

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
29 June 2023 (29.06.2023)



(10) International Publication Number
WO 2023/122349 A3

(51) International Patent Classification:

C12M 3/00 (2006.01) *B81B 5/00* (2006.01)
A61M 39/22 (2006.01) *F16K 99/00* (2006.01)
B01L 3/00 (2006.01) *A01N 1/02* (2006.01)
B81B 7/04 (2006.01)

(21) International Application Number:

PCT/US2022/054004

(22) International Filing Date:

23 December 2022 (23.12.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/293,422 23 December 2021 (23.12.2021) US

(71) Applicant: **DLOC BIOSYSTEMS, INC.** [LB/LB]; Building 30, Street D-4, Baissour Main Road, Baissour, Aley, Mount Lebanon (LB).

(72) Inventors: **MALAEB, Waddah**; c/o DLOC Biosystems, Inc., 651 N. Broad Street, Suite 206, Middletown, Delaware 19709 (US). **GRIMALDI, Giulia**; c/o DLOC Biosystems, Inc., 651 N. Broad Street, Suite 206, Middletown, Delaware 19709 (US). **AMMOURI, Mustafa**; c/o DLOC Biosystems, Inc., 651 N. Broad Street, Suite 206, Middletown, Delaware 19709 (US). **MALAEB, Farid**; c/o DLOC Biosystems, Inc., 651 N. Broad Street, Suite 206, Middletown, Delaware 19709 (US). **EL ARIDI, Bahaa Eddine**; c/o DLOC Biosystems, Inc., 651 N. Broad Street, Suite 206, Middletown, Delaware 19709 (US).

(74) Agent: **DICKE, Matthew, S.**; K&L Gates LLP, c/o Foreign Patents, P.O. Box 1135, Chicago, Illinois 60690-1135 (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, 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).

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:

03 August 2023 (03.08.2023)



WO 2023/122349 A3

(54) Title: HUMAN-ON-CHIP OPERATING SYSTEM

(57) Abstract: A human-on-chip plate. The human-on-chip plate may include, at least one 3D culture biochip, at least one micro-valve, at least one microfluidic channel, at least one inlet or outlet plate port. The outlet ports from one chip may be connected to another chip by routing the valves. Multiple chips may be connected in parallel, in series or in combination and one or more chips in the human-on-chip plate may be bypassed. Each fluid connection may be altered independently and at any time. The at least one valving system connects or separates different compartments of and between the organ-on-chip system. The at least one inlet and one outlet ports to access and block the microchannels. The at least one valving system could allow for sampling, changing the model flow map, and introduce or reduce at least one fluidic chamber.