

Table S1. Primers used in this study.

Primers for heterologous PLUTO expression in *Escherichia coli*

PLUTO_pTACMAT2_fwd 5'-TTTCTCGAGTGGTCTCCAATTGCTTAAGC-3'

PLUTO_pTACMAT2_rev 5'-TTTGGTACCAAAGCGGATGTGAAGAAG-3'

Primers for PLUTO Mutagenesis

PLUTO_E227Q_sense 5'-CGGATGGTATGGTATCCAGACATGGATCGGAGG-3'

PLUTO_E227Q_antisense 5'-CCTCCGATCCATGTCTGGATACCATAACCATCCG-3'

PLUTO_E227A_sense 5'-GGATGGTATGGTATCGCGACATGGATCGGAGGT-3'

PLUTO_E227A_antisense 5'-ACCTCCGATCCATGTGCGGATACCATAACCATCC-3'

PLUTO_E227D_sense 5'-CGGATGGTATGGTATCGATAACATGGATCGGAGGT-3'

PLUTO_E227D_antisense 5'-ACCTCCGATCCATGTATCGGATACCATAACCATCCG-3'

PLUTO_E227K_sense 5'-CGGATGGTATGGTATCAAGACATGGATCGGAGG-3'

PLUTO_E227K_antisense 5'-CCTCCGATCCATGTCTTGATACCATAACCATCCG-3'

PLUTO_G147Q_sense 5'-GTCAAGTTTATGGATCGGTCTCGTAGTTCAGGTGCCTACTTACTAC-3'

PLUTO_G147Q_antisense 5'-GTAGTAAGTAGGCACCTGAACTACGAGACCGATCCATAAACTTGAC-3'

PLUTO_G147K_sense 5'-ATGTCAAGTTTATGGATCGGTCTCGTAGTTAAGGTGCCTACTTACTACC-3'

PLUTO_G147K_antisense 5'-GGTAGTAAGTAGGCACCTTAACTACGAGACCGATCCATAAACTTGACAT-3'

PLUTO_W342A_sense 5'-CTAACCGCAAACATAAGCTTCGCGGCAACTCTAGCTTTAAACAT-3'

PLUTO_W342A_antisense 5'-ATGTTTAAAGCTAGAGTTGCCGCGAAGCTTATGTTTGCGGTTAG-3'

PLUTO_V145A_sense 5'-TTTATGGATCGGTCTCGCAGTTGGTGTGCCTACTT-3'

PLUTO_V145A_antisense 5'-AAGTAGGCACACCAACTGCGAGACCGATCCATAAAA-3'

PLUTO_T425A_sense 5'-CCCTAGCCCACTCACTGCAAACATAGCTGCAAAC-3'

PLUTO_T425A_antisense 5'-GTTTGCAGCTATGTTTGCAGTGAGTGTGACTAGGG-3'

PLUTO_W223A_sense 5'-GCATTAGTCGGTTGCGGAGCGTATGGTATCGAGACATG-3'

PLUTO_W223A_antisense 5'-CATGTCTCGATACCATACGCTCCGCAACCGACTAATGC-3'

PLUTO_L144A_sense 5'-ATGTCAAGTTTATGGATCGGTGCCGTAGTTGGTGTGCCTAC-3'

PLUTO_L144A_antisense 5'-GTAGGCACACCAACTACGGCACCGATCCATAAACTTGACAT-3'

PLUTO_F341A_sense 5'-CCTAACCGCAAACATAAGCGCCTGGGCAACTCTAGCTTTA-3'

PLUTO_F341A_antisense 5'-TAAAGCTAGAGTTGCCAGGCGCTTATGTTTGCGGTTAGG-3'

PLUTO_N426A_sense	5'-CCTAGCCACACTCACTACAGCCATAGCTGCAAACGTGGTC-3'
PLUTO_N426A_antisense	5'-GACCACGTTTGCAGCTATGGCTGTAGTGAGTGTGGCTAGG-3'
PLUTO_N430A_sense	5'-CACTACAAACATAGCTGCAGCCGTGGTCGCCCCAG-3'
PLUTO_N430A_antisense	5'-CTGGGGCGACCACGGCTGCAGCTATGTTTGTAGTG-3'
PLUTO_V145A_G147Q_sense	5'-CAAGTTTATGGATCGGTCTCGCAGTTCAGGTGCCTACTTACTACCTCGCC-3'
PLUTO_V145A_G147Q_antisense	5'-GGCGAGGTAGTAAGTAGGCACCTGAACTGCGAGACCGATCCATAAACTTG-3'
PLUTO_I226A_sense	5'-CGGTTGCGGATGGTATGGTGCCGAGACATGGATCG-3'
PLUTO_I226A_antisense	5'-CGATCCATGTCTCGGCACCATAACCATCCGCAACCG-3'