MINI-REVIEW

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# Analytical superiority versus turnaround time: Why karyotyping persists amid the emergence of optical genome mapping in acute leukemia diagnostics

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Acute leukemia diagnostics, karyotyping, optical genome mapping, turnaround time, diagnostic workflow.

**ABSTRACT**

Optical genome mapping (OGM) provides high-resolution, genome-wide detection of structural and copy number variants in hematologic malignancies and has demonstrated increased diagnostic yield compared with conventional cytogenetics. Despite these advantages, karyotyping remains widely used in acute leukemia diagnostics. We examine the practical and analytical factors underlying continued reliance on conventional cytogenetic testing, with particular emphasis on turnaround time. At our institution, OGM has been implemented alongside karyotyping since 2023 and has been applied to more than 800 cases. While OGM improves detection of cryptic and complex genomic rearrangements, conventional karyotyping continues to deliver significantly faster preliminary and final results, which directly impact early clinical decision-making in acute leukemia. We describe our integrated diagnostic workflow and compare operational performance between modalities, highlighting trade-offs between genomic resolution and reporting speed. These findings support a complementary role for OGM while reinforcing the ongoing clinical necessity of rapid karyotyping in frontline acute leukemia diagnostics.