Single Cell Raman Spectroscopy for Early Cancer Detection

Tech ID: 11314 / UC Case 2004-500-0

ABSTRACT

Researchers at the University of California, Davis and Lawrence Livermore National Laboratory have developed a non-invasive method of applying single-cell Raman spectroscopy to the early detection of cancer cells.

FULL DESCRIPTION

Early detection of cancer is key to effective treatment and increased survival rates. Current methods of malignant cell identification include chemical stains, labeling and light microscopy. However, each of these techniques is cumbersome or invasive (sometimes both). Another limitation to current diagnostic approaches is that they can be limited to analyzing only bulk samples of cells.

Researchers at the University of California, Davis and Lawrence Livermore National Laboratory have developed a method of Raman spectroscopy that uses laser tweezers to optically trap individual cells in solution. This technique allows for the non-destructive, non-invasive analysis of cells and subcellular components. Raman spectroscopy of a single, non-affixed, cell can yield a defining, bio-molecular, fingerprint of either a cell or a subcellular component - without altering its biology. Furthermore, combined with a specific method of isolating cells, the invention can analyze either different areas of the same cell or different cells within the same cell sub-population simultaneously.

APPLICATIONS

- Cell analysis for screening and identification of cancer cells
- Progressive re-evaluation and prognosis determination for patients undergoing treatment

FEATURES/BENEFITS

- Can analyze either different areas of the same cell or different cells within the same cell sub-population simultaneously
- Analysis of single cell possible
- Quantitative evaluation of disease progression, resulting in more accurate treatment protocols as treatment continues
- High reproducibility
- Minimal damage to cells being studied

RELATED MATERIALS

- Chan JW, Taylor DS, Zwerdling T, Lane SM, Ihara K, and Huser T. 2006. Micro-Raman Spectroscopy Detects Individual Neoplastic and Normal Hematopoietic Cells. Biophys J. 90(2):648-56. Epub 2005 Oct 20.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,365,220	07/30/2019	2004-500

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OTHER INFORMATION

KEYWORDS

Raman, Spectroscopy,

Oncology; Laser tweezers;

Non-invasive

CATEGORIZED AS

- **Imaging**
  - Medical
- **Medical**
  - Diagnostics
  - Disease: Cancer
  - Imaging
  - Screening

RELATED CASES

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