

Supplemental Table 5. Sequence of crRNAs and the respective variants edited using these crRNAs

crRNA sequence	Variants edited using the specific crRNA
AAAAAATGTTGGCCTCTCTT	T10P, T10I, T10K, T10=, F11L (c.31T>C), F11V, F11C, F11L (c.33T>G), F12S
TTAAAAATTTCAAAAAATGT	E13*, E13K, E13V, E13D, I14V, I14N, I14M
AAGACACGCTGCAACAAAGC	F15L, F15C, K16R, T17I, T17=, R18H, C19R, C19Y, C19F, A22= (c.66A>C), A22= (c.66A>G), A22= (c.66A>T), D23H
TCAAACCAATTAAGACTTAT	D23G, D23V, L24V, L24F, G25*, G25R, G25E, P26S, P26R, P26L, P26=, S28G, S28N, N30D, N30H, N30S, N30K
TAGGACCAATAAGTCTTAAT	L29V, L29R, N30D, N30H, N30S, N30K, W31R, W31G, W31L, W31C, F32L (c.94T>C), F32L (c.96T>G), E33*, E33K, L35F
GCAGGTTTCAGAATTATAGGG	S36Y, S36F, S37A, S37L, S37*, E38K, A39=
GGGTTTATAATCACTATAGA	H2623Y, H2623R
ATCACTATAGATGGATCATA	W2626C, I2627F
TTATTGAACTTACAGATGGG	T2722R, D2723A, D2723G
AACTCAGTATCAACAACCTAC	Y3035S
CAGAAACGACAAATCCTATT	G3076V, G3076E, V3079I
AGATGGGTGGTATGCTGTTA	V2728I, K2729N
TGTTCTGAGGTGGACCTAAT	L3074=

Few variants (such as N30D, N30H, N30S and N30K) are edited using multiple crRNAs

Supplemental Table 6. List of all ssODNs used in this study

T10P

Ref: ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A
MUT: ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P P F F E I F K T R C N K A
WT': ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACCTTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A

T10I

Ref: ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A
MUT: ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P I F F E I F K T R C N K A
WT': ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACCTTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A

T10K

Ref: ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A
MUT: ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P K F F E I F K T R C N K A
WT': ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACCTTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A

T10=

Ref: ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A
MUT: ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACGTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A
WT': ATATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACCTTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGAC
M P I G S K E R P T F F E I F K T R C N K A

F11L (c.31T>C)

Ref: ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T F F E I F K T R C N K A
MUT: ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACAGTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T L F E I F K T R C N K A
WT': ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTCCTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T F F E I F K T R C N K A

F11V

Ref: ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T F F E I F K T R C N K A
MUT: ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACAGTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T V F E I F K T R C N K A
WT': ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTCCTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T F F E I F K T R C N K A

F11C

Ref: ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T F F E I F K T R C N K A
MUT: ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACAGTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T C F E I F K T R C N K A
WT': ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTCCTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T F F E I F K T R C N K A

F11L (c.33T>G)

Ref: ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T F F E I F K T R C N K A
MUT: ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTCGTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T L F E I F K T R C N K A
WT': ATCGTAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTCCTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAA
M P I G S K E R P T F F E I F K T R C N K A

F12S

Ref: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A
MUT: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTCTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F S E I F K T R C N K A
WT': TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTCTGTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A

E13*

Ref: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A
MUT: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATT TT TAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F - I F K T R C N K A
WT': TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATT TT GAGATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A

E13K

Ref: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A
MUT: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATT TT AAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F K I F K T R C N K A
WT': TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATT TT GAGATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A

E13V

Ref: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A
MUT: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATT TT GTTATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F V I F K T R C N K A
WT': TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATT TT GAGATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A

E13D

Ref: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A
MUT: TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATT TT GAGATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F D I F K T R C N K A
WT': TAGGTAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATT TT GAGATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTT
M P I G S K E R P T F F E I F K T R C N K A

I14V

Ref: TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E I F K T R C N K A
MUT: TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAGTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E V F K T R C N K A
WT': TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAATCTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E I F K T R C N K A

I14N

Ref: TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E I F K T R C N K A
MUT: TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAATAATTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E N F K T R C N K A
WT': TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAATCTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E I F K T R C N K A

I14M

Ref: TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E I F K T R C N K A
MUT: TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E M F K T R C N K A
WT': TAAAAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATAT
M P I G S K E R P T F F E I F K T R C N K A

F15L

Ref: AAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAA
M P I G S K E R P T F F E I F K T R C N K A
MUT: AAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAA
M P I G S K E R P T F F E I L K T R C N K A
WT': AAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAA
M P I G S K E R P T F F E I F K T R C N K A

F15C

Ref: AAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAA
M P I G S K E R P T F F E I F K T R C N K A
MUT: AAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAA
M P I G S K E R P T F F E I C K T R C N K A
WT': AAATGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAA
M P I G S K E R P T F F E I F K T R C N K A

K16R

Ref: TGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAACTT
P I G S K E R P T F F E I F K T R C N K A
MUT: TGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAACTT
P I G S K E R P T F F E I F R T R C N K A
WT': TGCCTATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAACTT
P I G S K E R P T F F E I F K T R C N K A

T17I

Ref: TATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAACTTTATA
I G S K E R P T F F E I F K T R C N K A
MUT: TATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGATACGCTGCAATAAAGCAGGTATTGACAAATTTTATATAACTTTATA
I G S K E R P T F F E I F K I R C N K A
WT': TATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACCGCTGCAATAAAGCAGGTATTGACAAATTTTATATAACTTTATA
I G S K E R P T F F E I F K T R C N K A

T17=

Ref: TATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTTATATAACTTTATA
I G S K E R P T F F E I F K T R C N K A
MUT: TATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACGCGCTGCAATAAAGCAGGTATTGACAAATTTTATATAACTTTATA
I G S K E R P T F F E I F K T R C N K A
WT': TATTGGATCCAAAGAGAGGCCAACATTTTTTGAAATTTTAAAGACCGCTGCAATAAAGCAGGTATTGACAAATTTTATATAACTTTATA
I G S K E R P T F F E I F K T R C N K A

R18H

Ref: TTGGATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTATATAACTTTATAAA
G S K E R P T F F E I F K T R C N K A
MUT: TTGGATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACACTGCAAAAGCAGGTATTGACAAATTTATATAACTTTATAAA
G S K E R P T F F E I F K T H C N K A
WT': TTGGATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGATGCAAAAGCAGGTATTGACAAATTTATATAACTTTATAAA
G S K E R P T F F E I F K T R C N K A

C19R

Ref: GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R C N K A
MUT: GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGACGCAATAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R R N K A
WT': GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGATGTAAATAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R C N K A

C19Y

Ref: GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R C N K A
MUT: GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGATACAAATAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R Y N K A
WT': GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGATGTAAATAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R C N K A

C19F

Ref: GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R C N K A
MUT: GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGATTCAAATAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R F N K A
WT': GATCCAAAGAGAGGCCAACATTTTTGAAATTTTAAAGACACGATGTAAATAAGCAGGTATTGACAAATTTATATAACTTTATAAATTA
S K E R P T F F E I F K T R C N K A

A22= (c.66A>C)

Ref: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTATATAACTTTATAAATTACACCGAGAA
R P T F F E I F K T R C N K A
MUT: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAATAAAGCCGGTATTGACAAATTTATATAACTTTATAAATTACACCGAGAA
R P T F F E I F K T R C N K A
WT': AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTATATAACTTTATAAATTACACCGAGAA
R P T F F E I F K T R C N K A

A22= (c.66A>G)

Ref: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGTATTGACAAATTTATATAACTTTATAAATTACACCGAGAA
R P T F F E I F K T R C N K A
MUT: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAATAAAGCCGGTATTGACAAATTTATATAACTTTATAAATTACACCGAGAA
R P T F F E I F K T R C N K A
WT': AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGTAACAAAGCAGGTATTGACAAATTTATATAACTTTATAAATTACACCGAGAA
R P T F F E I F K T R C N K A

A22= (c.66A>T)

Ref: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A
MUT: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAAAGGCTGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A
WT': AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A

D23H – ssODN pair #1

Ref: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A
MUT: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A
WT': AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A

D23H – ssODN pair #2

Ref: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A
MUT: AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A
WT': AGAGGCCAACATTTTTGAAATTTTAAAGACACGCTGCAACAAAGCAGGATATTGACAAATTTATATAACTTTATAAAATTACACCGAGAA
R P T F F E I F K T R C N K A

D23G

Ref: TCACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCT
L G P I S L N W F E E L S
MUT: TCACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCT
L G P I S L N W F E E L S
WT': TCACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCT
L G P I S L N W F E E L S

D23V

Ref: TCACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCT
L G P I S L N W F E E L S
MUT: TCACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCT
L G P I S L N W F E E L S
WT': TCACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCT
L G P I S L N W F E E L S

L24V

Ref: ACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCTTC
L G P I S L N W F E E L S
MUT: ACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCTTC
V G P I S L N W F E E L S
WT': ACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTGAAGAACCTTCTTC
L G P I S L N W F E E L S

L24F

Ref: ACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTC
L G P I S L N W F E E L S
MUT: ACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTTGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTC
F G P I S L N W F E E L S
WT': ACTGGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTGGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTC
L G P I S L N W F E E L S

G25*

Ref: GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L G P I S L N W F E E L S S
MUT: GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGGACCAATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L - P I S L N W F E E L S S
WT': GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGGTCCAATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L G P I S L N W F E E L S S

G25R

Ref: GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L G P I S L N W F E E L S S
MUT: GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGGACCAATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L R P I S L N W F E E L S S
WT': GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGGTCCAATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L G P I S L N W F E E L S S

G25E

Ref: GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L G P I S L N W F E E L S S
MUT: GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGAACCAATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L E P I S L N W F E E L S S
WT': GGTTAAACTAAGGTGGGATTTTTTTTTTAAATAGATTTAGGTCCAATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGA
L G P I S L N W F E E L S S

P26S

Ref: AAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
L G P I S L N W F E E L S S E A
MUT: AAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
L G S I S L N W F E E L S S E A
WT': AAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCTATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
L G P I S L N W F E E L S S E A

P26R

Ref: AAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
L G P I S L N W F E E L S S E A
MUT: AAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACGAATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
L G R I S L N W F E E L S S E A
WT': AAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCTATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
L G P I S L N W F E E L S S E A

P26L

Ref: AAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT

L G P I S L N W F E E L S S E A
 MUT: AAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
 L G L I S L N W F E E L S S E A
 WT': AAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCTATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
 L G P I S L N W F E E L S S E A

P26=

Ref: AAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
 L G P I S L N W F E E L S S E A
 MUT: AAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCGATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
 L G P I S L N W F E E L S S E A
 WT': AAAACTAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCTATTAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCT
 L G P I S L N W F E E L S S E A

S28G – ssODN pair #1

Ref: TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I S L N W F E E L S S E A P
 MUT: TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATTGGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I G L N W F E E L S S E A P
 WT': TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATTAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I S L N W F E E L S S E A P

S28G – ssODN pair #2

Ref: TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I S L N W F E E L S S E A P
 MUT: TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I G L N W F E E L S S E A P
 WT': TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I S L N W F E E L S S E A P

S28N

Ref: TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I S L N W F E E L S S E A P
 MUT: TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAATCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I N L N W F E E L S S E A P
 WT': TAAGGTGGGATTTTTTTTTTAAATAGATTAGGACCAATTAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACC
 L G P I S L N W F E E L S S E A P

L29V

Ref: GGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTA
 L G P I S L N W F E E L S S E A P P
 MUT: GGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTA
 L G P I S V N W F E E L S S E A P P
 WT': GGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTA
 L G P I S L N W F E E L S S E A P P

L29R

Ref: GGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTA
 L G P I S L N W F E E L S S E A P P
 MUT: GGTGGGATTTTTTTTTTAAATAGATTAGGACCAATAAGCGTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTA
 L G P I S R N W F E E L S S E A P P

WT': GGTGGGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTCAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTA
L G P I S L N W F E E L S S E A P P

N30D – ssODN pair #1

Ref: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N
MUT: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTGAATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L D W F E E L S S E A P P Y N
WT': GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N

N30D – ssODN pair #2

Ref: GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N
MUT: GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTGATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L D W F E E L S S E A P P Y N
WT': GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTAATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N

N30H – ssODN pair #1

Ref: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N
MUT: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTCAATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L H W F E E L S S E A P P Y N
WT': GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N

N30H – ssODN pair #2

Ref: GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N
MUT: GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTCATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L H W F E E L S S E A P P Y N
WT': GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTAATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N

N30S – ssODN pair #1

Ref: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N
MUT: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAGTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L S W F E E L S S E A P P Y N
WT': GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N

N30S – ssODN pair #2

Ref: GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N
MUT: GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTAGTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L S W F E E L S S E A P P Y N
WT': GGATTTTTTTTTTAAATAGATTTAGGA^{CCA}ATAAGTCTTAATGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N

N30K – ssODN pair #1

Ref: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N
MUT: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAAGTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L K W F E E L S S E A P P Y N
WT': GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAAGTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N

N30K – ssODN pair #2

Ref: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTTGGTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N
MUT: GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAAGTTGGTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L K W F E E L S S E A P P Y N
WT': GGATTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAAGTTGGTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAAT
L G P I S L N W F E E L S S E A P P Y N

W31R

Ref: TTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N W F E E L S S E A P P Y N S
MUT: TTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATCGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N R F E E L S S E A P P Y N S
WT': TTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N W F E E L S S E A P P Y N S

W31G

Ref: TTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N W F E E L S S E A P P Y N S
MUT: TTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATGGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N G F E E L S S E A P P Y N S
WT': TTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N W F E E L S S E A P P Y N S

W31L – ssODN pair #1

Ref: TTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N W F E E L S S E A P P Y N S
MUT: TTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N L F E E L S S E A P P Y N S
WT': TTTTTTTTTTAAATAGATTTAGGACCAATAAGCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N W F E E L S S E A P P Y N S

W31L – ssODN pair #2

Ref: TTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N W F E E L S S E A P P Y N S
MUT: TTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N L F E E L S S E A P P Y N S
WT': TTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT
L G P I S L N W F E E L S S E A P P Y N S

W31C

Ref: TTTTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAACTTTCTTCAGAAGCTCCACCCTATAATTCT

L G P I S L N W F E E L S S E A P P Y N S
 MUT: TTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCT
 L G P I S L N **C** F E E L S S E A P P Y N S
 WT': TTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAA**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCT
 L G P I S L N W F E E L S S E A P P Y N S

F32L (c.94T>C)

Ref: TTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAA
 L G P I S L N W F E E L S S E A P P Y N S E
 MUT: TTTTTTTTAAATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAA
 L G P I S L N W **L** E E L S S E A P P Y N S E
 WT': TTTTTTTTAAATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAA
 L G P I S L N W F E E L S S E A P P Y N S E

F32L (c.96T>G)

Ref: TTTTTTTTAAATAGATTTAGGACCAATAAGTCTTAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAA
 L G P I S L N W F E E L S S E A P P Y N S E
 MUT: TTTTTTTTAAATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAA
 L G P I S L N W **L** E E L S S E A P P Y N S E
 WT': TTTTTTTTAAATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAA
 L G P I S L N W F E E L S S E A P P Y N S E

E33*

Ref: TTTTAAATAGATTTAGGACCAATAAGTCTTAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAACCT
 L G P I S L N W F E E L S S E A P P Y N S E P
 MUT: TTTTAAATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTT**TAA**GAACTTCTTCAGAAGCTCCACCCTATAATTCTGAACCT
 L G P I S L N W F **-** E E L S S E A P P Y N S E P
 WT': TTTTAAATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTT**GAG**GAACTTCTTCAGAAGCTCCACCCTATAATTCTGAACCT
 L G P I S L N W F E E L S S E A P P Y N S E P

E33K

Ref: TTTTAAATAGATTTAGGACCAATAAGTCTTAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAACCT
 L G P I S L N W F E E L S S E A P P Y N S E P
 MUT: TTTTAAATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTT**TAA**GAACTTCTTCAGAAGCTCCACCCTATAATTCTGAACCT
 L G P I S L N W F **K** E E L S S E A P P Y N S E P
 WT': TTTTAAATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTT**GAG**GAACTTCTTCAGAAGCTCCACCCTATAATTCTGAACCT
 L G P I S L N W F E E L S S E A P P Y N S E P

L35F

Ref: ATAGATTTAGGACCAATAAGTCTTAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAACCTGCAGAA
 L G P I S L N W F E E L S S E A P P Y N S E P A E
 MUT: ATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAACCTGCAGAA
 L G P I S L N W F E E **F** S S E A P P Y N S E P A E
 WT': ATAGATTTAGGACCAATAAG**CTT**AAAT**TGG**TTTGAAGAAGCTTCTTCAGAAGCTCCACCCTATAATTCTGAACCTGCAGAA
 L G P I S L N W F E E L S S E A P P Y N S E P A E

S36Y

Ref: GATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTCTTCAGAAGCT**CCA**CCCTATAATTCTGAACCTGCAGAAGAA
 L G P I S L N W F E E L S S E A P P Y N S E P A E E
 MUT: GATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTT**TAT**TCAGAAGCT**CCA**CCCTATAATTCTGAACCTGCAGAAGAA
 L G P I S L N W F E E L **Y** S S E A P P Y N S E P A E E

WT': GATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCAGAGCTCCACCATAAATTCTGAACCTGCAGAAGAA
L G P I S L N W F E E L S S E A P P Y N S E P A E E

S36F

Ref: GATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAA
L G P I S L N W F E E L S S E A P P Y N S E P A E E
MUT: GATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTTCAGAGCTCCACCATAAATTCTGAACCTGCAGAAGAA
L G P I S L N W F E E L F S E A P P Y N S E P A E E
WT': GATTTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCAGAGCTCCACCATAAATTCTGAACCTGCAGAAGAA
L G P I S L N W F E E L S S E A P P Y N S E P A E E

S37A

Ref: TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S S E A P P Y N S E P A E E S
MUT: TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S A E A P P Y N S E P A E E S
WT': TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S S E A P P Y N S E P A E E S

S37L

Ref: TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S S E A P P Y N S E P A E E S
MUT: TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTTAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S L E A P P Y N S E P A E E S
WT': TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S S E A P P Y N S E P A E E S

S37*

Ref: TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S S E A P P Y N S E P A E E S
MUT: TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S - E A P P Y N S E P A E E S
WT': TTAGGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCT
L G P I S L N W F E E L S S E A P P Y N S E P A E E S

E38K

Ref: GGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCTGAA
G P I S L N W F E E L S S E A P P Y N S E P A E E S E
MUT: GGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCTGAA
G P I S L N W F E E L S S K A P P Y N S E P A E E S E
WT': GGACCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCTGAA
G P I S L N W F E E L S S E A P P Y N S E P A E E S E

A39=

Ref: CCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCTGAACAT
P I S L N W F E E L S S E A P P Y N S E P A E E S E H
MUT: CCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCTGAACAT
P I S L N W F E E L S S E A P P Y N S E P A E E S E H
WT': CCAATAAGTCTTAATTGGTTTGAAGAAGCTTTCTTCAGAGCTCCACCCTATAATTCTGAACCTGCAGAAGAATCTGAACAT
P I S L N W F E E L S S E A P P Y N S E P A E E S E H

H2623Y

Ref: CAGGTGTGGATCCAAAGCTTATTTCTAGAATTGGGTTTATAATCACTATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCT
G V D P K L I S R I W V Y N H Y R W I I W K L A A M E C A
MUT: CAGGTGTGGATCCAAAGCTTATTTCTAGAATTGGGTTTATAATTACTATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCT
G V D P K L I S R I W V Y N Y Y R W I I W K L A A M E C A
WT': CAGGTGTGGATCCAAAGCTTATTTCTAGAATTGGGTTTATAATCATATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCT
G V D P K L I S R I W V Y N H Y R W I I W K L A A M E C A

H2623R

Ref: CAGGTGTGGATCCAAAGCTTATTTCTAGAATTGGGTTTATAATCACTATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCT
G V D P K L I S R I W V Y N H Y R W I I W K L A A M E C A
MUT: CAGGTGTGGATCCAAAGCTTATTTCTAGAATTGGGTTTATAATCGATATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCT
G V D P K L I S R I W V Y N R Y R W I I W K L A A M E C A
WT': CAGGTGTGGATCCAAAGCTTATTTCTAGAATTGGGTTTATAATCATATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCT
G V D P K L I S R I W V Y N H Y R W I I W K L A A M E C A

W2626C

Ref: TCCAAAGCTTATTTCTAGAATTGGGTTTATAATCACTATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCTTTCTTAAGGA
P K L I S R I W V Y N H Y R W I I W K L A A M E C A F P K
MUT: TCCAAAGCTTATTTCTAGAATTGGGTTTATAATCACTATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCTTTCTTAAGGA
P K L I S R I W V Y N H Y R C I I W K L A A M E C A F P K
WT': TCCAAAGCTTATTTCTAGAATTGGGTTTATAATCACTATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCTTTCTTAAGGA
P K L I S R I W V Y N H Y R W I I W K L A A M E C A F P K

I2627F

Ref: TCCAAAGCTTATTTCTAGAATTGGGTTTATAATCACTATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCTTTCTTAAGGA
P K L I S R I W V Y N H Y R W I I W K L A A M E C A F P K
MUT: TCCAAAGCTTATTTCTAGAATTGGGTTTATAATCACTATAGATGGATTCATATGGAACTGGCAGCTATGGAATGTGCCTTTCTTAAGGA
P K L I S R I W V Y N H Y R F I W K L A A M E C A F P K
WT': TCCAAAGCTTATTTCTAGAATTGGGTTTATAATCACTATAGATGGATCATATGGAACTGGCAGCTATGGAATGTGCCTTTCTTAAGGA
P K L I S R I W V Y N H Y R W I I W K L A A M E C A F P K

T2722R

Ref: AAAC TAGTAGTGCAGATACCCAAAAAGTGGCCATTATTGAACTTACAGATGGGTGGTATGCTGTTAAGGCCAGTTAGATCCTCCCCTCT
T S S A D T Q K V A I I E L T D G W Y A V K A Q L D P P L
MUT: AAAC TAGTAGTGCAGATACCCAAAAAGTGGCCATTATTGAACTTACAGATGGGTGGTATGCTGTTAAGGCCAGTTAGATCCTCCCCTCT
T S S A D T Q K V A I I E L R D G W Y A V K A Q L D P P L
WT': AAAC TAGTAGTGCAGATACCCAAAAAGTGGCCATTATTGAACTTACTGATGGGTGGTATGCTGTTAAGGCCAGTTAGATCCTCCCCTCT
T S S A D T Q K V A I I E L T D G W Y A V K A Q L D P P L

D2723A

Ref: AAAC TAGTAGTGCAGATACCCAAAAAGTGGCCATTATTGAACTTACAGATGGGTGGTATGCTGTTAAGGCCAGTTAGATCCTCCCCTCTTA
T S S A D T Q K V A I I E L T D G W Y A V K A Q L D P P L L
MUT: AAAC TAGTAGTGCAGATACCCAAAAAGTGGCCATTATTGAACTTACAGCTGGGTGGTATGCTGTTAAGGCCAGTTAGATCCTCCCCTCTTA
T S S A D T Q K V A I I E L T A G W Y A V K A Q L D P P L L
WT': AAAC TAGTAGTGCAGATACCCAAAAAGTGGCCATTATTGAACTTACAGCTGGGTGGTATGCTGTTAAGGCCAGTTAGATCCTCCCCTCTTA
T S S A D T Q K V A I I E L T D G W Y A V K A Q L D P P L L

D2723G

Ref: AAAC TAGTAGTGCAGATACCCAAAAAGTGGCCATTATTGAACTTACAGATGGGTGGTATGCTGTTAAGGCCAGTTAGATCCTCCCCTCTTA

T S S A D T Q K V A I I E L T D G W Y A V K A Q L D P P L L
MUT: A A A C T A G T A G T G C A G A T A C C C A A A A G T G G C C A T T A T T G A A C T T A C A G G T G G G T G G T A T G C T G T T A A G G C C C A G T T A G A T C C T C C C C T C T T A
T S S A D T Q K V A I I E L T G G W Y A V K A Q L D P P L L
WT': A A A C T A G T A G T G C A G A T A C C C A A A A G T G G C C A T T A T T G A A C T T A C A G A C G G G T G G T A T G C T G T T A A G G C C C A G T T A G A T C C T C C C C T C T T A
T S S A D T Q K V A I I E L T D G W Y A V K A Q L D P P L L

V2728I

Ref: C C C A A A A A G T G G C C A T T A T T G A A C T T A C A G A T G G G T G G T A T G C T G T T A A G G C C C A G T T A G A T C C T C C C C T C T T A G C T G T C T T A A G A A T G
Q K V A I I E L T D G W Y A V K A Q L D P P L L A V L K N
MUT: C C C A A A A A G T G G C C A T T A T T G A A C T T A C A G A T G G G T G G T A T G C T A T T A A G G C C C A G T T A G A T C C T C C C C T C T T A G C T G T C T T A A G A A T G
Q K V A I I E L T D G W Y A I K A Q L D P P L L A V L K N
WT': C C C A A A A A G T G G C C A T T A T T G A A C T T A C A G A T G G G T G G T A T G C T G T A A G G C C C A G T T A G A T C C T C C C C T C T T A G C T G T C T T A A G A A T G
Q K V A I I E L T D G W Y A V K A Q L D P P L L A V L K N

K2729N

Ref: A A A A A G T G G C C A T T A T T G A A C T T A C A G A T G G G T G G T A T G C T G T T A A G G C C C A G T T A G A T C C T C C C C T C T T A G C T G T C T T A A G A A T G G C A
K V A I I E L T D G W Y A V K A Q L D P P L L A V L K N G
MUT: A A A A A G T G G C C A T T A T T G A A C T T A C A G A T G G G T G G T A T G C T G T T A A T G C C C A G T T A G A T C C T C C C C T C T T A G C T G T C T T A A G A A T G G C A
K V A I I E L T D G W Y A V N A Q L D P P L L A V L K N G
WT': A A A A A G T G G C C A T T A T T G A A C T T A C A G A T G G G T G G T A T G C T G T T A A G C C C A G T T A G A T C C T C C C C T C T T A G C T G T C T T A A G A A T G G C A
K V A I I E L T D G W Y A V K A Q L D P P L L A V L K N G

Y3035S

Ref: C T G A A G A G C T A A C A T A C A G T T A G C A G C G A C A A A A A A A C T C A G T A A C A A C T A C C G G T A C A A C C T T T C A T T G T A A T T T T C A G T T T
E R A N I Q L A A T K K T Q Y Q Q L P
MUT: C T G A A G A G C T A A C A T A C A G T T A G C A G C G A C A A A A A A A C T C A G T C T C A A C A C T A C C G G T A C A A C C T T T C A T T G T A A T T T T C A G T T T
E R A N I Q L A A T K K T Q S Q Q L P
WT': C T G A A G A G C T A A C A T A C A G T T A G C A G C G A C A A A A A A A C T C A G T A C C A A C A C T A C C G G T A C A A C C T T T C A T T G T A A T T T T C A G T T T
E R A N I Q L A A T K K T Q Y Q Q L P

L3074=

Ref: T T T T T A G A T C C A G A C T T T C A G C C A T C T T G T T C T G A G G T G G A C C T A A T A G G A T T T G T C G T T T C T G T T G T G A A A A A A C A G G T A A T G C A C A A
F L D P D F Q P S C S E V D L I G F V V S V V K K T
MUT: T T T T T A G A T C C A G A C T T T C A G C C A T C T T G T T C T G A G G T G G A C C T G A T A G G A T T T G T C G T T T C T G T T G T G A A A A A A C A G G T A A T G C A C A A
F L D P D F Q P S C S E V D L I G F V V S V V K K T
WT': T T T T T A G A T C C A G A C T T T C A G C C A T C T T G T T C T G A G G T G G A C C T T A T A G G A T T T G T C G T T T C T G T T G T G A A A A A A C A G G T A A T G C A C A A
F L D P D F Q P S C S E V D L I G F V V S V V K K T

G3076V

Ref: T A G A T C C A G A C T T T C A G C C A T C T T G T T C T G A G G T G G A C C T A A T A G G A T T T G T C G T T T C T G T T G T G A A A A A A C A G G T A A T G C A C A A T A T A
D P D F Q P S C S E V D L I G F V V S V V K K T
MUT: T A G A T C C A G A C T T T C A G C C A T C T T G T T C T G A G G T G G A C C T A A T A G T A T T T G T C G T T T C T G T T G T G A A A A A A C A G G T A A T G C A C A A T A T A
D P D F Q P S C S E V D L I V F V V S V V K K T
WT': T A G A T C C A G A C T T T C A G C C A T C T T G T T C T G A G G T G G A C C T A A T A G G T T T T G T C G T T T C T G T T G T G A A A A A A C A G G T A A T G C A C A A T A T A
D P D F Q P S C S E V D L I G F V V S V V K K T

G3076E

Ref: T A G A T C C A G A C T T T C A G C C A T C T T G T T C T G A G G T G G A C C T A A T A G G A T T T G T C G T T T C T G T T G T G A A A A A A C A G G T A A T G C A C A A T A T A
D P D F Q P S C S E V D L I G F V V S V V K K T
MUT: T A G A T C C A G A C T T T C A G C C A T C T T G T T C T G A G G T G G A C C T A A T A G A A T T T G T C G T T T C T G T T G T G A A A A A A C A G G T A A T G C A C A A T A T A
D P D F Q P S C S E V D L I E F V V S V V K K T

WT ' : TAGATCCAGACTTTCAGCCATCTTGTCTGAGGTGGACCTAATAGGGTTTGTGCGTTTCTGTTGTGAAAAAACAGGTAATGCACAATATA
D P D F Q P S C S E V D L I G F V V S V V K K T

V3079I

Ref : TTTCAGCCATCTTGTCTGAGGTGGACCTAATAGGATTGTCGTTTCTGTTGTGAAAAAACAGGTAATGCACAATATAGTTAATTTTTT
F Q P S C S E V D L I G F V V S V V K K T

MUT : TTTCAGCCATCTTGTCTGAGGTGGACCTAATAGGATTGTCATTCTGTTGTGAAAAAACAGGTAATGCACAATATAGTTAATTTTTT
F Q P S C S E V D L I G F V I S V V K K T

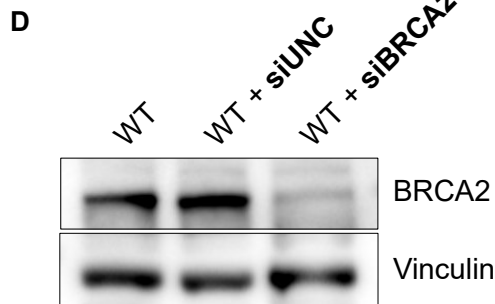
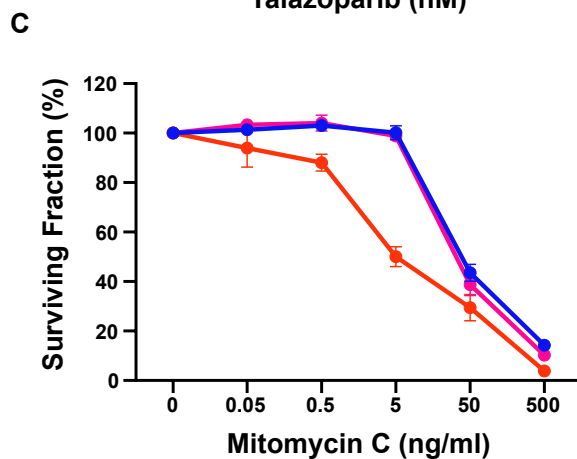
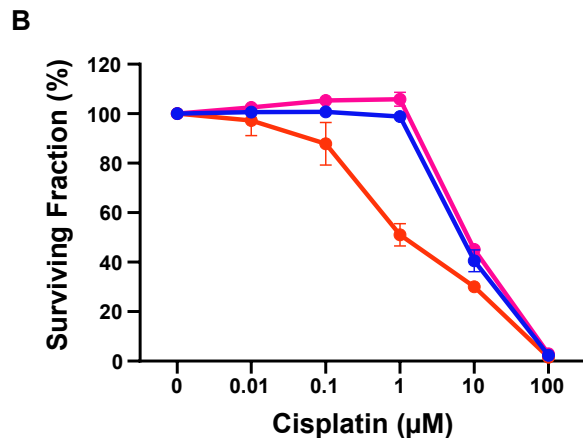
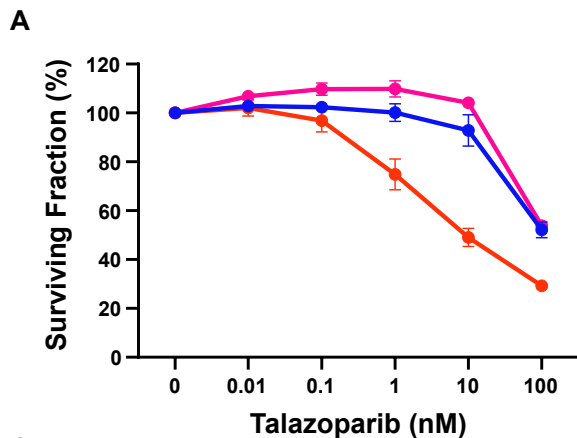
WT ' : TTTCAGCCATCTTGTCTGAGGTGGACCTAATAGGATTGTCGTAATCTGTTGTGAAAAAACAGGTAATGCACAATATAGTTAATTTTTT
F Q P S C S E V D L I G F V V S V V K K T

Supplemental Table 7. List of all primers used in this study

BRCA2 exon 2 variants: T10P, T10I, T10K, T10=, F11L (c.31T>C), F11V, F11C, F11L (c.33T>G), F12S, E13*, E13K, E13V, E13D, I14V, I14N, I14M, F15L, F15C, K16R, T17I, T17=, R18H, C19R, C19Y, C19F, A22= (c.66A>C), A22= (c.66A>G), A22= (c.66A>T), D23H, were amplified using	Forward primer	ACACTCTTTCCCTACACGA CGCTCTTCCGATCTATGCA TCCCTGTGTAAGTGC
	Reverse primer	TGACTGGAGTTCAGACGTG TGCTCTTCCGATCTAGCAA CACTGTGACGTAAGTGC
BRCA2 exon 3 variants: D23G, D23V, L24V, L24F, G25*, G25R, G25E, P26S, P26R, P26L, P26=, S28G, S28N, L29V, L29R, N30D, N30H, N30S, N30K, W31R, W31G, W31L, W31C, F32L (c.94T>C), F32L (c.96T>G), E33*, E33K, L35F, S36Y, S36F, S37A, S37L, S37*, E38K, A39=, were amplified using	Forward primer	ACACTCTTTCCCTACACGA CGCTCTTCCGATCTACTGT TCTGGGTCACAAATTTG
	Reverse primer	TGACTGGAGTTCAGACGTG TGCTCTTCCGATCTAGGTT TGGTTCGTAATTGTTGTT
BRCA2 exon 17 variants: H2623Y, H2623R, W2626C, I2627F, were amplified using	Forward primer	ACACTCTTTCCCTACACGA CGCTCTTCCGATCTGGTGT GGATCCAAAGCTTATTTT
	Reverse primer	TGACTGGAGTTCAGACGTG TGCTCTTCCGATCTGAAAC CTTAACCATACTGCCGT
BRCA2 exon 18 variants: T2722R, D2723A, D2723G, V2728I, K2729N, were amplified using	Forward primer	ACACTCTTTCCCTACACGA CGCTCTTCCGATCTGATGA CACAGCTGCAAAAACAC
	Reverse primer	TGACTGGAGTTCAGACGTG TGCTCTTCCGATCTGCTTC AAGAGGTGTACAGGCA

BRCA2 exon 23 variant: Y3035S was amplified using	Forward primer	ACACTCTTTCCCTACACGA CGCTCTTCCGATCTACTGA GTATTTGGCGTCCATCA
	Reverse primer	TGACTGGAGTTCAGACGTG TGCTCTTCCGATCTTGGAG ATTCCATAAACTAACAAGC AC
BRCA2 exon 24 variants: L3074=, G3076V, G3076E, V3079I, were amplified using	Forward primer	ACACTCTTTCCCTACACGA CGCTCTTCCGATCTGCCCC TTCAC TTCAGCAAAT
	Reverse primer	TGACTGGAGTTCAGACGTG TGCTCTTCCGATCTTCAGA GGTTCAAAGAGGCTTACT

Supplementary Figure 1



● iCas9-MCF10A-*BRCA2*^{+/-} (WT)
● WT + siUNC
● WT + siBRCA2

Supplementary Figure 2

