated a broad range of studies related to bioanalytical method development, clinical analysis, pharmacokinetics, bioequivalence, biomarker quantification, and related applications. However, many of these topics are already well represented in established journals dedicated to bioanalysis, pharmaceutical analysis, and clinical chemistry. As the field has matured, it has become increasingly apparent that many of the most significant advances in biomedical and clinical research are enabled by innovations in separation science. Consequently, there is a growing need for a dedicated platform that emphasizes the methodological foundations underlying the isolation, identification, characterization, and quantification of analytes in complex biological matrices.

The revised section is intended to provide such a platform. It will particularly welcome contributions addressing advanced chromatographic and electrophoretic techniques, hyphenated methods such as Chromatography-Mass Spectrometry (CMS) and

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high-resolution mass spectrometry, innovative sample preparation and enrichment strategies, multidimensional separation approaches, and emerging miniaturized, rapid, and point-of-care separation technologies [6]. Equally important are studies demonstrating how these methodological advances contribute to biomedical discovery, clinical diagnostics, therapeutic monitoring, and translational medicine.

Importantly, this update should be viewed as an evolution rather than a departure from the original mission of the section. Bioanalytical and clinical applications remain central to its scope. However, the new title and description place greater emphasis on the separation methodologies that increasingly underpin progress in biomedical research and clinical analysis. By strengthening this focus, the section seeks to establish a clearer scientific identity while fostering interdisciplinary research at the interface of analytical chemistry, biomedical sciences, and clinical practice.

We invite researchers developing and applying innovative separation technologies to address biological and clinical questions across multiple levels of complexity, from molecular and cellular systems to individual patients and broader populations. As biomedical research increasingly advances toward precision medicine, systems biology, and data-driven healthcare, the ability to extract meaningful information from complex biological systems will become ever more important. Separation science lies at the heart of this endeavor, providing the methodological foundation that transforms complex samples into actionable knowledge. Through this renewed scope, the section seeks to showcase methodological innovation, analytical excellence, and biomedical impact, publishing research that not only advances separation science itself but also contributes to a deeper understanding of human biology, the development of more effective therapies, and improved clinical outcomes. Ultimately, our goal is to highlight the scientific advances that will define the next generation of diagnostics, therapeutics, and precision medicine.

Conflicts of Interest: The authors declare no conflict of interest.

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