

Figure S2. Sequences alignment of the coding sequence of the gene GRMZM2G569948

Alignment of the coding sequence of KCS (GRMZM2G569948) with sequences obtained through Sanger sequencing of PCR based products. 3 primers were used for the sequencing: ZmKCS-3F, ZmKCS-2R, ZmKCS-3R. The sequences of the primers can be found in the Table of primers in the supplementary materials. The coding sequence of KCS (GRMZM2G569948) was downloaded from maizegdb.org ID: ZEAMMB73_Zm00001d016438

	
	10 20 30 40 50	
KcsB73	ATGGAAAACC CGGCGCCGCC GACCAACCCG GCCTCCGCCA CGCCGTCGCC	
KCS3Fdes	ATGGAAAACC CGGCGCCGCC GACCAACCCG GCCTCCGCCA CGCCGTCGCC	
KCS3FWT	ATGGAAAACC CGGCGCCGCC GACCAACCCG GCCTCCGCCA CGCCGTCGCC	
Kcs2Rdes	-----	
Kcs2RWT	-----	
KCS3Rdes	-----	
KCS3RWT	-----	

	
	60 70 80 90 100	
KcsB73	GTCGCGGCAG CTGCCGGA CTCCAGCAGTC GGTTCGTCTC AAGTACGTGA	
KCS3Fdes	GTCGCGGCAG CTGCCGGA CTCCAGCAGTC GGTTCGTCTC AAGTACGTGA	
KCS3FWT	GTCGCGGCAG CTGCCGGA CTCCAGCAGTC GGTTCGTCTC AAGTACGTGA	
Kcs2Rdes	-----	
Kcs2RWT	-----	
KCS3Rdes	-----	
KCS3RWT	-----	

	
	110 120 130 140 150	
KcsB73	AGCTGGGGTA CCATTACCTC ATCACCACG GCATGTACCT GCTGCTCACC	
KCS3Fdes	AGCTGGGGTA CCATTACCTC ATCACCACG GCATGTACCT GCTGCTCACC	
KCS3FWT	AGCTGGGGTA CCATTACCTC ATCACCACG GCATGTACCT GCTGCTCACC	
Kcs2Rdes	-----	
Kcs2RWT	-----	
KCS3Rdes	-----	
KCS3RWT	-----	

	
	160 170 180 190 200	
KcsB73	CCGCTGATGG TGCTCGTGGC CGTGTA CTCCAGCTCT CCCC GCGCGA	
KCS3Fdes	CCGCTGATGG TGCTCGTGGC CGTGTA CTCCAGCTCT CCCC GCGCGA	
KCS3FWT	CCGCTGATGG TGCTCGTGGC CGTGTA CTCCAGCTCT CCCC GCGCGA	
Kcs2Rdes	-----	
Kcs2RWT	-----	
KCS3Rdes	-----	
KCS3RWT	-----	

	
	210 220 230 240 250	
KcsB73	CGTCGCCGAC CTGTGGG-CG CACCTCCGCC TCAACCTCAT CTCCGTGCTC	
KCS3Fdes	CGTCGCCGAC CTGTGGG-CG CACCTCCGCC TCAACCTCAT CTCCGTGCTG	
KCS3FWT	CGTCGCCGAC CTGTGGG-CG CACCTCCGCC TCAACCTCAT CTCCGTGCTC	
Kcs2Rdes	-----	
Kcs2RWT	CGTCGCCGAC CTGTGGGGCG CACCTCCGCC TCAACCTCAT CTCCGTGCTC	
KCS3Rdes	-----	
KCS3RWT	-----	

	
	260 270 280 290 300	
KcsB73	GCCTGCTCCA CGCTCCTCGT CTTCTCGGC ACGGCCTACT TCCTCACCCG	
KCS3Fdes	GCCTGCTCCA CGCTCCTCGT CTTCTCGGC ACGGCCTACT TCCTCACCCG	
KCS3FWT	GCCTGCTCCA CGCTCCTCGT CTTCTCGGC ACGGCCTACT TCCTCACCCG	
Kcs2Rdes	-----	
Kcs2RWT	GCCTGCTCCA CGCTCCTCGT CTTCTCGGC ACGGCCTACT TCCTCACCCG	
KCS3Rdes	-----	
KCS3RWT	-----	

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310 320 330 340 350

KcsB73	CCCGCGG-CC	CGTGTACCTG	GTCGACTTCG	CCTGCTACAA	GCCCGGGGCCG
KCS3Fdes	CCCGCGG-CC	CGTGTACCTG	GTCGACTTCG	CCTGCTACAA	GCCCGGGGCCG
KCS3FWT	CCCGCGG-CC	CGTGTACCTG	GTCGACTTCG	CCTGCTACAA	GCCCGGGGCCG
Kcs2Rdes	CCCGCGGGCC	CGTGTACCTG	GTCGACTTCG	CCTGCTACAA	GCCCGGGGCCG
Kcs2RWT	CCCGCGG-CC	CGTGTACCTG	GTCGACTTCG	CCTGCTACAA	GCCCGGGGCCG
KCS3Rdes	-----	-----	-----	-----	-----
KCS3RWT	-----	-----	-----	-----	-----

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360 370 380 390 400

KcsB73	GAGCGCCGGT	GCACGCGCGA	CACCTTCATG	CGCTGCTCCA	GGCTCACC GG
KCS3Fdes	GAGCGCCGGT	GCACGCGCGA	CACCTTCATG	CGCTGCTCCA	GGCTCACC GG
KCS3FWT	GAGCGCCGGT	GCACGCGCGA	CACCTTCATG	CGCTGCTCCA	GGCTCACC GG
Kcs2Rdes	GAGCGTCGGT	GCACGCGCGA	CACCTTCATG	CGCTGCTCCA	GGCTCACC GG
Kcs2RWT	GAGCGCCGGT	GCACGCGCGA	CACCTTCATG	CGCTGCTCCA	GGCTCACC GG
KCS3Rdes	-----	-----	-----	-----	-----
KCS3RWT	-----	-----	-----	-----	-----

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410 420 430 440 450

KcsB73	CTGCTTCACC	GACGCCAGCC	TCGAGTTCCA	GCGCAAGATC	CTGGAGCGCT
KCS3Fdes	CTGCTTCACC	GACGCCAGCC	TCGAGTTCCA	GCGCAAGATC	CTGGAGCGCT
KCS3FWT	CTGCTTCACC	GACGCCAGCC	TCGAGTTCCA	GCGCAAGATC	CTGGAGCGCT
Kcs2Rdes	CTGCTTCACT	GACGCCAGCC	TCGAGTTCCA	GCGCAAGATC	CTGGAGCGCT
Kcs2RWT	CTGCTTCACC	GACGCCAGCC	TCGAGTTCCA	GCGCAAGATC	CTGGAGCGCT
KCS3Rdes	-----	-----	-----	-----	-----
KCS3RWT	-----	-----	-----	-----	-----

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460 470 480 490 500

KcsB73	CGGGGCTGGG	CGAGGACACG	TACCTTCCCC	CCGCCGTCAC	GCGGGTGCCG
KCS3Fdes	CGGGGCTGGG	CGAGGACACG	TACCTTCCCC	CCGCCGTCAC	GCGGGTGCCG
KCS3FWT	CGGGGCTGGG	CGAGGACACG	TACCTTCCCC	CCGCCGTCAC	GCGGGTGCCG
Kcs2Rdes	CGGGGCTGGG	CGAGGACACG	TACCTTCCCC	CCGCCGTCAC	GCGGGTGCCG
Kcs2RWT	CGGGGCTGGG	CGAGGACACG	TACCTTCCCC	CCGCCGTCAC	GCGGGTGCCG
KCS3Rdes	-----	-----	-----	-----	-----
KCS3RWT	-----	-----	-----	-----	-----

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510 520 530 540 550

KcsB73	CCCAACCCGT	CCATGGACGA	GGCGCGCGCG	GAGGCGCGGG	AGGTCATGTT
KCS3Fdes	CCCAACCCGT	CCATGGACGA	GGCGCGCGCG	GAGGCGCGGG	AGGTCATGTT
KCS3FWT	CCCAACCCGT	CCATGGACGA	GGCGCGCGCG	GAGGCGCGGG	AGGTCATGTT
Kcs2Rdes	CCCAACCCGT	CCATGGACGA	GGCGCGCGCG	GAGGCGCGGG	AGGTCATGTT
Kcs2RWT	CCCAACCCGT	CCATGGACGA	GGCGCGCGCG	GAGGCGCGGG	AGGTCATGTT
KCS3Rdes	-----	-----	-----	-----	-----
KCS3RWT	-----	-----	-----	-----	-----

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560 570 580 590 600

KcsB73	CGGCGCCGTT	GACGAGCTGC	TCGCCAAGAC	GGGGGTCAAG	CCCAAAGACA
KCS3Fdes	CGGCGCCGTT	GACGAGCTGC	TCGCCAAGAC	GGGGGTCAAG	CCCAAAGACA
KCS3FWT	CGGCGCCGTT	GACGAGCTGC	TCGCCAAGAC	GGGGGTCAAG	CCCAAAGACA
Kcs2Rdes	CGGCGCCGTT	GACGAGCTGC	TCGCCAAGAC	GGGGGTCAAG	CCCAAAGACA
Kcs2RWT	CGGCGCCGTT	GACGAGCTGC	TCGCCAAGAC	GGGGGTCAAG	CCCAAAGACA
KCS3Rdes	-----	-----	-----	-----	-----
KCS3RWT	-----	-----	-----	-----	-----

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610 620 630 640 650

KcsB73	TCGGGATCCT	CGTGGTGAAC	TGCAGCCTGT	TCAACCCGAC	GCCGTCGCTG
KCS3Fdes	TCGGGATCCT	CGTGGTGAAC	TGCAGCCTGT	TCAACCCGAC	GCCGTCGCTG
KCS3FWT	TCGGGATCCT	CGTGGTGAAC	TGCAGCCTGT	TCAACCCGAC	GCCGTCGCTG

Kcs2Rdes	TCGGGATCCT	CGTGGTGAAC	TGCAGCCTGT	TCAACCCGAC	GCCGTCGCTG
Kcs2RWT	TCGGGATCCT	CGTGGTGAAC	TGCAGCCTGT	TCAACCCGAC	GCCGTCGCTG
KCS3Rdes	-----	-----	-----	-----	-----
KCS3RWT	-----	-----	-----	-----	-----

	660	670	680	690	700
KcsB73	TCGGCCATGG	TGGTCAACCA	CTACAAGCTG	CGCGGGAACG	TGGTGAGCTA
KCS3Fdes	TCGGCCATGG	TGGTCAACCA	CTACAAGCTG	CGCGGGAACG	TGGTGAGCTA
KCS3FWT	TCGGCCATGG	TGGTCAACCA	CTACAAGCTG	CGCGGGAACG	TGGTGAGCTA
Kcs2Rdes	TCGGCCATGG	TGGTCAACCA	CTACAAGCTG	CGCGGGAACG	TGGTGAGCTA
Kcs2RWT	TCGGCCATGG	TGGTCAACCA	CTACAAGCTG	CGCGGGAACG	TGGTGAGCTA
KCS3Rdes	-----	-----	-----	-----	-----
KCS3RWT	-----	-----	-----	-----	-----

	710	720	730	740	750
KcsB73	CAACCTCGGC	GGGATGGGGT	GCAGCGCC-G	GGCTGCTGTC	CGTGGACCTC
KCS3Fdes	CAACCTCGGC	GGGATGGGGT	GCAGCGCCCG	GGCTGCTGTC	CGTGGACCTC
KCS3FWT	CAACCTCGGC	GGGATGGGGT	GCAGCGCC-G	GGCTGCTGTC	CGTGGACCTC
Kcs2Rdes	CAACCTCGGC	GGGATGGGGT	GCAGCGCC-G	GGCTGCTGTC	CGTGGACCTC
Kcs2RWT	CAACCTCGGC	GGGATGGGGT	GCAGCGCC-G	GGCTGCTGTC	CGTGGACCTC
KCS3Rdes	-----	-----	-----	-----	~~~~~
KCS3RWT	-----	-----	-----	~~~~~	~~~~~

	760	770	780	790	800
KcsB73	GCCAAGGACC	TGCTGCAGAC	GCACCCGGGG	TCGTACGCGC	TGGTCATCAG
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	GCCAAGGACC	TGCTGCAGAC	GCACCCGGGG	TCGTACGCGC	TGGTCATCAG
Kcs2Rdes	GCCAAGGACC	TGCTGCAGAC	GCACCCGGGG	TCGTACGCGC	TGGTCATCAG
Kcs2RWT	GCCAAGGACC	TGCTGCAGAC	GCACCCGGGG	TCGTACGCGC	TGGTCATCAG
KCS3Rdes	~~~~~	~~~~~	~~~~~	TCGTACGCGC	TGGTCATCAG
KCS3RWT	~~~~~	~~~~~	~~~~~	TCGTACGCGC	TGGTCATCAG

	810	820	830	840	850
KcsB73	CACGGAGAAC	ATCACGCTCA	ACTGGTACTC	GGGGAACGAC	CGCTCCAAGC
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	C-----	-----	-----	-----	-----
Kcs2Rdes	CACGGAGAAC	ATCACGCTCA	ACTGGTACTC	GGGGAACGAC	CGCTCCAAGC
Kcs2RWT	CACGGAGAAC	ATCACGCTCA	ACTGGTACTC	GGGGAACGAC	CGCTCCAAGC
KCS3Rdes	CACGGAGAAC	ATCACGCTCA	ACTGGTACTC	GGGGAACGAC	CGCTCCAAGC
KCS3RWT	CACGGAGAAC	ATCACGCTCA	ACTGGTACTC	GGGGAACGAC	CGCTCCAAGC

	860	870	880	890	900
KcsB73	TGGTGTCCAA	CTGCCTGTTC	CGGATGGGCG	GCGCCGCGGT	GCTGCTCTCG
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	TGGTGTCCAA	CTGCCTGTTC	CGGATGGGCG	GCGCCGCGGT	GCTGCTCTCG
Kcs2RWT	TGGTGTCCAA	CTGCCTGTTC	CGGATGGGCG	GCGCCGCGGT	GCTGCTCTCG
KCS3Rdes	TGGTGTCCAA	CTGCCTGTTC	CGGATGGGCG	GCGCCGCGGT	GCTGCTCTCG
KCS3RWT	TGGTGTCCAA	CTGCCTGTTC	CGGATGGGCG	GCGCCGCGGT	GCTGCTCTCG

	910	920	930	940	950
KcsB73	AATCGGCGGT	CCGACCGGCG	GCGGGCCAAG	TACGAGCTGG	TGCACACGGT
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	AATCGGCGGT	CCGACCGGCG	GCGGGCCAAG	TACGAGCTGG	TGCACACGGT
Kcs2RWT	AATCGGCGGT	CCGACCGGCG	GCGGGCCAAG	TACGAGCTGG	TGCACACGGT
KCS3Rdes	AATCGGCGGT	CCGACCGGCG	GCGGGCCAAG	TACGAGCTGG	TGCACACGGT
KCS3RWT	AATCGGCGGT	CCGACCGGCG	GCGGGCCAAG	TACGAGCTGG	TGCACACGGT

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 960 970 980 990 1000

KcsB73

KCS3Fdes

KCS3FWT

Kcs2Rdes

Kcs2RWT

KCS3Rdes

KCS3RWT

GCGCACGCAC AAGGGCGCGG ACGACCGGTG CTTCGGCTGC GTGACGCAGG

GCGCACGCAC AAGGGCGCGG ACGACCGGTG CTTCGGCTGC GTGACGCAGG
GCGCACGCAC AAGGGCGCGG ACGACCGGTG CTTCGGCTGC GTGACGCAGG
GCGCACGCAC AAGGGCGCGG ACGACCGGTG CTTCGGCTGC GTGACGCAGG
GCGCACGCAC AAGGGCGCGG ACGACCGGTG CTTCGGCTGC GTGACGCAGG

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 1010 1020 1030 1040 1050

KcsB73

KCS3Fdes

KCS3FWT

Kcs2Rdes

Kcs2RWT

KCS3Rdes

KCS3RWT

AGGAGGACGG CGAGGGCGTC GTGGGCGTGT CGCTGTCGAG GGACCTGATG

AGGAGGACGG CGAGGGCGTC GTGGGCGTGT CGCTGTCGAG GGACCTGATG
AGGAGGACGG CGAGGGCGTC GTGGGCGTGT CGCTGTCGAG GGACCTGATG
AGGAGGACGG CGAGGGCGTC GTGGGCGTGT CGCTGTCGAG GGACCTGATG
AGGAGGACGG CGAGGGCGTC GTGGGCGTGT CGCTGTCGAG GGACCTGATG

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 1060 1070 1080 1090 1100

KcsB73

KCS3Fdes

KCS3FWT

Kcs2Rdes

Kcs2RWT

KCS3Rdes

KCS3RWT

GCGGTGGCGG GCGACGCGCT CAAGACGAAC ATAACAACGC TGGGCCCCGCT

GCGGTGGCGG GCGACGCGCT CAAGACGAAC ATAACAACGC TGGGCCCCGCT
GCGGTGGCGG GCGACGCGCT CAAGACGAAC ATAACAACGC TGGGCCCCGCT
GCGGTGGCGG GCGACGCGCT CAAGACGAAC ATAACAACGC TGGGCCCCGCT
GCGGTGGCGG GCGACGCGCT CAAGACGAAC ATAACAACGC TGGGCCCCGCT

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 1110 1120 1130 1140 1150

KcsB73

KCS3Fdes

KCS3FWT

Kcs2Rdes

Kcs2RWT

KCS3Rdes

KCS3RWT

GGTGCTGCCG CTGTCCGAGC AGCTGCTGTT CATGGCGACG CTGGTCGCCA

GGTGCTGCCG CTGTCCGAGC AGCTGCTGTT -----
GGTGCTGCCG CTGTCCGAGC AGCTGCTGTT -----
GGTGCTGCCG CTGTCCGAGC AGCTGCTGTT CATGGCGACG CTGGTCGCCA
GGTGCTGCCG CTGTCCGAGC AGCTGCTGTT CATGGCGACG CTGGTCGCCA

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 1160 1170 1180 1190 1200

KcsB73

KCS3Fdes

KCS3FWT

Kcs2Rdes

Kcs2RWT

KCS3Rdes

KCS3RWT

AGAAGCTGCT CAAGATGAAG AAGGTGAAGC CGTACATCCC GGATTTCAAA

AGAAGCTGCT CAAGATGAAG AAGGTGAAGC CGTACATCCC GGATTTCAAA
AGAAGCTGCT CAAGATGAAG AAGGTGAAGC CGTACATCCC GGATTTCAAA

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 1210 1220 1230 1240 1250

KcsB73

KCS3Fdes

KCS3FWT

Kcs2Rdes

Kcs2RWT

KCS3Rdes

KCS3RWT

CTGGCGTTTC AGCACTTCTG CATCCACGCC GGCGGCCGTG CCGTGCTGGA

CTGGCGTTTC AGCACTTCTG CATCCACGCC GGCGGCCGTG CCGTGCTGGA
CTGGCGTTTC AGCACTTCTG CATCCACGCC GGCGGCCGTG CCGTGCTGGA

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 1260 1270 1280 1290 1300

KcsB73

KCS3Fdes

KCS3FWT

Kcs2Rdes

CGAGCTGGAG AGCAACCTGG CGCTCACGGA TTGGCACATG GAGCCGTCGC

Kcs2RWT	-----	-----	-----	-----	-----
KCS3Rdes	CGAGCTGGAG	AGCAACCTGG	CGCTCACGGA	TTGGCACATG	GAGCCGTCGC
KCS3RWT	CGAGCTGGAG	AGCAACCTGG	CGCTCACGGA	TTGGCACATG	GAGCCGTCGC

	1310	1320	1330	1340	1350
KcsB73	GGATGACGCT	GCACCGGTTTC	GGGAACACGT	CCAGCAGCTC	GCTCTGGTAC
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	-----	-----	-----	-----	-----
Kcs2RWT	-----	-----	-----	-----	-----
KCS3Rdes	GGATGACGCT	GCACCGGTTTC	GGGAACACGT	CCAGCAGCTC	GCTCTGGTAC
KCS3RWT	GGATGACGCT	GCACCGGTTTC	GGGAACACGT	CCAGCAGCTC	GCTCTGGTAC

	1360	1370	1380	1390	1400
KcsB73	GAGCTGGCCT	ACAGCGAGGC	CAAGGGGAGG	ATCCGGCGCC	GCCACCGGGT
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	-----	-----	-----	-----	-----
Kcs2RWT	-----	-----	-----	-----	-----
KCS3Rdes	GAGCTGGCCT	ACAGCGAGGC	CAAGGGGAGG	ATCCGGCGCC	GCCACCGGGT
KCS3RWT	GAGCTGGCCT	ACAGCGAGGC	CAAGGGGAGG	ATCCGGCGCC	GCCACCGGGT

	1410	1420	1430	1440	1450
KcsB73	GTGGCAGATC	GCGTTCGGGT	CAGGGTTCAA	GTGCAACAGC	GCCGTGTGGA
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	-----	-----	-----	-----	-----
Kcs2RWT	-----	-----	-----	-----	-----
KCS3Rdes	GTGGCAGATC	GCGTTCGGGT	CAGGGTTCAA	GTGCAACAGC	GCCGTGTGGA
KCS3RWT	GTGGCAGATC	GCGTTCGGGT	CAGGGTTCAA	GTGCAACAGC	GCCGTGTGGA

	1460	1470	1480	1490	1500
KcsB73	GGGCGCTCCG	GTCGGTGAAC	CCGGCGGAGG	AGACGAACCC	GTGGATGGAC
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	-----	-----	-----	-----	-----
Kcs2RWT	-----	-----	-----	-----	-----
KCS3Rdes	GGGCGCTCCG	GTCGGTGAAC	CCGGCGGAGG	AGACGAACCC	GTGGATGGAC
KCS3RWT	GGGCGCTCCG	GTCGGTGAAC	CCGGCGGAGG	AGACGAACCC	GTGGATGGAC

	1510	1520	1530	1540	1550
KcsB73	GAGATCGACA	GGTTTCCCGT	GGATGTTCCC	AAGGTCTCTA	AGGTTTCAAG
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	-----	-----	-----	~~~~~	~~~~~
Kcs2RWT	-----	-----	-----	~~~~~	~~~~~
KCS3Rdes	GAGATCGACA	GGTTTCCCGT	GGATGTTCCC	AAGGTCTCTA	AGGTTTCAAG
KCS3RWT	GAGATCGACA	GGTTTCCCGT	GGATGTTCCC	AAGGTCTCTA	AGGTTTCAAG

	1560	1570	1580	1590	1600
KcsB73	CGACTGA---	-----	-----	-----	-----
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	~~~~~	-----	-----	-----	-----
Kcs2RWT	~~~~~	-----	-----	-----	-----
KCS3Rdes	CGACTGAAAT	GCATTGCTAG	TTGCGTGAAT	GATGGAGCTT	GCAATTGTTT
KCS3RWT	CGACTGAAAT	GCATTGCTAG	TTGCGTGAAT	GATGGAGCTT	GCAATTGTTT

	1610	1620	1630	1640	1650
KcsB73	-----	-----	-----	-----	-----
KCS3Fdes	-----	-----	-----	-----	-----
KCS3FWT	-----	-----	-----	-----	-----
Kcs2Rdes	-----	-----	-----	-----	-----
Kcs2RWT	-----	-----	-----	-----	-----
KCS3Rdes	GGATAGAAGA	-----	-----	-----	-----
KCS3RWT	GGATAGAAGA	TCTGGTGGAA	TTTTTCATAG	TTCAT-----	-----