A Rapid, Inexpensive, Simple, and Sensitive in vitro Cell Growth Assay

Technology #17696

Applications

This technology is a novel and improved method for monitoring cell growth and colony formation capacity by measuring total DNA and comparative colony size distribution. This method could be used to evaluate cell toxicity in a wide range of agents in an automated high throughput format.

Problem Addressed

Cell survival assays are commonly used to monitor the effects of drugs or other agents on cell viability. These assays include colony forming assays and methods that measure metabolic activity as a surrogate endpoint for cell viability. Colony forming assays measure the ability of a cell to give rise to a daughter cell while metabolic activity methods measure the end process of a cellular activity, such as cellular respiration, etc. Colony forming assays are the most sensitive cell viability assays, but they are labor intensive and time consuming, which can be costly. In addition, relatively large culture dishes and high volumes of media are required, making the assay incompatible with high-throughput screening. Metabolic activity assays, such as XTT, MTT, and CellTiter-Glo (CTG) are commonly used high-throughput assays, but they are not as sensitive and/or robust as colony forming assays. Metabolic activity can be susceptible to culture conditions where cellular activity can be affected without causing cell death. Importantly, results from metabolic activity methods are often validated by colony forming assays. This invention overcomes limitations from other assays by miniaturizing colony forming assays. Growing cells on a chip, staining the DNA, and subsequent imaging reduce the handling time.

Technology

This invention is an assay to evaluate growth inhibition for a wide range of agents on mammalian and potentially other cell types. Live cells are seeded on micron scale wells, grown in optimal culture conditions, and expose to different test conditions. In normal, nontoxic conditions, cells are expected to double every 24 hours, producing colonies. However, cells exposed to agents that inhibit cell division or induce cell death give rise to smaller or non-existent colonies, depending on the level of toxicity. The number of cells in a colony is estimated by measuring total DNA per well, which is stained with a dye. Cell growth is calculated by comparative colony size distribution. An automated system that takes images is able to capture up to 100 colonies at the time. Image analysis is also automated with a custom software, which processes thousands of colonies in seconds.

Advantages

- Automated system can be used for high-throughput screening
- Equally sensitive as colony forming assays
- Less labor intensive, less reagents, less time, and inexpensive

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Categories For This Invention:

Biotechnology
Diagnostics
Other (Diagnostics)
Research Tools
Other (Research Tools)
Screening Assays

Intellectual Property:

Methods for cell proliferation and toxicity testing
US Patent Pending

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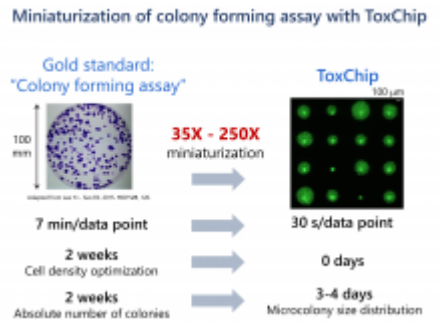
Image Gallery:



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