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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 May 2015 (28.05.2015)

WIPO | PCT

(10) International Publication Number
WO 2015/077443 A2

(51) International Patent Classification:
C12P 7/64 (2006.01) *C12N 9/02* (2006.01)

(21) International Application Number:
PCT/US2014/066595

(22) International Filing Date:
20 November 2014 (20.11.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/906,819 20 November 2013 (20.11.2013) US

(71) Applicant: **SYNTHETIC GENOMICS, INC.** [US/US]; 11149 North Torrey Pines Road, Suite 100, La Jolla, CA 92037 (US).

(72) Inventors: **GRIFFIN, Benjamin M.**; 12562 Maestro Court, San Diego, CA 92130 (US). **KAMBOURAKIS, Spiros**; 4885 Kensington Drive, San Diego, CA 92116 (US).

(74) Agents: **HAILE, Lisa A.** et al.; DLA Piper LLP (US), 4365 Executive Drive, Suite 1100, San Diego, CA 92121-2133 (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, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, 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, SM, ST, SV, SY, TH, 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, 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, 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:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

— *with sequence listing part of description (Rule 5.2(a))*

(54) Title: METHODS FOR PRODUCING DICARBOXYLIC ACIDS

(57) Abstract: The present invention provides methods of producing dicarboxylic acids. The methods involve incubating a fatty acid or hydrocarbon substrate with an enzyme to produce a dicarboxylic acid product. The enzyme acts on the substrate to produce a product that has been both over-oxidized and has undergone cleavage of a C-C bond. In some embodiments the enzymes having these useful characteristics are mutants of a cytochrome P450 enzyme, for example an enzyme of the class CYP102 or a mutant thereof. The invention provides enzymes where these desirable characteristics can be found in a single enzyme, and thus in some embodiments the methods can be performed through the action of a single enzyme.

WO 2015/077443 A2