SIMULTANEOUS DETECTION OF PROTEIN ISOFORMS AND NUCLEIC ACIDS FROM LOW STARTING CELL NUMBERS

Tech ID: 29778 / UC Case 2019-029-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,038,407	07/16/2024	2019-029

BRIEF DESCRIPTION

Embryo-specific nucleic acid modifications, including retrotransposon activity-derived genomic modifications and alternative splicing of mRNA, is crucial for the development of mammalian embryos. However, determining if all genomic modifications and mRNA isoforms translate to protein variations remain intriguing questions due to difficulty in measuring protein isoforms and nucleic acids from small starting cell numbers.

UC Researchers have developed a system for performing dual nucleic acid and protein isoform measurements on low starting cell numbers equivalent to the number of blastomeres composing early embryonic development stages (morula and blastocysts). The system integrates fractionation polyacrylamide gel electrophoresis (fPAGE) with off-chip analysis of nucleic acids in the nuclei. An additional method can be used to remove nuclei for off-chip analysis. The system can measure expression of protein isoforms from the cytoplasmic fraction of 1-100 cells while achieving analysis of either DNA or mRNA retained in the nuclei. The researchers have demonstrated signal from immunoprobed protein correlates strongly with protein expression prior to lysis in TurboGFP-expressing cells and that mRNA levels correlate with protein abundance in TurboGFP-expressing cells.

SUGGESTED USES

» diagnosis and prognosis for cancer and/or any diseases where mutations to DNA or modifications to mRNA may be causing (i) differential expression of proteins, (i) expression of protein isoforms, or (iii) posttranslational modifications in cells

» research, gene editing: validation of edited genes, and detection of on target and off-target effects of gene editing

» simultaneous detection of nucleic acids and proteins in single cells, single embryos, or groups of cells such as spheroids

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Single-Cell Isoelectric Focusing and pH Gradient Arrays
- Automated Microfluidic Device for Analyte Detection

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INVENTORS

» Herr, Amy E.

OTHER INFORMATION

CATEGORIZED AS

» **Medical**
» Diagnostics
» Research Tools
» **Research Tools**
» Expression System
» Nucleic Acids/DNA/RNA

RELATED CASES

2019-029-0

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