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Easily Screen Your Cell Lines for Genomic Instability and Off-Target Events with Optical Genome Mapping

Whether you are working with producer cell lines, research cell lines, or cell therapy applications, ensuring the genomic integrity and stability of your cell lines is of critical importance. Traditional cytogenetic methods have significant limitations in resolution, turnaround time, and scalability. The Bionano Saphyr® System offers an advanced digital workflow through optical genome mapping (OGM), enabling genome-wide analysis of structural variants (SVs) and copy number variation (CNV). Our standard level of detection of SVs is ≥5% variant allele frequency, with even lower levels possible through high coverage protocols. With these capabilities, OGM can meet your needs for improved performance and more control over your cell line QC operations.

Advantages of Optical Genome Mapping Compared to Traditional Techniques

	Karyotype	Chromosomal Microarray	OGM
Average TAT	2+ weeks	<1 week	<1 week
Resolution	5-10 Mbp	>50-100 kbp	>500 bp
Detects deletions and duplications	✓ (>5-10 Mbp)	✓	✓
Detects translocations and inversions	✓ (>5-10 Mbp)	✗	✓
Detects repeat instability	✗	✗	✓
Scalable digital analysis	✗	✓	✓
Easy to perform in-house	✗	✓	✓

The Bionano Saphyr® System Offers Scalable Analysis Capabilities with a Complete Sample-to-Answer Platform

Sample Extraction and Labeling

OGM Data Generation

Data Analysis and Interpretation

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Redefine Quality Control for Cell Bioprocessing with Optical Genome Mapping

Several sites, including both academic research foundations and commercial biotechnology organizations, have shared their experiences with OGM in cell bioprocessing QC applications. The table below summarizes examples where OGM has met or exceeded expectations across a variety of cell QC applications.

Organization	Application	Methods	Findings
CiRA Foundation (Japan)[1]	Evaluating the effects of CRISPR-Cas9 gene editing	Performed a stringent genomic integrity assessment of CRISPR-Cas9 edited iPSC subclones, using WGS, karyotyping and OGM	OGM uniquely identified unexpected chromosomal translocations and inversions introduced by gene editing
Oklahoma Medical Research Foundation (USA)[2]	Evaluating the effects of prolonged cell culture on induced pluripotent stem cells (iPSCs)	Measured the effects of cell culturing in two iPSC lines in parallel for 50 passages and examined them at multiple time points using OGM	OGM identified substantial changes in the iPSC line genomes, including deletions, insertions, balanced translocations and inversions
Verve Therapeutics (USA)[3]	Evaluating genomic integrity after CRISPER-Cas genome engineering in a primary liver cell line used in drug development	Assessed for chromosomal rearrangements and large insertions or deletions in a liver cell line treated with a single course gene editing drug in development	They showed that no additional SVs accumulated after treatment when compared with untreated controls
bit.bio (UK)[4]	Cytogenetic quality control of iPSCs	Assessed the cytogenetic health of iPSC banks at commercial scale	They adopted OGM in-house as a single workflow solution, replacing an outsourced two-assay process, reducing TAT from 5 weeks to 1 week and improving the quality of SV data

See How OGM Can Support Your Cell QC Needs

The Bionano Saphyr® System is available through either a rental agreement or purchase. Installation, training, software, and support are included.

Ready to learn more? We welcome the opportunity to discuss your needs in detail.

Contact sales@bionano.com to review your project.

"We were immediately impressed by the quality of data produced by Saphyr. It also reduced costs per sample and turnaround time from 5 weeks to under 1 week. We've gained unprecedented clarity as to the genetic health of our cell lines."

Arran Constantine | Scientist MSAT, bit.bio

Commenting on adoption of OGM in-house for quality control of iPSCs

References: 1. *Kitano et al.* Mol Ther Methods Clin Dev. 2022;26:15-25. doi: https://doi.org/10.1016/j.omtm.2022.05.010 2. Dubose *et al. Genes*. 2022; 13(7):1157. doi: https://www.mdpi.com/2073-4425/13/7/1157 3. Verve Therapeutics press release. April 26, 2022. https://ir.vervetx.com/news-releases/news-release-details/verve-therapeutics-presents-comprehensive-analyses-target 4. Bit.bio website. May 5, 2022. https://www.bit.bio/blog/how-our-culture-enables-new-technologies

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