

Special Issue

Leukemias: Molecular Pathogenesis and Influence of the Microenvironment

Message from the Guest Editors

In recent years, accumulating evidence has highlighted the critical role played by the bone marrow microenvironment (BMME) in the progression of acute myeloid leukemia (AML) and myelodysplastic syndrome (MDS).

Given the integral role of the molecular and microenvironmental dependencies in MDS and AML pathogenesis, therapeutic strategies targeting both intrinsic leukemic alterations and the protective tumor niche are greatly needed. Emerging therapies that target the disruption of the leukemic microenvironment, reactivate immune surveillance, and selectively eradicate LSCs hold promise for more effective and durable treatment approaches. However, to overcome therapy resistance and treatment failure, it is equally critical to develop innovative technologies and preclinical models that accurately recapitulate disease heterogeneity, drug resistance mechanisms, and clonal evolution. Advanced ex vivo culture systems, patient-derived xenografts (PDXs), organoid models, extracellular vesicles, and single-cell omics technologies will be essential for deciphering resistance pathways and identifying novel therapeutic vulnerabilities in MDS and AML.

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