



(43) International Publication Date
21 May 2015 (21.05.2015)

(10) International Publication Number
WO 2015/073978 A3

- (51) **International Patent Classification:**
C12Q 1/68 (2006.01)
- (21) **International Application Number:**
PCT/US2014/065975
- (22) **International Filing Date:**
17 November 2014 (17.11.2014)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/905,051 15 November 2013 (15.11.2013) US
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- (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).

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:**
16 July 2015

(54) **Title:** METHODS FOR MULTIPLEX DETECTION OF ALLELES ASSOCIATED WITH OPHTHALMIC CONDITIONS

(57) **Abstract:** Systems and methods for detecting at least two genomic alleles associated with corneal dystrophy in a sample from a human subject are disclosed in which cells (e.g., epithelial) of the subject are adhered to a tip of a substrate. The tip of the substrate is agitated in a lysis solution that lyses cells adhered to the substrate. The substrate is removed from the lysis solution upon completion of this agitation. The resulting lysis solution is incubated and then genomic DNA from the lysis solution is isolated to form a gDNA solution. From this, identity of at least two nucleotides present in the human TGF β I gene is determined using at least two oligonucleotide primer pairs and the gDNA solution. These at least two nucleotides are located at respective independent positions of the TGF β I gene corresponding to respective independent single nucleotide polymorphisms (SNPs) associated with corneal dystrophy.



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