

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
22 June 2023 (22.06.2023)



(10) International Publication Number
WO 2023/114538 A3

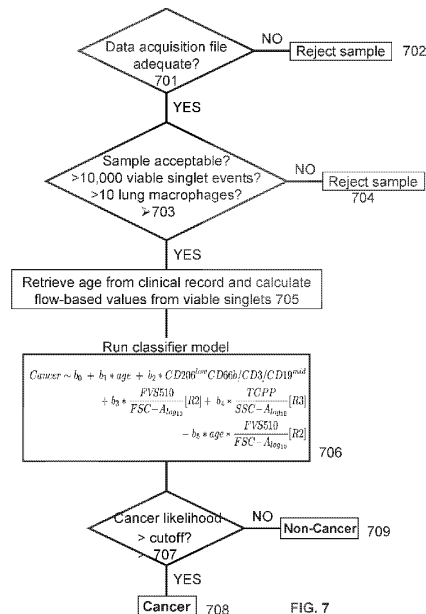
- (51) **International Patent Classification:**
G01N 33/68 (2006.01) *G01N 33/574* (2006.01)
G01N 33/58 (2006.01)
- (21) **International Application Number:**
PCT/US2022/053353
- (22) **International Filing Date:**
19 December 2022 (19.12.2022)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
63/291,247 17 December 2021 (17.12.2021) US
63/357,994 01 July 2022 (01.07.2022) US
63/390,826 20 July 2022 (20.07.2022) US
- (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, Jancen;** 201 Third Street NW, Suite 1340, Albuquerque, NM 87102 (US).

(81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— of inventorship (Rule 4.17(iv))

(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 iiii 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.

WO 2023/114538 A3

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Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:

14 September 2023 (14.09.2023)