

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

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 January 2010 (28.01.2010)

(10) International Publication Number
WO 2010/011874 A3

PCT

(51) International Patent Classification:

C12N 1/21 (2006.01) C12P 7/52 (2006.01)
C12N 15/09 (2006.01)

(21) International Application Number:

PCT/US2009/051607

(22) International Filing Date:

23 July 2009 (23.07.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/135,861	23 July 2008 (23.07.2008)	US
61/135,862	23 July 2008 (23.07.2008)	US
61/088,331	12 August 2008 (12.08.2008)	US
61/096,937	15 September 2008 (15.09.2008)	US

(71) Applicants (for all designated States except US): **OPX BIOTECHNOLOGIES, INC** [US/US]; 2425 55th Street, Suite 100, Boulder, CO 80301 (US). **THE REGENTS OF THE UNIVERSITY OF COLORADO** [US/US]; 1800 Grant Street, 8th Floor, Denver, CO 80203 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **WARNECKE-LIPSCOMB, Tanya, E.** [US/US]; 760 32nd St, Boulder, CO 80303 (US). **LYNCH, Mike, D.** [US/US]; 4885 Old Post Circle, Boulder, CO 80301 (US). **GILL, Ryan, T.** [US/US]; 2025 Ash St., Denver, CO 80207 (US).

(74) Agent: **FISCHER, Joseph**; Opx Biotechnologies, Inc., 2425 55th Street, Suite 100, Boulder, CO 80301 (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, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, 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))
- with sequence listing part of description (Rule 5.2(a))

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

5 August 2010

(54) Title: METHODS, SYSTEMS AND COMPOSITIONS FOR INCREASED MICROORGANISM TOLERANCE TO AND PRODUCTION OF 3-HYDROXYPROPIONIC ACID (3-HP)

(57) Abstract: The present invention relates to methods, systems and compositions, including genetically modified microorganisms, adapted to exhibit increased tolerance to 3-hydroxypropionic acid (3-HP), particularly through alterations to interrelated metabolic pathways identified herein as the 3-HP toleragenic pathway complex ("3HPTGC"). In various embodiments these organisms are genetically modified so that an increased 3-HP tolerance is achieved. Also, genetic modifications may be made to provide at least one genetic modification to any of one or more 3-HP biosynthesis pathways in microorganisms comprising one or more genetic modifications of the 3HPTGC.



WO 2010/011874 A3