Docket #: S18-239

Methods for Evaluating Health and Stability of Cultured Cells

Cell culture is a central technique used for a plethora of research applications including in the modeling of complex diseases, creating transgenic animals, gene therapy, cell therapy, regenerating lost tissue, and organ biogenesis. Pluripotent stem cells grown in vitro rapidly develop genetic abnormalities commonly including karyotypic abnormalities (gain or loss of an entire chromosome). These abnormalities are undertested because existing techniques are costly or demand expensive machinery and frequently involve several days to complete. To address this issue, Stanford researchers have invented digital PCR-based methods for screening for common abnormalities in cultured cells, including aneuploidy, genetic mutations, and mycoplasma contamination, as well cell line verification.

Stage of Development
Researchers have developed and tested this screen for mouse genomic DNA. They plan to develop the method for human DNA as well.

Applications

- Aneuploidy screen of ongoing cells in culture
- Genetic mutation identification
- Mycoplasma contamination detection
- Cell line verification

Advantages

- Rapid - less than 3 hours
- Inexpensive
- Quantitative

- Only require crudely extracted genomic DNA
- Analyze genomic DNA from chimeric or hybrid samples
- Does not require live cells
- Wide application to many species
- User chooses statistical power

Publications

- Suchy, F. P., Nishimura, et al. (2022). Streamlined and quantitative detection of chimerism using digital PCR. *Scientific Reports, 12*(1), 10223.

Patents

- Published Application: 20260110031

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