

(51) International Patent Classification:
C12Q 1/68 (2006.01) *C12N 15/11* (2006.01)(21) International Application Number:
PCT/US2009/002088(22) International Filing Date:
3 April 2009 (03.04.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/080,720 4 April 2008 (04.04.2008) US(71) Applicant (for all designated States except US): **GENOMICS USA, INC.** [US/US]; 1622 West Colonial Parkway, Suite 1-a, Inverness, IL 60067 (US).(72) Inventor: **HOGAN, Michael, E.**; 2122 East Adams St., Tucson, AZ 85719 (US).(74) Agent: **ADLER, Benjamin, Aaron**; Adler & Associates, 8011 Candle Ln., Houston, TX 77071 (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, 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, 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, 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))

(88) Date of publication of the international search report:
21 January 2010

(54) Title: METHODS AND DEVICES BASED UPON A NOVEL FORM OF NUCLEIC ACID DUPLEX ON A SURFACE

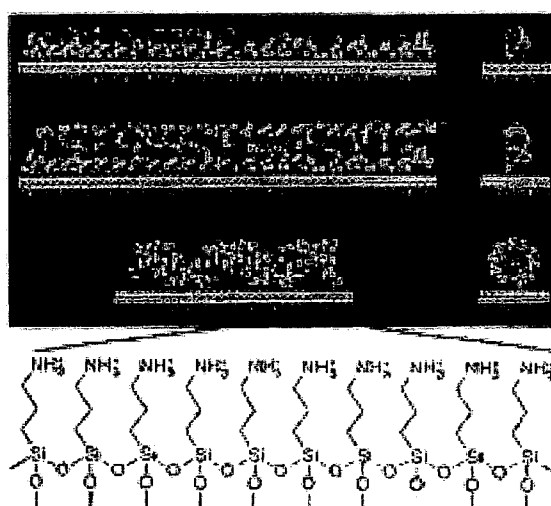


Fig. 3A

Fig. 3B

Fig. 3C

Fig. 3D

(57) **Abstract:** Provided herein are biomolecular hybridization devices comprising a substrate with a permanently and covalently attached surface of functional groups and an adsorbed monolayer of unmodified, single-stranded oligonucleotides all of which are 10 to about 24 bases in length as a saturated film of constrained oligonucleotides on the surface via direct non-covalent phosphate-surface adsorptive contact of substantially all phosphate groups of each oligonucleotide. The constrained oligonucleotides are effective to dissociably hybridize to a complementary single-stranded nucleic acid with asymmetric, non-helical base pairing and without oligonucleotide dissociation from the surface of the device. Also, provided are methods for hybridizing solution-state target nucleic acids to probe nucleic acids and for identifying a nucleotide sequence to which a nucleotide-binding protein binds using the biomolecular hybridization devices.