

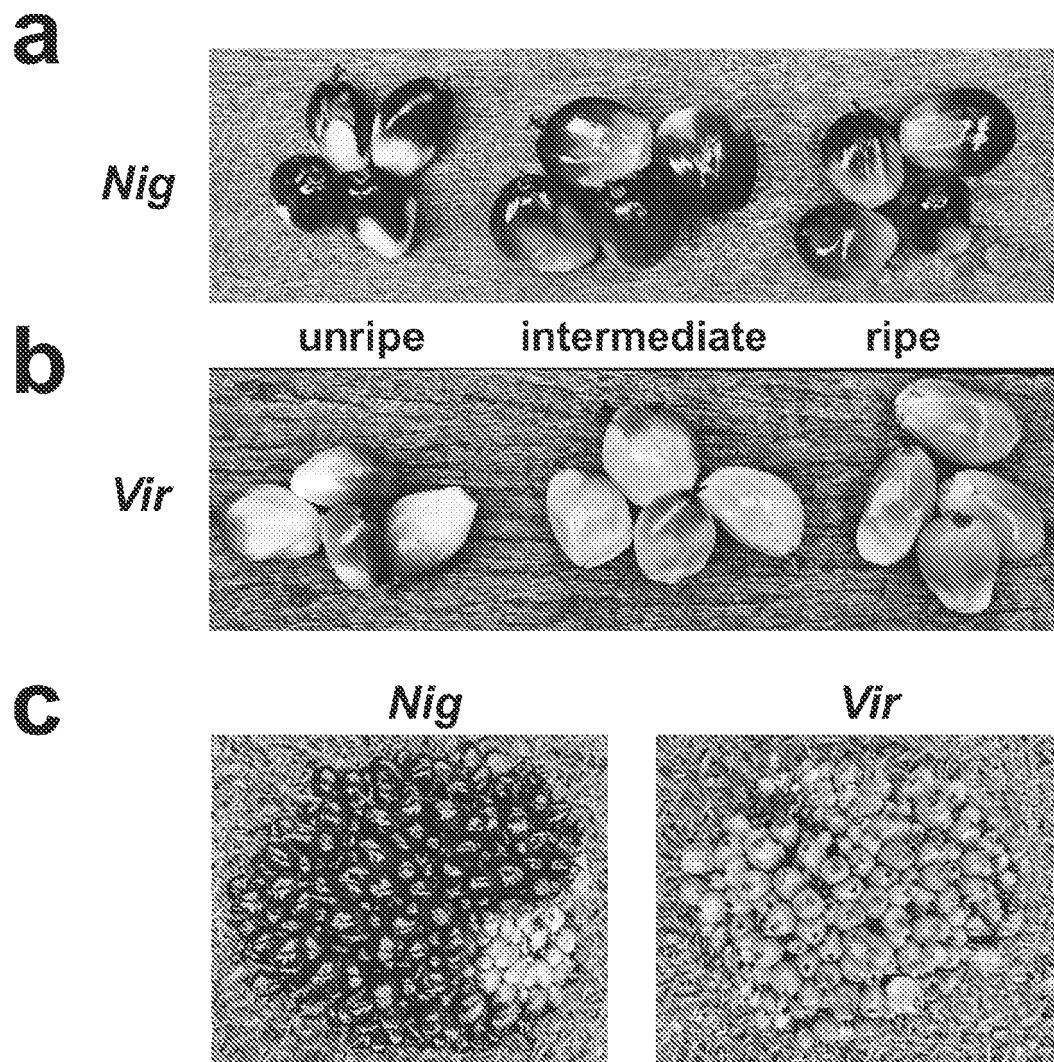


FIG. 1

MET16/*Bam*HI

318	319	320	337	338	339	466	T128 (P)
(N)	(V)	(N)	(V)	(-)	(V)	(N)	(Σ)

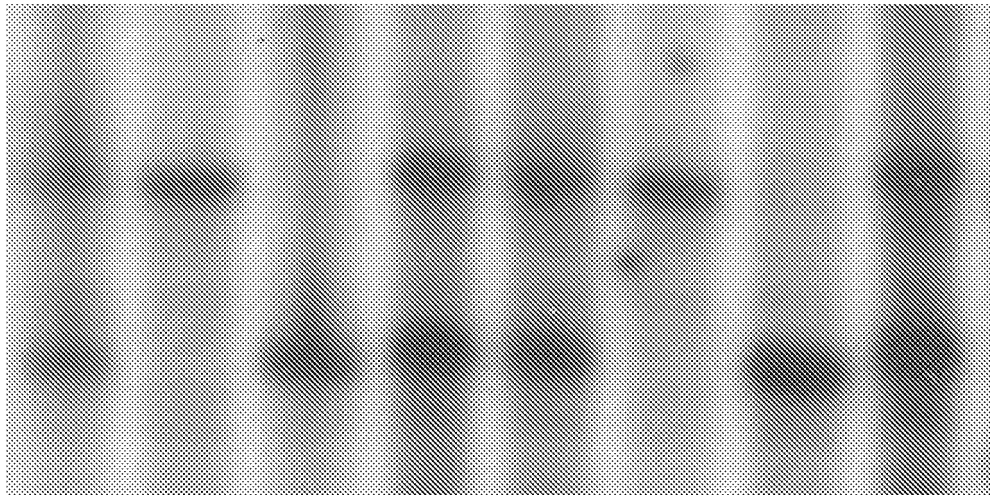
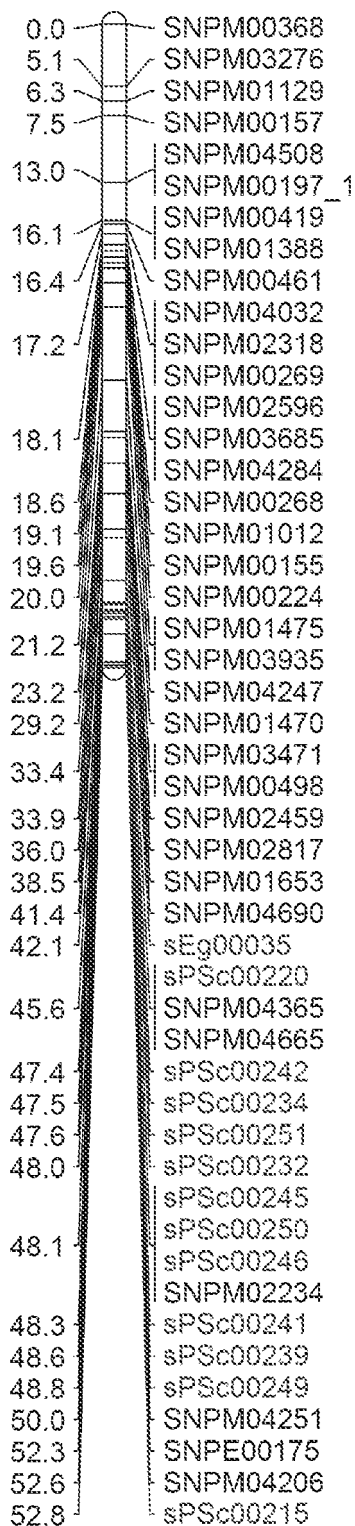
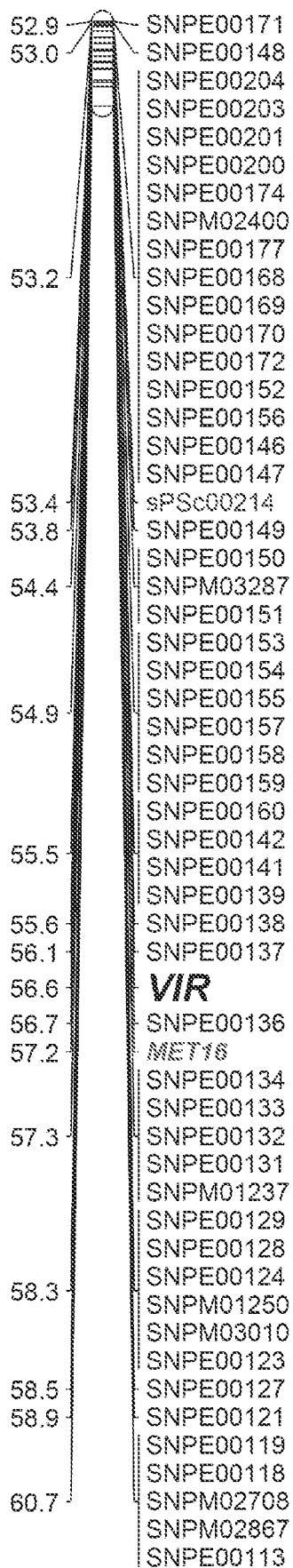


FIG. 2

T128_LG1_Vir[1]



T128_LG1_Vir[2]



T128_LG1_Vir[3]

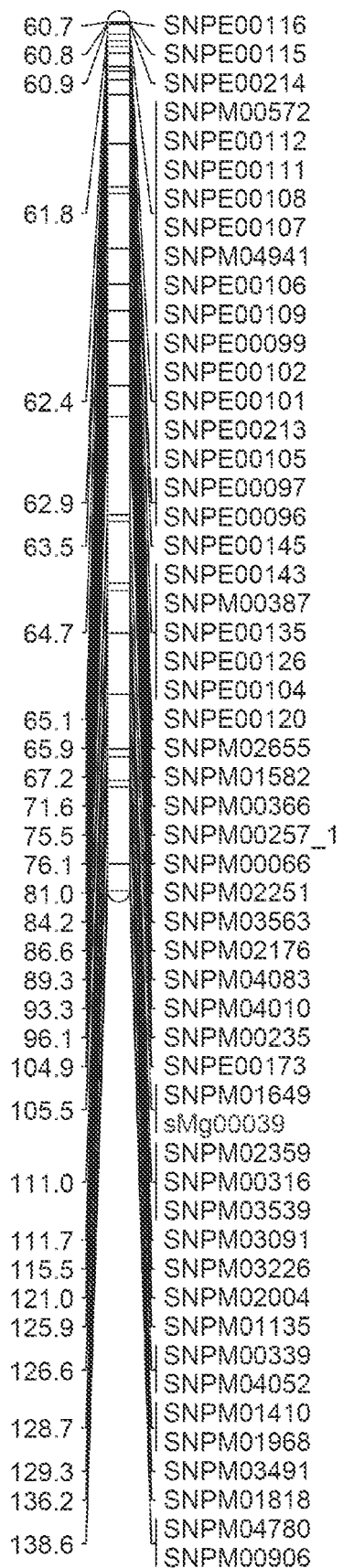


FIG. 3

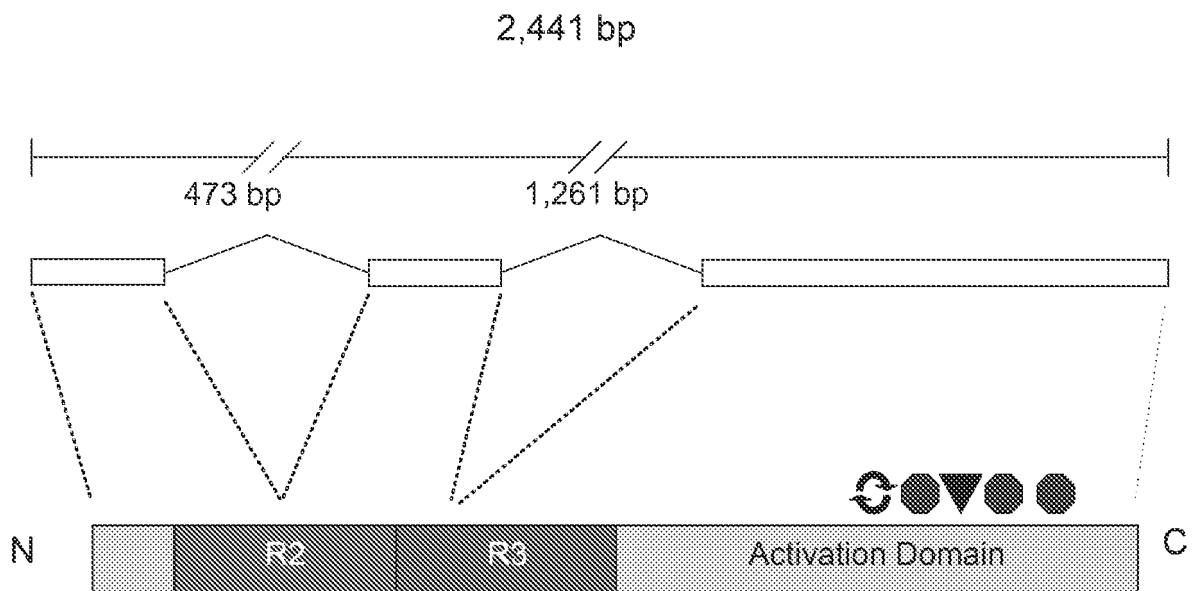


FIG. 4

a. Wild-type *VIR* cDNA sequence

ATGGGTAATTTGCGTGCCGAAGTCCAACGTCCAGCTGGTGTTCGCAAAGGAGCATGGAGTGAAGAGGAGG
 ACAGGCTTCTGAGAAAGTTCGTTGAGAAATATGGCGAAGGGAACTGGCGCCATGTTCCCCAAAGGGCAGG
 CCTCAGAAGGTGCCGAAAGAGCTGCCGACTACGGTGGTTGAACTATCTCAGCCCTAGGATCAACAGGGAG
 AAATTTTCGGAGGAAGAAACAGATCTTATCATCAGGCTTCATAAGCTCTTGGGCAACAGGTGGTCATTAA
 TTGCAGGTAGGCTTCCAGGCAGGACAGCAAATGACATCAAGAAGTACTGGAACACTCACCTGGGCAAGAA
 AGTAGAAGTTGAAAACAAGAAGGCGGAGCCCAGTGCTGATGCCAAAGTAATTAAGCCACGGCCATGGAAA
 GTACCGTTGCAATGGTTATGGTCAGAAGATCAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAGTTTG
 GGATACCAGAAGTACCAGACAATCTCAGAGAACGATGAAGCGTGGCTGAATTGTATAATGAATGGAGATAG
 AGAGAACAGTGCAGTGCCAGACGTTGGAAAACGGGAGCACAATGAACCTGCAGAATGAATTTGGAATCGGA
 GGCTTGGAGGAAAATAGAGATGGGGCAGTGTTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGG
 CCCTATATAGTGCTCATATATGGTAGTGCAATAGTTGCCATTATAAGTTGTTTCGAACTTTAATGCTCC
 TGAAATTCCCATGCAAGTATTTAGAGCTTCATATCCTACAAAAAGACAGGAAACGAGACCTTGAAAAAG
 ACTCAGTACCAGAAGGCATCCACTTATTGATTGCTTTTATACTTGCAACATGAAGGAAGCACGCTTTCTC
 ACCAAAAA

b. Event 1 Exon 3 sequence

GTGGTCATTAAATTGCAGGTAGGCTTCCAGGCAGGACAGCAAATGACATCAAGAAGTACTGGAACACTCACCTGGGCA
 AGAAAGTAGAAGTTGAAAACAAGAAGGCGGAGCCCAGTGCTGATGCCAAAGTAATTAAGCCACGGCCATGGAAAGTA
 CCGTTGCAATGGTTATGGTCAGAAGATCAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAGTTTGGGATACCAGA
 ACTACCGACAATCTCAGAGAACGATGAAGCGTGGCTGAATTGTATAATGAATGGAGATAGAGAGAACAGTGCAGTGC
 CAGACGTTGGAAACGGGAGCACAATGAACCTGCAGAATGAATTTGGAATCGGAGGCTTGGAGGAAAATGAGATGGG
 GCAGTGTTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGGCCACTATATAGTGCTCATATATGGTAGTGCA
 ATAGTTGCCATTATAAGTTGTTTCGAACTTTAATGCTCCTGAAATTTCCCATGCAAGTATTTAGAGCTTCATATCCTA
 CAAAAAGACAGGAAACGAGACCTTGAAAAAGACTCAGTACCAGAAGGCATCCACTTATTGATTGCTTTTATACTTG
 CAACATGAAGGAAGCACGCTTTCTACCAAAAAA

c. Event 2 Exon 3 sequence

GTGGTCATTAAATTGCAGGTAGGCTTCCAGGCAGGACAGCAAATGACATCAAGAAGTACTGGAACACTCACCTGGGCA
 AGAAAGTAGAAGTTGAAAACAAGAAGGCGGAGCCCAGTGCTGATGCCAAAGTAATTAAGCCACGGCCATGGAAAGTA
 CCGTTGCAATGGTTATGGTCAGAAGATCAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAGTTTGGGATACCAGA
 ACTACCGACAATCTCAGAGAACGATGAAGCGTGGCTGAATTGTATAATGAATGGAGATAGAGAGAACAGTGCAGTGC
 CAGACGTTGGAAACGGGAGCACAATGAACCTGCAGAATGAATTTGGAATCGGAGGCTTGGAGGAAAATAGAGATGGG
 GCAGTGTTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGGCCACTATATAGTGCTCATATATGGTAGTGCA
 ATAGTTGCCATTATAAGTTGTTTCGAACTTTAATGCTCCTGAAATTTCCCATGCAAGTATTTAGAGCTTCATATCCTA
 CAAAAAGACAGGAAACGAGACCTTGAAAAAGACTCAGTACCAGAAGGCATCCACTTATTGATTGCTTTTATACTTG
 CAACATGAAGGAAGCACGCTTTCTACCAAAAAA

d. Event 3 Exon 3 sequence

GTGGTCATTAAATTGCAGGTAGGCTTCCAGGCAGGACAGCAAATGACATCAAGAAGTACTGGAACACTCACCTGGGCA
 AGAAAGTAGAAGTTGAAAACAAGAAGGCGGAGCCCAGTGCTGATGCCAAAGTAATTAAGCCACGGCCATGGAAAGTA
 CCGTTGCAATGGTTATGGTCAGAAGATCAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAGTTTGGGATACCAGA
 ACTACCGACAATCTCAGAGAACGATGAAGCGTGAATTTGTATAATGAATGGAGATAGAGAGAACAGTGCAGTGC
 CAGACGTTGGAAACGGGAGCACAATGAACCTGCAGAATGAATTTGGAATCGGAGGCTTGGAGGAAAATAGAGATGGG
 GCAGTGTTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGGCCACTATATAGTGCTCATATATGGTAGTGCA
 ATAGTTGCCATTATAAGTTGTTTCGAACTTTAATGCTCCTGAAATTTCCCATGCAAGTATTTAGAGCTTCATATCCTA
 CAAAAAGACAGGAAACGAGACCTTGAAAAAGACTCAGTACCAGAAGGCATCCACTTATTGATTGCTTTTATACTTG
 CAACATGAAGGAAGCACGCTTTCTACCAAAAAA

e. Event 4 Exon 3 sequence

```

GTGGTCATTAATTGCAGGTAGGCTTCCAGGCAGGACAGCAAATGACATCAAGAACTACTGGAACACTCACCTGGGCA
AGAAAGTAGAAGTTGAAAAACAAGAAGGCGGAGCCCAGTGCTGATGCCAAAGTAATTAAGCCACGGCCATGGAAAGTA
CCGTTGCAATGGTTATGGTCAGAAGATCAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAGTTTGGGATACCAGA
ACTACCGACAATCTCAGAGAACGATGAAGCGTGGCTGAATTGT--
AATGAATGGAGA[TAG]AGAGAAACAGTGCACTGCCAGACGTTGGAAACGGGAGCACAAATGAACCTGCAGAATGAATTTG
GAATCGGAGGCTTGGAGGAAAATAGAGATGGGGCAGTGCTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGG
GCCACTATATAGTGCTCATATATGGTAGTGCAATAGTTGCCATTATAAGTTGTTTCGAACTTTAATGCTCCTGAAAT
TCCCATGCAAGTATTTAGAGCTTCATATCCTACAAAAAGACAGGAAACGAGACCTTGAAAAAAGACTCAGTACCAGA
AGGCATCCACTTATTGATTGCTTTTATACTTGCAACATGAAGGAAGCACGCTTTCTCACCAAAAAAAAAA

```

f. Event 5 Exon 3 sequence

```

GTGGTCATTAATTGCAGGTAGGCTTCCAGGCAGGACAGCAAATGACATCAAGAACTACTGGAACACTCAC
CTGGGCAAGAAAGTAGAAGTTGAAAAACAAGAAGGCGGAGCCCAGTGCTGATGCCAAAGTAATTAAGCCAC
GGCCATGGAAAGTACCGTTGCAATGGTTTTGGTCAGAAGATCAGCAATCATGTGGAAGCCAGCAGCCGCA
AGAAGAT[TAA]TGCTTTGGGCCACTATATAGTGCTTATATATGGGATGACTTGCTTTGGGCCACTATATAG
TGCTTATATATGGTAGTGCAATAG

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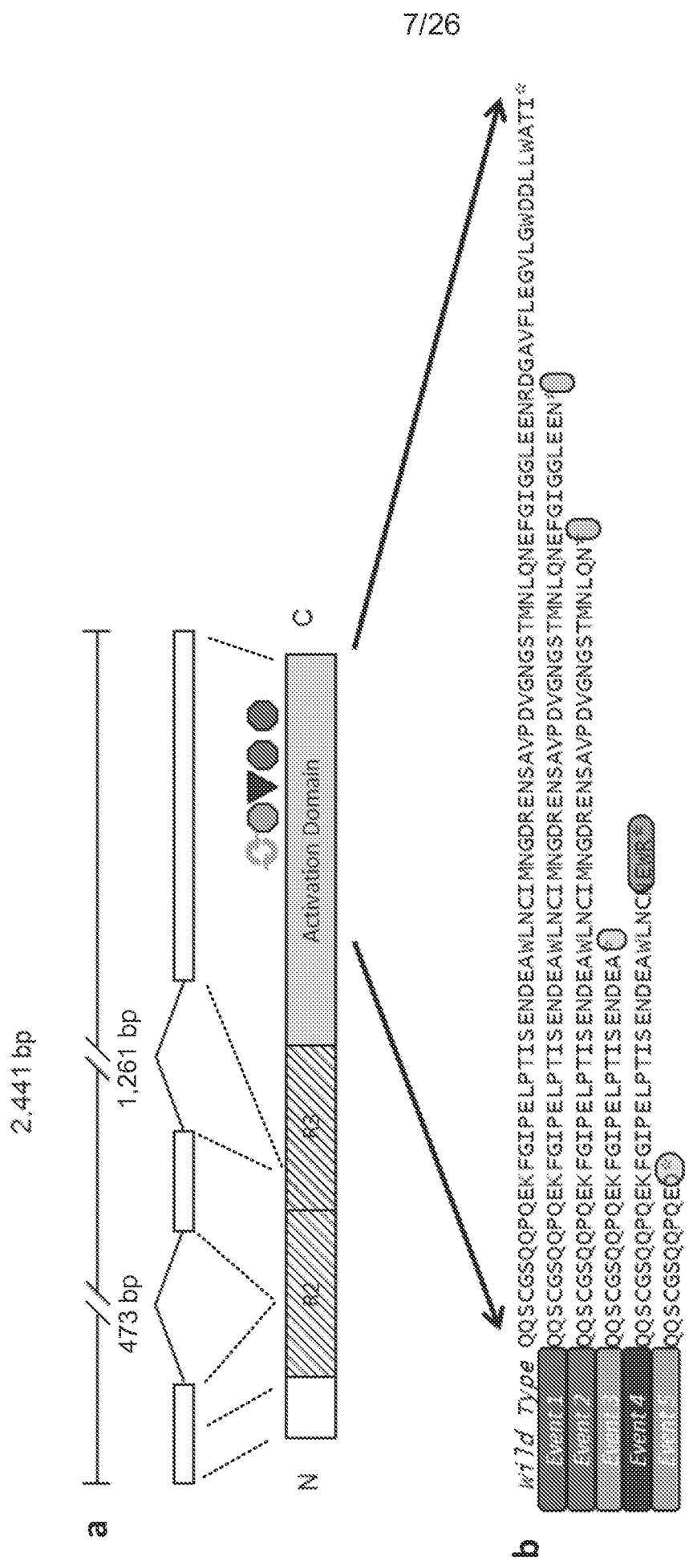


FIG. 6



FIG. 7

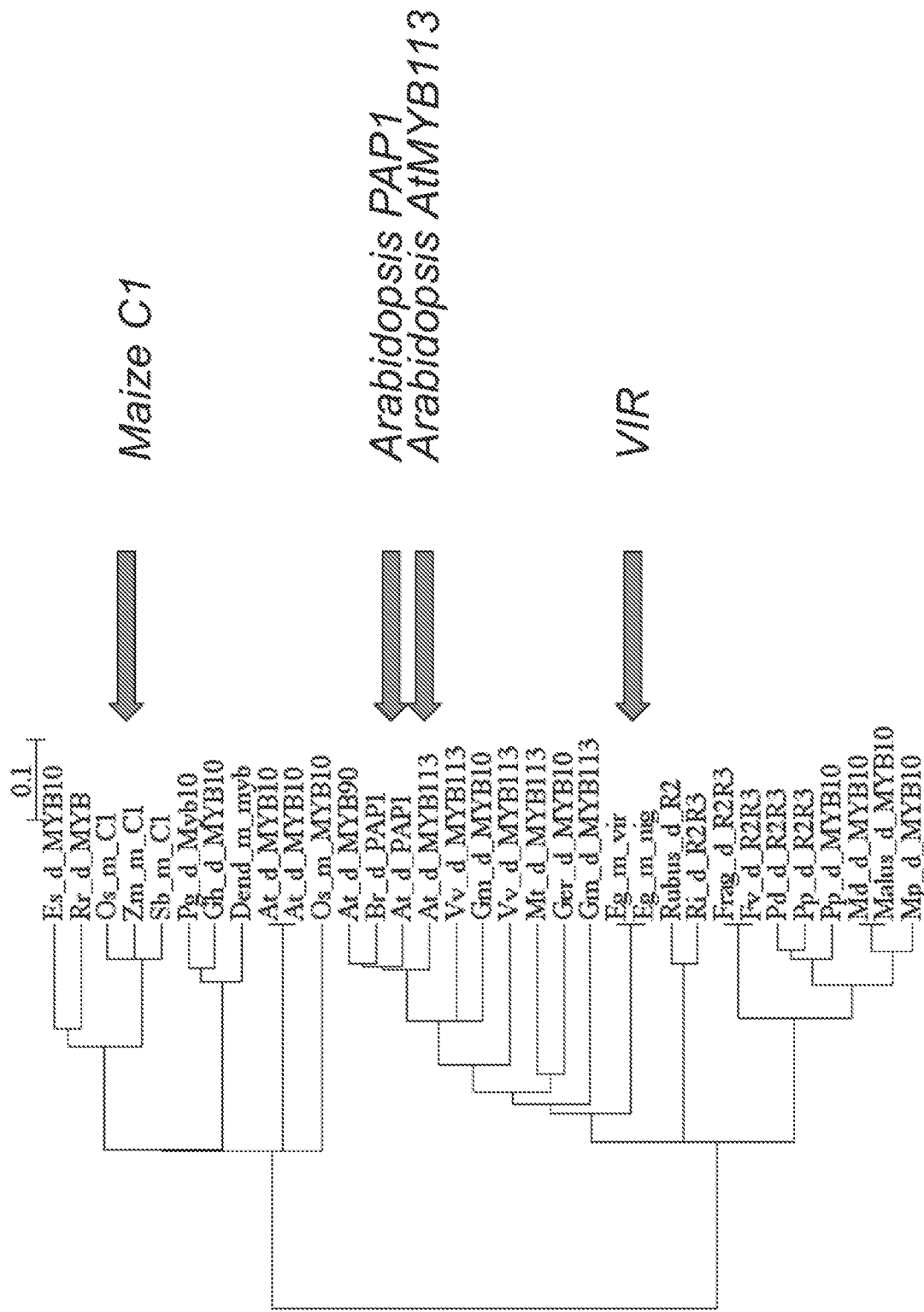


FIG. 8

```

Zm_m_C1      ---MGRRA--CCAKEGVKRGAWTSKEDDAAAYVKAHGEKWKWREVPOKAGLRRRCGKSCRL
Sb_m_C1      ---MGRRA--CCAKEGVKRGAWTSKEDDVLAAAYVKAHGEKWKWREVPOKAGLRRRCGKSCRL
Os_m_C1      ---MGRRA--CCAKEGMKRGAWTSKEDDVLASYIKSHGEGKWKWREVPOKAGLRRRCGKSCRL
Es_d_MYB10   ---MGRSP--CCSKEGLNRGAWTSKEDKLLKDYIRVHGEKWKWRSPLPRAGLRRRCGKSCRL
Rr_d_MYB     ---MGRSSSRCDKEGANKGAWTAHEDQVLRDYYVKEYEGEGKWKWMSRETGLKRCGKSCRL
Rubus_d_R2R3 ---MEVRKGAWTKEEDHLLRNYIEKHGEGKWKWNVPLNAGLNRRCRKS CRM
Ri_d_R2R3    ---MEGY---DLVSRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Pp_d_R2R3    ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Pd_d_R2R3    ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Pp_d_MYB10   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Md_d_MYB10   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Malus_d_MYB10 ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Mp_d_MYB10   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Frag_d_R2R3  ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Fv_d_R2R3    ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Ger_d_MYB10  ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Mt_d_MYB113  ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Gm_d_MYB10   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Vv_d_MYB113a ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
At_d_PAP1    ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
At_d_MYB90   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Br_d_PAP1    ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
At_d_MYB113  ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Vv_d_MYB113  ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Gm_d_MYB113  ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Eg_m_vir     ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Eg_m_nig     ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Pg_d_MYB10   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Gh_d_MYB10   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Dend_m_myb10 ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
Os_m_MYB10   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
At_d_MYB10   ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
At_d_MYB10b  ---MEGY---NLGVRKGAWTKEEDDLLRQYIEHQEGKWKWQVPLQAGLNRRCRKS CRM
1.....10.....20.....30.....40.....50.....60....

```



FIG. 9

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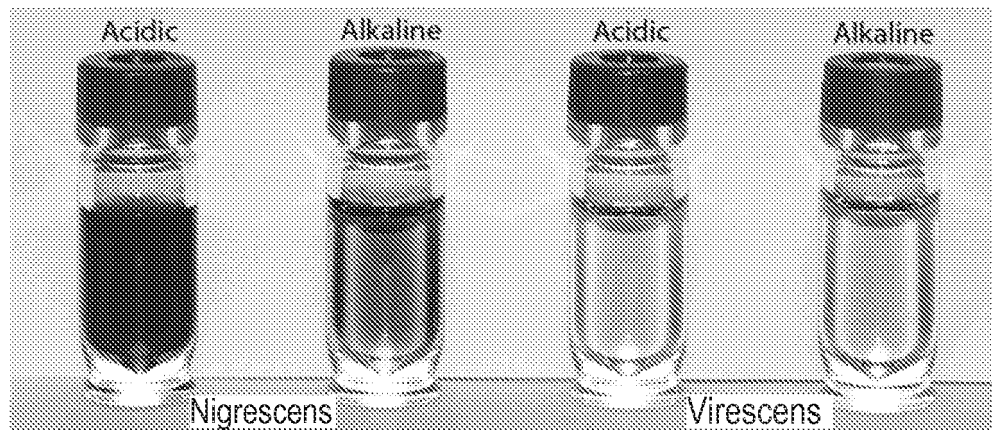


FIG. 10A

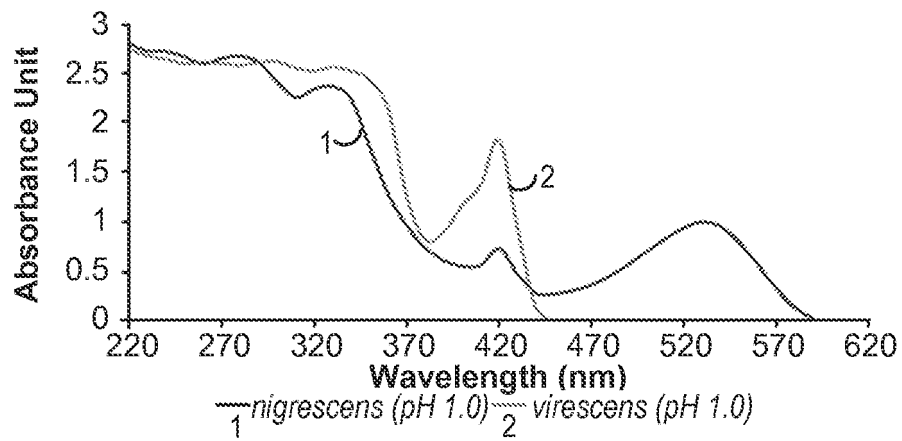


FIG. 10B

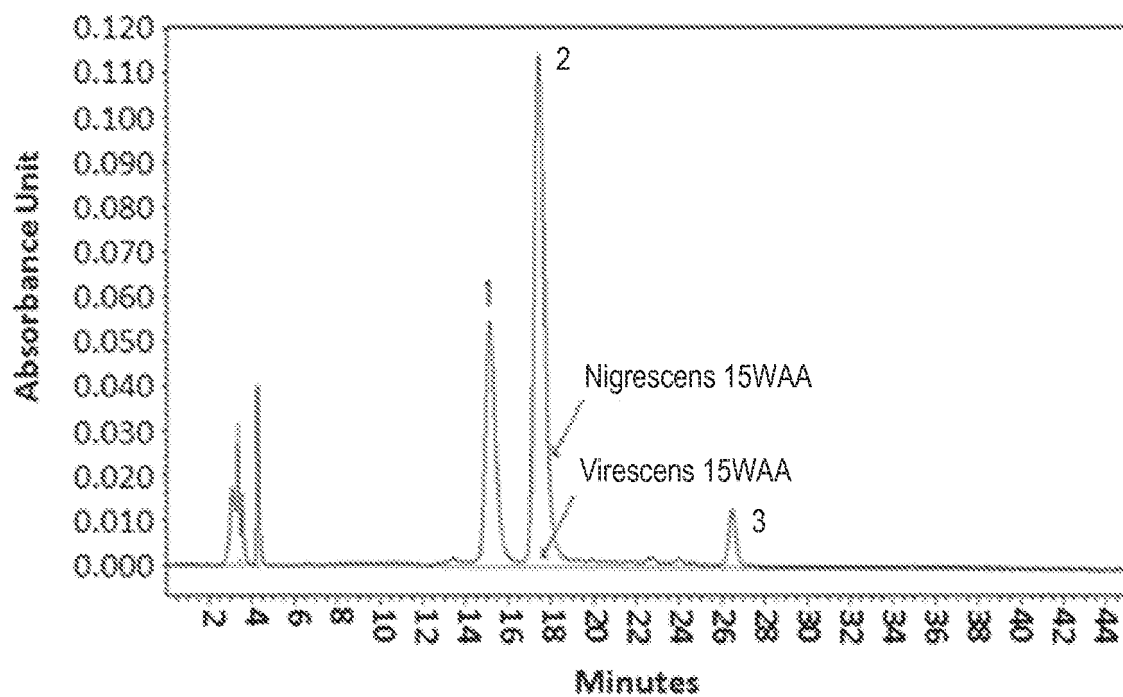


FIG. 10C

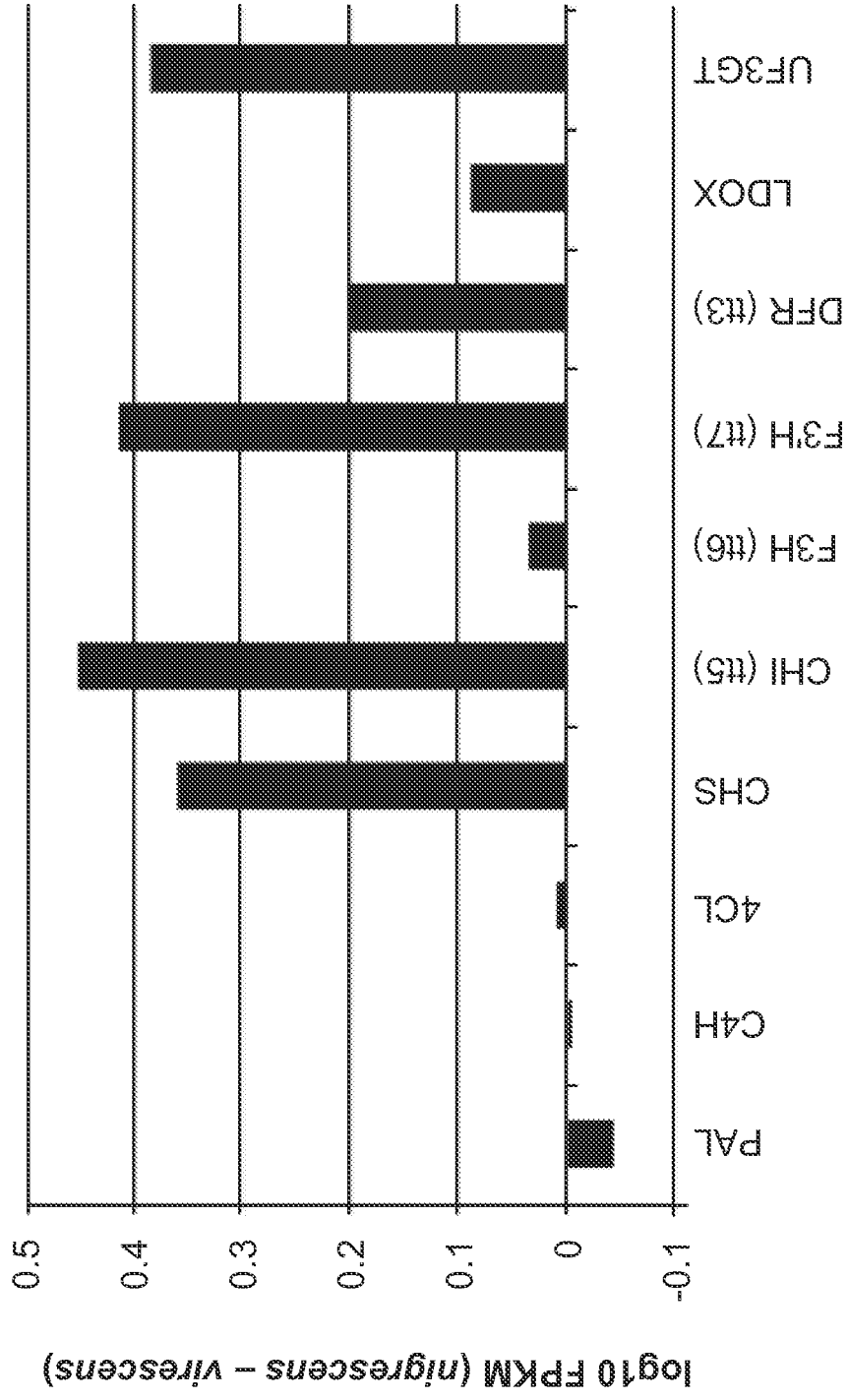


FIG. 10D

Figure: Alignment of Wild Type and Five Mutant Alleles

RTPAP1_mrna	0	ATGGGTAATTTGCGTGCCGAAGTCCAACGTCCAGCTGGTGTTCGCAAAGG
SNP_1	0	ATGGGTAATTTGCGTGCCGAAGTCCAACGTCCAGCTGGTGTTCGCAAAGG
SNP_2	0	ATGGGTAATTTGCGTGCCGAAGTCCAACGTCCAGCTGGTGTTCGCAAAGG
SNP_3	0	ATGGGTAATTTGCGTGCCGAAGTCCAACGTCCAGCTGGTGTTCGCAAAGG
SNP_4	0	ATGGGTAATTTGCGTGCCGAAGTCCAACGTCCAGCTGGTGTTCGCAAAGG
SNP_5	0	ATGGGTAATTTGCGTGCCGAAGTCCAACGTCCAGCTGGTGTTCGCAAAGG
RTPAP1_mrnaAA	0	MetGlyAsnLeuArgAlaGluValGlnArgProAlaGlyValArgLysG1
SNP_1AA	0	MetGlyAsnLeuArgAlaGluValGlnArgProAlaGlyValArgLysG1
SNP_2AA	0	MetGlyAsnLeuArgAlaGluValGlnArgProAlaGlyValArgLysG1
SNP_3AA	0	MetGlyAsnLeuArgAlaGluValGlnArgProAlaGlyValArgLysG1
SNP_4AA	0	MetGlyAsnLeuArgAlaGluValGlnArgProAlaGlyValArgLysG1
SNP_5AA	0	MetGlyAsnLeuArgAlaGluValGlnArgProAlaGlyValArgLysG1
		----- ----- ----- ----- -----
		1 11 21 31 41
RTPAP1_mrna	50	AGCATGGAGTGAAGAGGAGGACAGGCTTCTGAGAAAAGTGCCTTGAGAAAT
SNP_1	50	AGCATGGAGTGAAGAGGAGGACAGGCTTCTGAGAAAAGTGCCTTGAGAAAT
SNP_2	50	AGCATGGAGTGAAGAGGAGGACAGGCTTCTGAGAAAAGTGCCTTGAGAAAT
SNP_3	50	AGCATGGAGTGAAGAGGAGGACAGGCTTCTGAGAAAAGTGCCTTGAGAAAT
SNP_4	50	AGCATGGAGTGAAGAGGAGGACAGGCTTCTGAGAAAAGTGCCTTGAGAAAT
SNP_5	50	AGCATGGAGTGAAGAGGAGGACAGGCTTCTGAGAAAAGTGCCTTGAGAAAT
RTPAP1_mrnaAA	50	yAlaTrpSerGluGluGluAspArgLeuLeuArgLysCysValGluLysT
SNP_1AA	50	yAlaTrpSerGluGluGluAspArgLeuLeuArgLysCysValGluLysT
SNP_2AA	50	yAlaTrpSerGluGluGluAspArgLeuLeuArgLysCysValGluLysT
SNP_3AA	50	yAlaTrpSerGluGluGluAspArgLeuLeuArgLysCysValGluLysT
SNP_4AA	50	yAlaTrpSerGluGluGluAspArgLeuLeuArgLysCysValGluLysT
SNP_5AA	50	yAlaTrpSerGluGluGluAspArgLeuLeuArgLysCysValGluLysT
		----- ----- ----- ----- -----
		51 61 71 81 91
RTPAP1_mrna	100	ATGGCGAAGGGAAGTGGCGCCATGTTCCCCAAAGGGCAGGCCCTCAGAAAGG
SNP_1	100	ATGGCGAAGGGAAGTGGCGCCATGTTCCCCAAAGGGCAGGCCCTCAGAAAGG
SNP_2	100	ATGGCGAAGGGAAGTGGCGCCATGTTCCCCAAAGGGCAGGCCCTCAGAAAGG
SNP_3	100	ATGGCGAAGGGAAGTGGCGCCATGTTCCCCAAAGGGCAGGCCCTCAGAAAGG
SNP_4	100	ATGGCGAAGGGAAGTGGCGCCATGTTCCCCAAAGGGCAGGCCCTCAGAAAGG
SNP_5	100	ATGGCGAAGGGAAGTGGCGCCATGTTCCCCAAAGGGCAGGCCCTCAGAAAGG
RTPAP1_mrnaAA	100	yrGlyGluGlyAsnTrpArgHisValProGlnArgAlaGlyLeuArgArg
SNP_1AA	100	yrGlyGluGlyAsnTrpArgHisValProGlnArgAlaGlyLeuArgArg
SNP_2AA	100	yrGlyGluGlyAsnTrpArgHisValProGlnArgAlaGlyLeuArgArg
SNP_3AA	100	yrGlyGluGlyAsnTrpArgHisValProGlnArgAlaGlyLeuArgArg
SNP_4AA	100	yrGlyGluGlyAsnTrpArgHisValProGlnArgAlaGlyLeuArgArg
SNP_5AA	100	yrGlyGluGlyAsnTrpArgHisValProGlnArgAlaGlyLeuArgArg
		----- ----- ----- ----- -----
		101 111 121 131 141
RTPAP1_mrna	150	TGCCGAAAGAGCTGCCGACTACGGTGGTTGAACTATCTCAGCCCTAGGAT
SNP_1	150	TGCCGAAAGAGCTGCCGACTACGGTGGTTGAACTATCTCAGCCCTAGGAT
SNP_2	150	TGCCGAAAGAGCTGCCGACTACGGTGGTTGAACTATCTCAGCCCTAGGAT
SNP_3	150	TGCCGAAAGAGCTGCCGACTACGGTGGTTGAACTATCTCAGCCCTAGGAT
SNP_4	150	TGCCGAAAGAGCTGCCGACTACGGTGGTTGAACTATCTCAGCCCTAGGAT
SNP_5	150	TGCCGAAAGAGCTGCCGACTACGGTGGTTGAACTATCTCAGCCCTAGGAT
RTPAP1_mrnaAA	150	CysArgLysSerCysArgLeuArgTrpLeuAsnTyrLeuSerProArgI1
SNP_1AA	150	CysArgLysSerCysArgLeuArgTrpLeuAsnTyrLeuSerProArgI1
SNP_2AA	150	CysArgLysSerCysArgLeuArgTrpLeuAsnTyrLeuSerProArgI1
SNP_3AA	150	CysArgLysSerCysArgLeuArgTrpLeuAsnTyrLeuSerProArgI1
SNP_4AA	150	CysArgLysSerCysArgLeuArgTrpLeuAsnTyrLeuSerProArgI1
SNP_5AA	150	CysArgLysSerCysArgLeuArgTrpLeuAsnTyrLeuSerProArgI1
		----- ----- ----- ----- -----
		151 161 171 181 191

FIG. 11

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RTPAP1_mrna 200 CAACAGGGAGAAATTTTCGGAGGAAGAAACAGATCTTATCATCAGGCTTC
SNP_1 200 CAACAGGGAGAAATTTTCGGAGGAAGAAACAGATCTTATCATCAGGCTTC
SNP_2 200 CAACAGGGAGAAATTTTCGGAGGAAGAAACAGATCTTATCATCAGGCTTC
SNP_3 200 CAACAGGGAGAAATTTTCGGAGGAAGAAACAGATCTTATCATCAGGCTTC
SNP_4 200 CAACAGGGAGAAATTTTCGGAGGAAGAAACAGATCTTATCATCAGGCTTC
SNP_5 200 CAACAGGGAGAAATTTTCGGAGGAAGAAACAGATCTTATCATCAGGCTTC
RTPAP1_mrnaAA 200 eAsnArgGluLysPheSerGluGluGluThrAspLeuIleIleArgLeuH
SNP_1AA 200 eAsnArgGluLysPheSerGluGluGluThrAspLeuIleIleArgLeuH
SNP_2AA 200 eAsnArgGluLysPheSerGluGluGluThrAspLeuIleIleArgLeuH
SNP_3AA 200 eAsnArgGluLysPheSerGluGluGluThrAspLeuIleIleArgLeuH
SNP_4AA 200 eAsnArgGluLysPheSerGluGluGluThrAspLeuIleIleArgLeuH
SNP_5AA 200 eAsnArgGluLysPheSerGluGluGluThrAspLeuIleIleArgLeuH
|-----|-----|-----|-----|-----|
201 211 221 231 241

RTPAP1_mrna 250 ATAAGCTCTTGGGCAACAGGTGGTCATTAATTGCAGGTAGGCTTCCAGGC
SNP_1 250 ATAAGCTCTTGGGCAACAGGTGGTCATTAATTGCAGGTAGGCTTCCAGGC
SNP_2 250 ATAAGCTCTTGGGCAACAGGTGGTCATTAATTGCAGGTAGGCTTCCAGGC
SNP_3 250 ATAAGCTCTTGGGCAACAGGTGGTCATTAATTGCAGGTAGGCTTCCAGGC
SNP_4 250 ATAAGCTCTTGGGCAACAGGTGGTCATTAATTGCAGGTAGGCTTCCAGGC
SNP_5 250 ATAAGCTCTTGGGCAACAGGTGGTCATTAATTGCAGGTAGGCTTCCAGGC
RTPAP1_mrnaAA 250 isLysLeuLeuGlyAsnArgTrpSerLeuIleAlaGlyArgLeuProGly
SNP_1AA 250 isLysLeuLeuGlyAsnArgTrpSerLeuIleAlaGlyArgLeuProGly
SNP_2AA 250 isLysLeuLeuGlyAsnArgTrpSerLeuIleAlaGlyArgLeuProGly
SNP_3AA 250 isLysLeuLeuGlyAsnArgTrpSerLeuIleAlaGlyArgLeuProGly
SNP_4AA 250 isLysLeuLeuGlyAsnArgTrpSerLeuIleAlaGlyArgLeuProGly
SNP_5AA 250 isLysLeuLeuGlyAsnArgTrpSerLeuIleAlaGlyArgLeuProGly
|-----|-----|-----|-----|-----|
251 261 271 281 291

RTPAP1_mrna 300 AGGACAGCAAATGACATCAAGAACTACTGGAACACTCACCTGGGCAAGAA
SNP_1 300 AGGACAGCAAATGACATCAAGAACTACTGGAACACTCACCTGGGCAAGAA
SNP_2 300 AGGACAGCAAATGACATCAAGAACTACTGGAACACTCACCTGGGCAAGAA
SNP_3 300 AGGACAGCAAATGACATCAAGAACTACTGGAACACTCACCTGGGCAAGAA
SNP_4 300 AGGACAGCAAATGACATCAAGAACTACTGGAACACTCACCTGGGCAAGAA
SNP_5 300 AGGACAGCAAATGACATCAAGAACTACTGGAACACTCACCTGGGCAAGAA
RTPAP1_mrnaAA 300 ArgThrAlaAsnAspIleLysAsnTyrTrpAsnThrHisLeuGlyLysLy
SNP_1AA 300 ArgThrAlaAsnAspIleLysAsnTyrTrpAsnThrHisLeuGlyLysLy
SNP_2AA 300 ArgThrAlaAsnAspIleLysAsnTyrTrpAsnThrHisLeuGlyLysLy
SNP_3AA 300 ArgThrAlaAsnAspIleLysAsnTyrTrpAsnThrHisLeuGlyLysLy
SNP_4AA 300 ArgThrAlaAsnAspIleLysAsnTyrTrpAsnThrHisLeuGlyLysLy
SNP_5AA 300 ArgThrAlaAsnAspIleLysAsnTyrTrpAsnThrHisLeuGlyLysLy
|-----|-----|-----|-----|-----|
301 311 321 331 341

RTPAP1_mrna 350 AGTAGAAGTTGAAAAACAAGAAGCGGAGCCCAGTGCTGATGCCAAAGTAA
SNP_1 350 AGTAGAAGTTGAAAAACAAGAAGCGGAGCCCAGTGCTGATGCCAAAGTAA
SNP_2 350 AGTAGAAGTTGAAAAACAAGAAGCGGAGCCCAGTGCTGATGCCAAAGTAA
SNP_3 350 AGTAGAAGTTGAAAAACAAGAAGCGGAGCCCAGTGCTGATGCCAAAGTAA
SNP_4 350 AGTAGAAGTTGAAAAACAAGAAGCGGAGCCCAGTGCTGATGCCAAAGTAA
SNP_5 350 AGTAGAAGTTGAAAAACAAGAAGCGGAGCCCAGTGCTGATGCCAAAGTAA
RTPAP1_mrnaAA 350 sValGluValGluAsnLysLysAlaGluProSerAlaAspAlaLysValI
SNP_1AA 350 sValGluValGluAsnLysLysAlaGluProSerAlaAspAlaLysValI
SNP_2AA 350 sValGluValGluAsnLysLysAlaGluProSerAlaAspAlaLysValI
SNP_3AA 350 sValGluValGluAsnLysLysAlaGluProSerAlaAspAlaLysValI
SNP_4AA 350 sValGluValGluAsnLysLysAlaGluProSerAlaAspAlaLysValI
SNP_5AA 350 sValGluValGluAsnLysLysAlaGluProSerAlaAspAlaLysValI
|-----|-----|-----|-----|-----|
351 361 371 381 391

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FIG. 11 (cont'd)

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RTPAP1_mrna 400 TTAAGCCACGGCCATGGAAAGTACCGTTGCAATGGTTATGGTCAGAAGAT
  SNP_1 400 TTAAGCCACGGCCATGGAAAGTACCGTTGCAATGGTTATGGTCAGAAGAT
  SNP_2 400 TTAAGCCACGGCCATGGAAAGTACCGTTGCAATGGTTATGGTCAGAAGAT
  SNP_3 400 TTAAGCCACGGCCATGGAAAGTACCGTTGCAATGGTTATGGTCAGAAGAT
  SNP_4 400 TTAAGCCACGGCCATGGAAAGTACCGTTGCAATGGTTATGGTCAGAAGAT
  SNP_5 400 TTAAGCCACGGCCATGGAAAGTACCGTTGCAATGGTTATGGTCAGAAGAT
RTPAP1_mrnaAA 400 leLysProArgProTrpLysValProLeuGlnTrpLeuTrpSerGluAsp
  SNP_1AA 400 leLysProArgProTrpLysValProLeuGlnTrpLeuTrpSerGluAsp
  SNP_2AA 400 leLysProArgProTrpLysValProLeuGlnTrpLeuTrpSerGluAsp
  SNP_3AA 400 leLysProArgProTrpLysValProLeuGlnTrpLeuTrpSerGluAsp
  SNP_4AA 400 leLysProArgProTrpLysValProLeuGlnTrpLeuTrpSerGluAsp
  SNP_5AA 400 leLysProArgProTrpLysValProLeuGlnTrpLeuTrpSerGluAsp
  |-----|-----|-----|-----|-----|
  401         411         421         431         441

RTPAP1_mrna 450 CAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAAGTTTGGGATACCAGA
  SNP_1 450 CAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAAGTTTGGGATACCAGA
  SNP_2 450 CAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAAGTTTGGGATACCAGA
  SNP_3 450 CAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAAGTTTGGGATACCAGA
  SNP_4 450 CAGCAATCATGTGGAAGCCAGCAGCCGCAAGAAAAAGTTTGGGATACCAGA
  SNP_5 450 CAGCAATCATGTGGAAGCCAGCAGCCGCAAGAA-----GAT-----
RTPAP1_mrnaAA 450 GlnGlnSerCysGlySerGlnGlnProGlnGluLysPheGlyIleProGln
  SNP_1AA 450 GlnGlnSerCysGlySerGlnGlnProGlnGluLysPheGlyIleProGln
  SNP_2AA 450 GlnGlnSerCysGlySerGlnGlnProGlnGluLysPheGlyIleProGln
  SNP_3AA 450 GlnGlnSerCysGlySerGlnGlnProGlnGluLysPheGlyIleProGln
  SNP_4AA 450 GlnGlnSerCysGlySerGlnGlnProGlnGluLysPheGlyIleProGln
  SNP_5AA 450 GlnGlnSerCysGlySerGlnGlnProGlnGluAspTer
  |-----|-----|-----|-----|-----|
  451         461         471         481         491

RTPAP1_mrna 500 ACTACCGACAATCTCAGAGAACGATGAAGCGTGGCTGAATTGTATAATGA
  SNP_1 500 ACTACCGACAATCTCAGAGAACGATGAAGCGTGGCTGAATTGTATAATGA
  SNP_2 500 ACTACCGACAATCTCAGAGAACGATGAAGCGTGGCTGAATTGTATAATGA
  SNP_3 500 ACTACCGACAATCTCAGAGAACGATGAAGCGTagCTGAATTGTATAATGA
  SNP_4 500 ACTACCGACAATCTCAGAGAACGATGAAGCGTGGCTGAATTGTATGA---ATGA
  SNP_5 486 -----TAATG---
RTPAP1_mrnaAA 500 uLeuProThrIleSerGluAsnAspGluAlaTrpLeuAsnCysIleMetA
  SNP_1AA 500 uLeuProThrIleSerGluAsnAspGluAlaTrpLeuAsnCysIleMetA
  SNP_2AA 500 uLeuProThrIleSerGluAsnAspGluAlaTrpLeuAsnCysIleMetA
  SNP_3AA 500 uLeuProThrIleSerGluAsnAspGluAlaTer
  SNP_4AA 500 uLeuProThrIleSerGluAsnAspGluAlaTrpLeuAsnCysAsn-Gln
  SNP_5AA 486
  |-----|-----|-----|-----|-----|
  501         511         521         531         541

RTPAP1_mrna 550 ATGGAGATAGAGAGAACAGTGCAGTGCCAGACGTTGGAAACGGGAGCACA
  SNP_1 550 ATGGAGATAGAGAGAACAGTGCAGTGCCAGACGTTGGAAACGGGAGCACA
  SNP_2 550 ATGGAGATAGAGAGAACAGTGCAGTGCCAGACGTTGGAAACGGGAGCACA
  SNP_3 550 ATGGAGATAGAGAGAACAGTGCAGTGCCAGACGTTGGAAACGGGAGCACA
  SNP_4 548 ATGGAGATAGAGAGAACAGTGCAGTGCCAGACGTTGGAAACGGGAGCACA
  SNP_5 491 -----CtTTGGGC-----CACT
RTPAP1_mrnaAA 550 snGlyAspArgGluAsnSerAlaValProAspValGlyAsnGlySerThr
  SNP_1AA 550 snGlyAspArgGluAsnSerAlaValProAspValGlyAsnGlySerThr
  SNP_2AA 550 snGlyAspArgGluAsnSerAlaValProAspValGlyAsnGlySerThr
  SNP_3AA 550
  SNP_4AA 548 uTrpArgTer
  SNP_5AA 491
  |-----|-----|-----|-----|-----|
  551         561         571         581         591

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FIG. 11 (cont'd)

RTPAP1_mrna	600	ATGAACCTGCAGAATGAATTTGGAATCGGAGGCTTGGAGGAAAAATAGAGA
SNP_1	600	ATGAACCTGCAGAATGAATTTGGAATCGGAGGCTTGGAGGAAAAATtGAGA
SNP_2	600	ATGAACCTGCAGAATtAATTTGGAATCGGAGGCTTGGAGGAAAAATAGAGA
SNP_3	600	ATGAACCTGCAGAATGAATTTGGAATCGGAGGCTTGGAGGAAAAATAGAGA
SNP_4	598	ATGAACCTGCAGAATGAATTTGGAATCGGAGGCTTGGAGGAAAAATAGAGA
SNP_5	503	ATa-----
RTPAP1_mrnaAA	600	MetAsnLeuGlnAsnGluPheGlyIleGlyGlyLeuGluGluAsnArgAs
SNP_1AA	600	MetAsnLeuGlnAsnGluPheGlyIleGlyGlyLeuGluGluAsn <u>Ter</u>
SNP_2AA	600	MetAsnLeuGlnAsn <u>Ter</u>
SNP_3AA	600	
SNP_4AA	598	
SNP_5AA	503	
		----- ----- ----- ----- -----
		601 611 621 631 641
RTPAP1_mrna	650	TGGGGCAGTGTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGG
SNP_1	650	TGGGGCAGTGTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGG
SNP_2	650	TGGGGCAGTGTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGG
SNP_3	650	TGGGGCAGTGTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGG
SNP_4	648	TGGGGCAGTGTTTCTGGAAGGAGTTCTAGGATGGGATGACTTGCTTTGGG
SNP_5	506	-----tAGTGcTTaTatA-----TGGGATGACTTGCTTTGGG
RTPAP1_mrnaAA	650	pGlyAlaValPheLeuGluGlyValLeuGlyTrpAspAspLeuLeuTrpA
SNP_1AA	650	
SNP_2AA	650	
SNP_3AA	650	
SNP_4AA	648	
SNP_5AA	506	
		----- ----- ----- ----- -----
		651 661 671 681 691
RTPAP1_mrna	700	CCACTATATAGTGCTCATATATGGTAGTGCAATAGTTGCCATTATAAGTT
SNP_1	700	CCACTATATAGTGCTCATATATGGTAGTGCAATAGTTGCCATTATAAGTT
SNP_2	700	CCACTATATAGTGCTCATATATGGTAGTGCAATAGTTGCCATTATAAGTT
SNP_3	700	CCACTATATAGTGCTCATATATGGTAGTGCAATAGTTGCCATTATAAGTT
SNP_4	698	CCACTATATAGTGCTCATATATGGTAGTGCAATAGTTGCCATTATAAGTT
SNP_5	538	CCACTATATAGTGCTtATATATGGTAGTGCAATAGTTGCCATTATAAGTT
RTPAP1_mrnaAA	700	laThrIle <u>Ter</u>
SNP_1AA	700	
SNP_2AA	700	
SNP_3AA	700	
SNP_4AA	698	
SNP_5AA	538	
		----- ----- ----- ----- -----
		701 711 721 731 741
RTPAP1_mrna	750	GTTTCGAACTTTAATGCTCCTGAAATTCCCATGCAAGTATTTAGAGCTTC
SNP_1	750	GTTTCGAACTTTAATGCTCCTGAAATTCCCATGCAAGTATTTAGAGCTTC
SNP_2	750	GTTTCGAACTTTAATGCTCCTGAAATTCCCATGCAAGTATTTAGAGCTTC
SNP_3	750	GTTTCGAACTTTAATGCTCCTGAAATTCCCATGCAAGTATTTAGAGCTTC
SNP_4	748	GTTTCGAACTTTAATGCTCCTGAAATTCCCATGCAAGTATTTAGAGCTTC
SNP_5	588	GTTTCGAACTTTAATGCTCCTGAAATTCCCATGCAAGTATTTAGAGCTTC
RTPAP1_mrnaAA	750	
SNP_1AA	750	
SNP_2AA	750	
SNP_3AA	750	
SNP_4AA	748	
SNP_5AA	588	
		----- ----- ----- ----- -----
		751 761 771 781 791

FIG. 11 (cont'd)

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RTPAP1_mrna 800 ATATCCTACAAAAAGACAGGAAACGAGACCTTGAAAAAAGACTCAGTACC
  SNP_1      800 ATATCCTACAAAAAGACAGGAAACGAGACCTTGAAAAAAGACTCAGTACC
  SNP_2      800 ATATCCTACAAAAAGACAGGAAACGAGACCTTGAAAAAAGACTCAGTACC
  SNP_3      800 ATATCCTACAAAAAGACAGGAAACGAGACCTTGAAAAAAGACTCAGTACC
  SNP_4      798 ATATCCTACAAAAAGACAGGAAACGAGACCTTGAAAAAAGACTCAGTACC
  SNP_5      638 ATATCCTACAAAAAGACAGGAAACGAGACCTTGAAAAAAGACTCAGTACC
RTPAP1_mrnaAA 800
  SNP_1AA    800
  SNP_2AA    800
  SNP_3AA    800
  SNP_4AA    798
  SNP_5AA    638
               |-----|-----|-----|-----|-----
               801       811       821       831       841

RTPAP1_mrna 850 AGAAGGCATCCACTTATTGATTGCTTTTATACTTGCAACATGAAGGAAGC
  SNP_1      850 AGAAGGCATCCACTTATTGATTGCTTTTATACTTGCAACATGAAGGAAGC
  SNP_2      850 AGAAGGCATCCACTTATTGATTGCTTTTATACTTGCAACATGAAGGAAGC
  SNP_3      850 AGAAGGCATCCACTTATTGATTGCTTTTATACTTGCAACATGAAGGAAGC
  SNP_4      848 AGAAGGCATCCACTTATTGATTGCTTTTATACTTGCAACATGAAGGAAGC
  SNP_5      688 AGAAGGCATCCACTTATTGATTGCTTTTATACTTGCAACATGAAGGAAGC
RTPAP1_mrnaAA 850
  SNP_1AA    850
  SNP_2AA    850
  SNP_3AA    850
  SNP_4AA    848
  SNP_5AA    688
               |-----|-----|-----|-----|-----
               851       861       871       881       891

RTPAP1_mrna 900 ACGCTTTCTCACCAAAAAAAAAA
  SNP_1      900 ACGCTTTCTCACCAAAAAAAAAA
  SNP_2      900 ACGCTTTCTCACCAAAAAAAAAA
  SNP_3      900 ACGCTTTCTCACCAAAAAAAAAA
  SNP_4      898 ACGCTTTCTCACCAAAAAAAAAA
  SNP_5      738 ACGCTTTCTCACCAAAAAAAAAA
RTPAP1_mrnaAA 900
  SNP_1AA    900
  SNP_2AA    900
  SNP_3AA    900
  SNP_4AA    898
  SNP_5AA    738
               |-----|-----|-----
               901       911       921

```

FIG. 11 (cont'd)

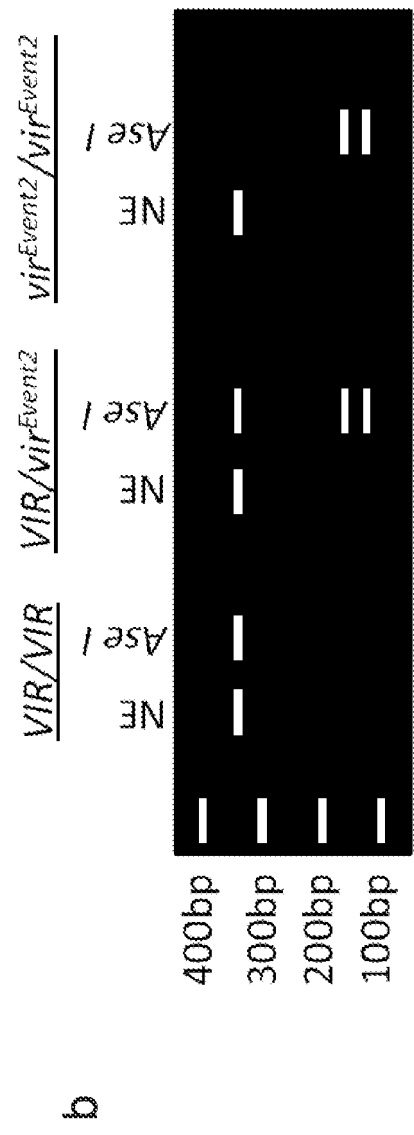
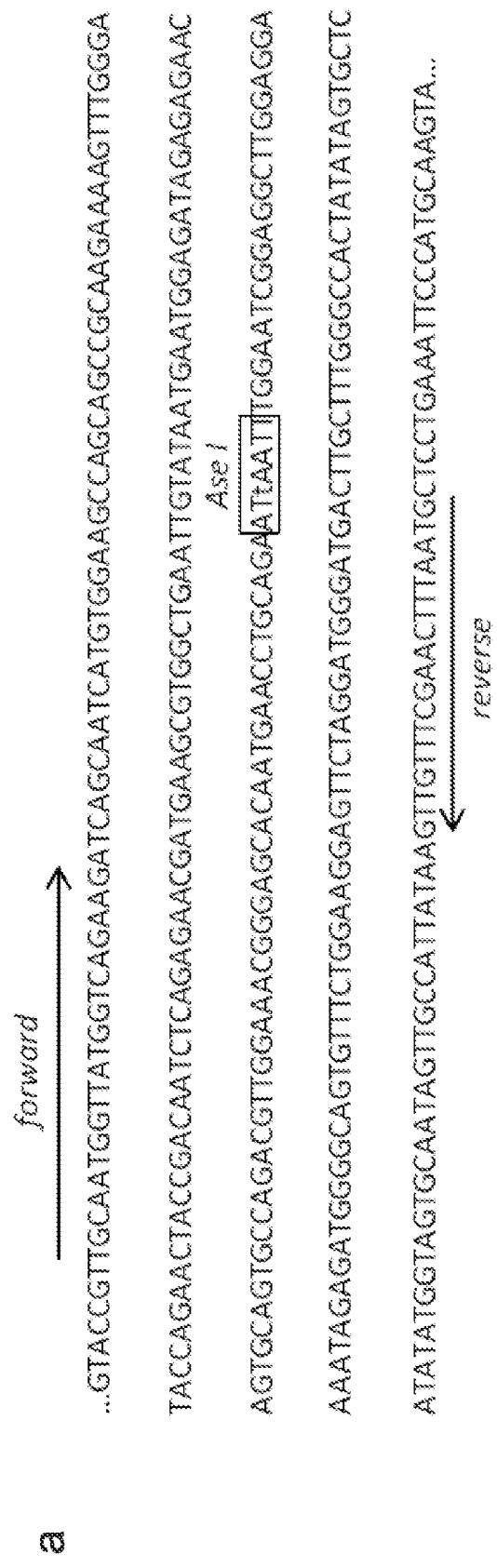


FIG. 12



FIG. 13

a.

$\xrightarrow{\text{forward}}$
 ...AAGTAA TTAAGCCACGGCCATGGAAAGTACCGTTGCAATGGTTATGGTCAGAAATCAGCAATCATGTGGA

 AGCCAGCAGCCGCAAGAAA GTTTGGGATACCAGAACTACCGACAATCTCAGAGAACGATGAAGCG aGC GAAT
Alu I

TGTATAA TGAATGGAGATAGAGAGAACAGTGCAGTGCCAGACGTTGGAAACGGGAGCACAATGAACCTGCAGAA

 TGAATTTGGAATCGGAGGCTTGGAGGAAATAGAGATGGGGCAGTGTCTTGGAAGGAGTTCTAGGATGGGATG

 ACTTGCTTTGGGCCACTATATAGTGCTCATATGGTAGTGCAATAGTTGCCATTATAAGTTGTTTCGAACTTTAAT
 $\xleftarrow{\text{reverse}}$
 GCTCCTGAAATT...

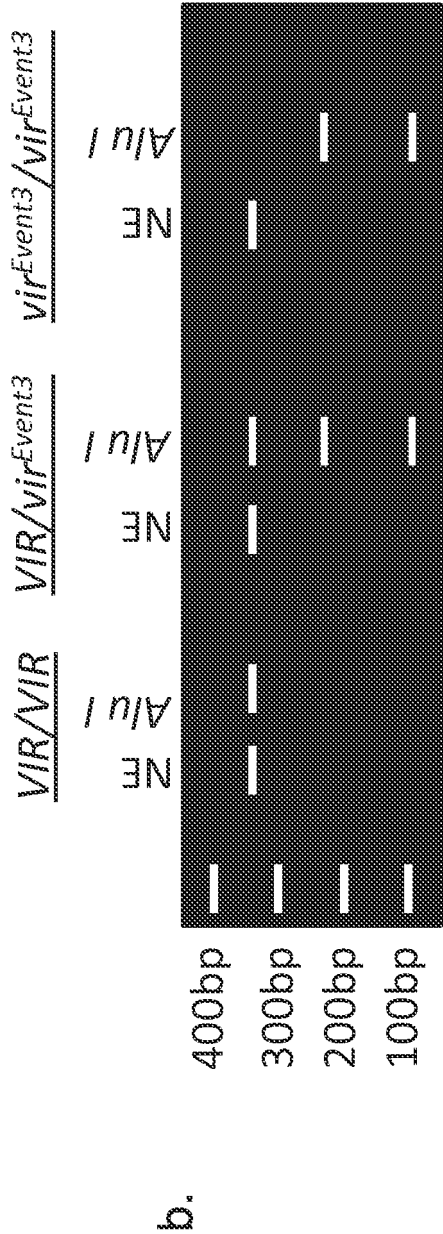


FIG. 14

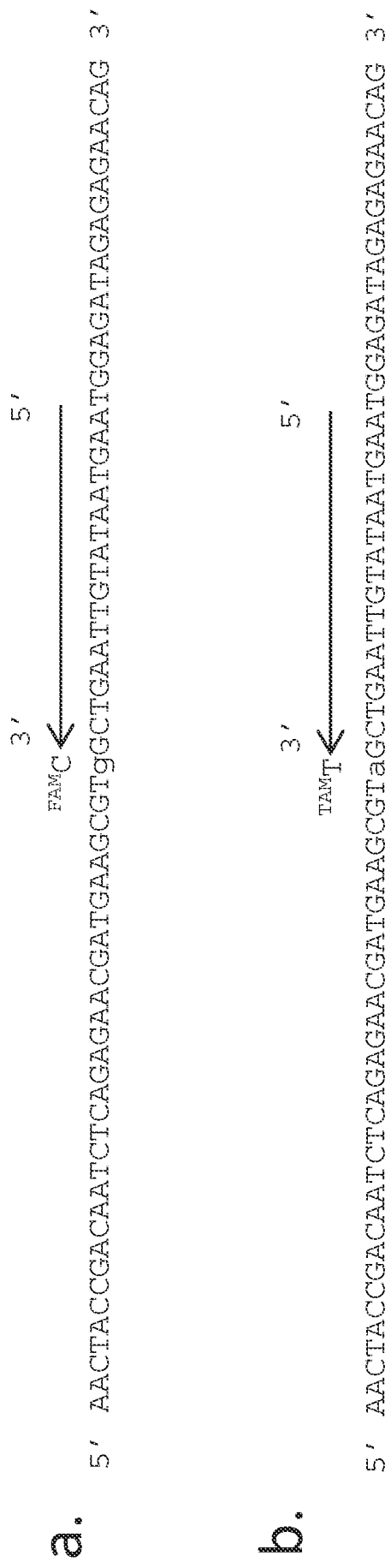


FIG. 15

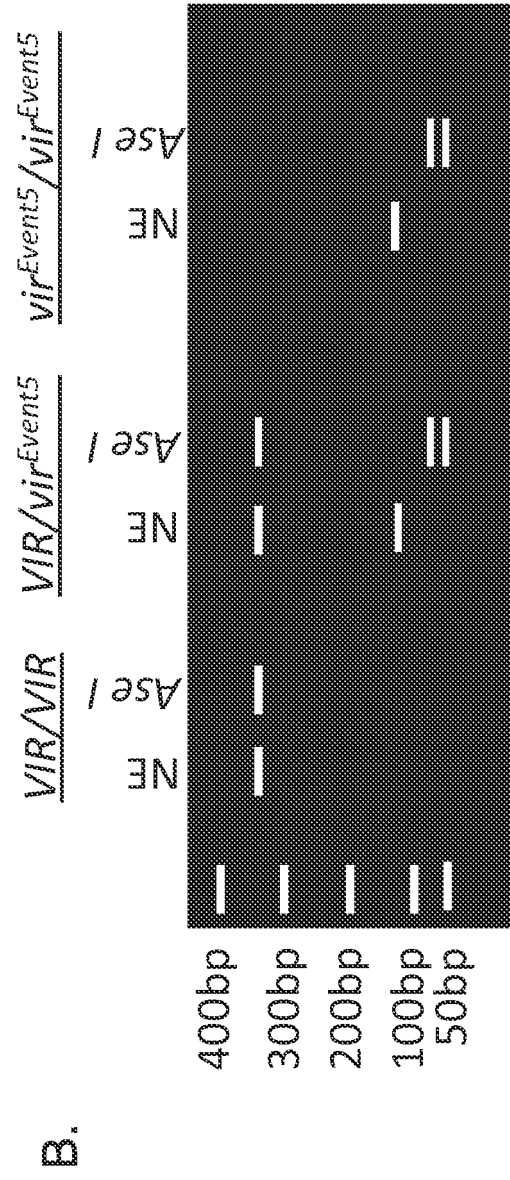
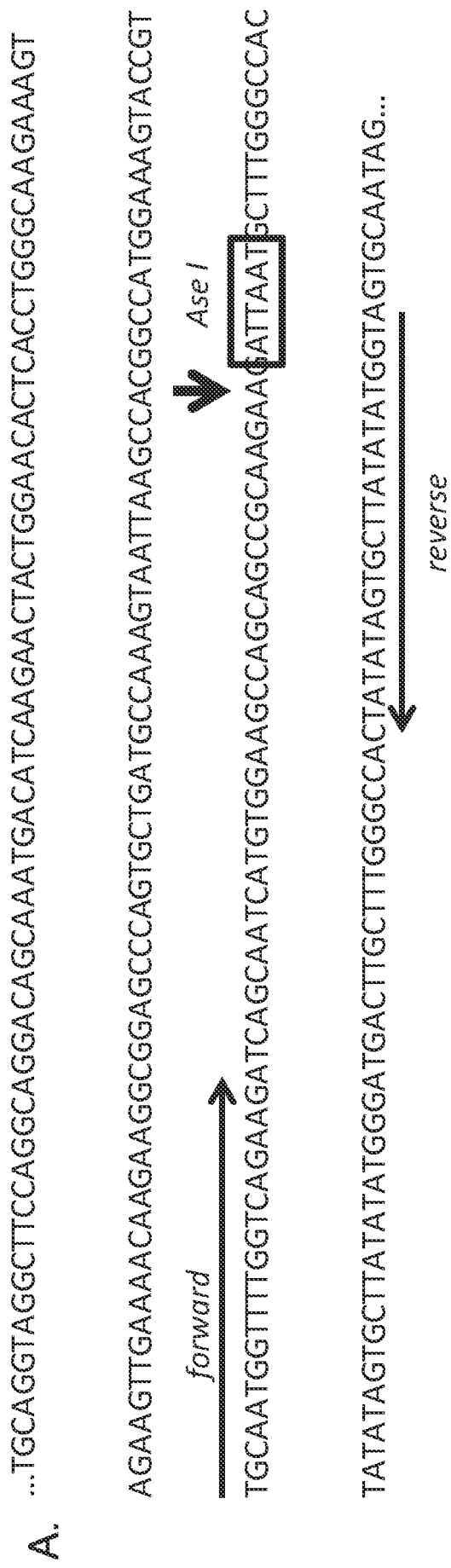


FIG. 16

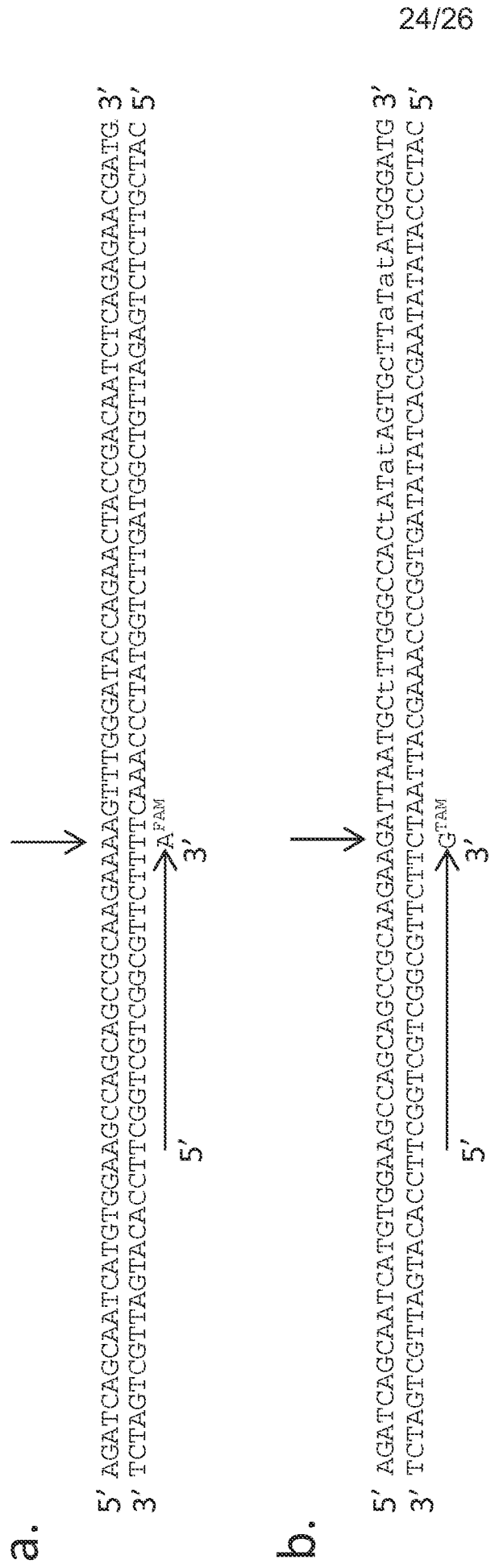


FIG. 17

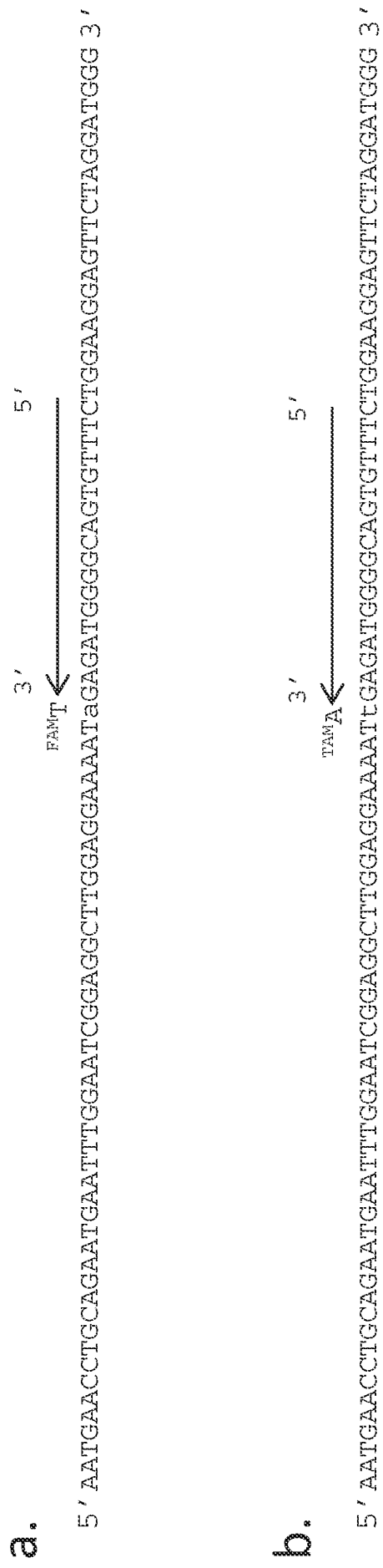
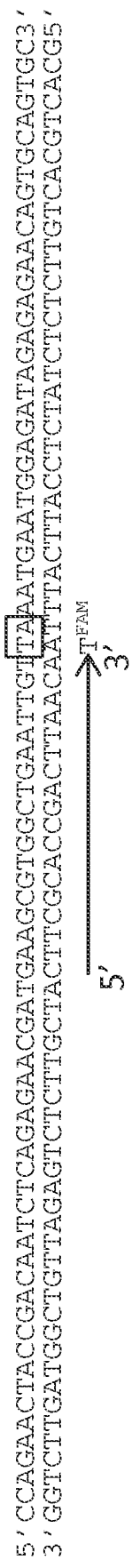


FIG. 18

a.



b.

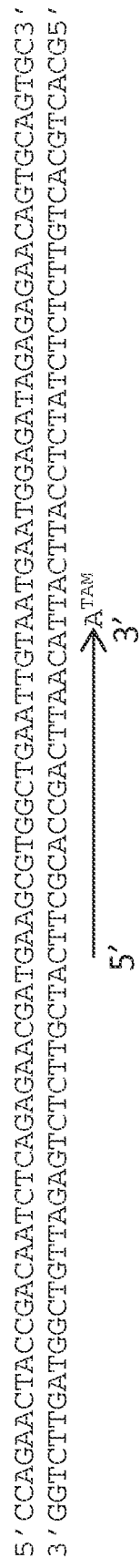


FIG. 19