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## Identification Of Cancer Cells Using Atomic Force Microscopy (afm)

Tech ID: 20131 / UC Case 2006-707-0

### BACKGROUND

Currently, tumor cells are detected by histomorphological analysis using stains and antibodies to highlight morphological changes and expression patterns of specific proteins. These histological analyses are typically performed in vitro on fixed tissue samples taken from a patient by invasive procedures (i.e., biopsy). Although the analysis may be simple, it often suffers from low sensitivity or specificity, and does not provide adequate functional measurements concerning tumor cell behavior.

### INNOVATION

Researchers at UCLA have applied atomic force microscopy (AFM) to the detection of tumor cells. AFM is a high-resolution imaging technology that is capable of measuring cell stiffness and cell-surface adhesion of individual living cells. UCLA researchers have used AFM to detect changes in the local nanomechanics inherent to both normal and tumor cells in vitro. Analysis yielded a distinction between tumor and normal cells, and aggressive (invasive, metastatic) and non-aggressive tumors.

### APPLICATIONS

- ▶ This invention can be applied in a routine diagnostic setting for the detection of cancer cells and analyzing their behavior.
- ▶ It can also be used in pharmacological studies to test the effectiveness of drugs on cancer cell metastasis and invasion.

### ADVANTAGES

- ▶ Tumor cells can be detected based upon physical properties rather than qualitative features.
- ▶ The technology can be used to more accurately detect cancer cells.

### STATE OF DEVELOPMENT

The invention has been partially tested. A blind study of a sample believed to contain both normal and tumor cells by histomorphological analysis was determined by AFM to contain tumor cells exclusively, despite morphological differences. Deeper histology tests confirmed the accuracy of the AFM results. In addition to detecting tumor cells in vitro, the technology is being explored for diagnostic and therapeutic use in vivo as well.

### RELATED MATERIALS

- ▶ [Cross, S.E., Jin, Y-S., Rao, J., and Gimzewski, J.K. Nanomechanical analysis of cells from cancer patients. Nature Nanotechnology 2, 780-783 \(2007\)](#)

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,678,105	06/13/2017	2006-707

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### OTHER INFORMATION

#### KEYWORDS

imaging research tools diagnostics,  
 Atomic force microscopy, AFM,  
 cancer, tumor, cells metastasis,  
 nanomechanical analysis,  
 immunohistochemistry, stiffness,  
 screening

#### CATEGORIZED AS

- ▶ **Biotechnology**
  - ▶ Health
- ▶ **Medical**
  - ▶ Diagnostics
  - ▶ Disease: Cancer
  - ▶ Imaging
  - ▶ Research Tools
  - ▶ Screening
- ▶ **Research Tools**
  - ▶ Other
  - ▶ Screening Assays

#### RELATED CASES

2006-707-0

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