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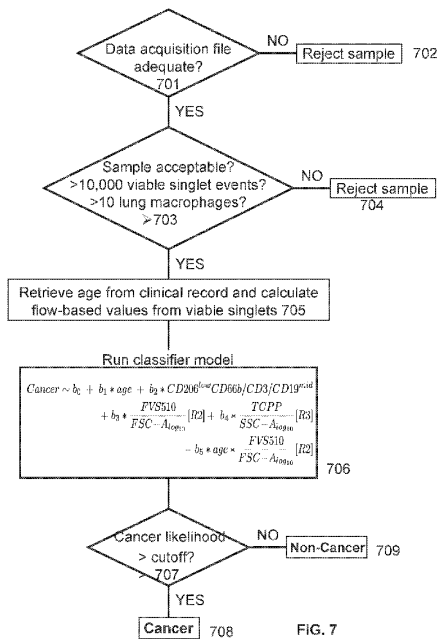
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- (71) **Applicant: BIOAFFINITY TECHNOLOGIES, INC.**
[US/US]; 22211 West Interstate 10, Suite 1206, San Antonio, TX 78257 (US).
- (72) **Inventors: REBEL, Vivienne, I.**; 8922 Apache Trail, San Antonio, TX 78255 (US). **LEMIEUX, Madeleine, E.**; 275 Main Street, Suite 252, Plantagenet, Ontario K0B 1L0 (CA).
- (74) **Agent: VILVEN, Janceen**; 201 Third Street NW, Suite 1340, Albuquerque, NM 87102 (US).

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Declarations under Rule 4.17:
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(54) **Title:** DETECTION OF EARLY-STAGE LUNG CANCER IN SPUTUM USING AUTOMATED FLOW CYTOMETRY AND MACHINE LEARNING



(57) **Abstract:** A system and method for analyzing a sputum sample from a subject suspected of having lung cancer comprising obtaining a plurality of cells from the sputum sample from the subject, marking the plurality of cells with i) a plurality of cell lineage specific marker compositions, ii) a cell viability composition and iii) a tetra (4-carboxyphenyl) porphyrin (TCPP) composition; analyzing the plurality of cells marked with iii) to obtain a subpopulation selected for cell size, selecting a viable singlet population of cells and obtaining flow cytometer values based upon the plurality of cell lineage specific marker compositions, the viability marker and the TCPP marker; applying a trained classifier to meta data from the subject and the flow cytometric values obtained; and generating, based upon the application of the trained classifier, a classification for the sputum sample wherein the classification is selected from a plurality of classification options comprising cancer and non-cancer.

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