Special Issue

The Spatial Metabolome Revealed: AI and Deep Learning in Tissue-Level Molecular Mapping

Message from the Guest Editors

The rapid convergence of artificial intelligence (AI), deep learning (DL), and spatial omics technologies is revolutionizing biomedical research. This Special Issue will focus on recent advances in AI- and DL-based methodologies for integrating and interpreting spatial transcriptomics and metabolomics data. These technologies enable unprecedented resolution in mapping gene expression and metabolic activity within tissues. Topics of interest include:

- AI/DL tools for integrated spatial transcriptomic and metabolomic analyses.
- Methods to map cellular heterogeneity, spatial metabolic niches, and metabolite-driven signaling networks.
- Predictive modeling of metabolic pathway dysregulation, gene–metabolite interactions, and disease trajectories.
- AI-driven discovery of spatial biomarkers, metabolic vulnerabilities, and therapeutic targets.
- Translational applications of spatial AI in cancer, metabolic, infectious, and immune-related diseases.
- Advances in model interpretability, biological validation, and clinical translation.

By highlighting these innovations, this Special Issue aims to advance the integration of spatial transcriptomic and metabolomic data into actionable biomedical insights.

Guest Editors

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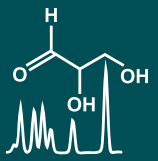

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About the Journal

Message from the Editor-in-Chief

The metabolome is the result of the combined effects of genetic and environmental influences on metabolic processes. Metabolomic studies can provide a global view of metabolism and thereby improve our understanding of the underlying biology. Advances in metabolomic technologies have shown utility for elucidating mechanisms which underlie fundamental biological processes including disease pathology. *Metabolites* is proud to be part of the development of metabolomics and we look forward to working with many of you to publish high quality metabolomic studies.

Editor-in-Chief

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manuscripts are peer-reviewed and a first decision is provided to authors approximately 16.7 days after submission; acceptance to publication is undertaken in 3.6 days (median values for papers published in this journal in the second half of 2025).

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