SUPPLEMENTARY TABLE 1. gRNA target and donor vector sequence for 1st editing.

1st edit gRNA target: CGGAGCGCGCGTAGTGCACC

Sequence of GSX2 1st donor vector (6778 bp):

TATATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTTCGTTCATCCATAGTTGCCTGACTCCCCGT
CGTGTAGATAACTACGATACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATACCGCGAGACCCACGCTCACCGGCTCCAGATTTATCAGCAATAAAC
CAGCCAGCCGGAAGGGCCGAGCGCAGAAGTGGTCCTGCAACTTTATCCGCCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAGAGTAAGTAGTTCGCCA
GTTAATAGTTTGCGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTCACGCTCGTCGTTTGGTATGGCTTCATTCAGCTCCGGTTCCCAACGATCAAGGC
GAGTTACATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTTCGGTCCTCCGATCGTTGTCAGAAGTAAGTTGGCCGCAGTGTTATCACTCATGGTTATG
GCAGCACTGCATAATTCTCTTACTGTCATGCCATCCGTAAGATGCTTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTGAGAATAGTGTATGCGGCGACC
GAGTTGCTCTTGCCCGGCGTCAATACGGGATAATACCGCGCCACATAGCAGAACTTTAAAAGTGCTCATCATTGGAAAACGTTCTTCGGGGCGAAAACTCTCA
AGGATCTTACCGCTGTTGAGATCCAGTTCGATGTAACCCACTCGTGCACCCAACTGATCTTCAGCATCTTTTACTTTCACCAGCGTTTCTGGGTGAGCAAAAAC
AGGAAGGCAAAATGCCGCAAAAAAGGGAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCCTTTTTCAATATTATTGAAGCATTTATCAGGGTTATTG
TCTCATGAGCGGATACATATTTGAATGTATTTAGAAAAATAAACAAATAGGGGTTCCGCGCACATTTCCCCGAAAAGTGCCACCTGACGTTAACTCGAGCACCA
CGCACCTGTCTGCACCGCCACCACCTACAACGTGGCGGACCCGCGGAGATTCCACTGCCTCACCATGGGTAGGGCGGGGTCTTGGGGCACCTGCGCTCCG
CGCCTTTCGCGCTCCTGGAGCAAACTTTCCACCTCCAGTGGAGGAAGTGGGAGCCCGGGGACAGGGTGAAGAGAGGACGGGCTTTTAGTGTAACTGTAG
AGTCAGCCACAGAAGTTCCACGAAAGTGGAAGTTAGTTTGCCAGCTTCTCCACTCAGCCTGGTGCGTTTTACTCCTAGTAGTAGGTGCTCGAGTATTGCCTTAT
TAATACTGGGGCCTTAGGGACCTCGAACGTCACGGCGGAGAAACCAGAGGTTAACTGCTTGGGATTTGGGGTGGGTGTGTTTGAACCTGTGTGGCATCCCCG
CGTCGGGGCGGCTAAAGCGTCTTGACGTTTTTGGCTAAGCCTGCGCGCTTCTCCGCTTGGCTCAAAGGGAGGCGATCAGATAGTGCAAGCCCCCATCCCTCT
TTAATCCTGTGACTTCGCATCCTGCGCATCGAAGACCTTTATTTGCTTTGCACGTCTCTTTTCTTCCCCGCTAAGCAACCACGTGCCTTGAAATGGGAAAGGGA
TACAGATGTTCGGCTGGGCTTCCCCGGGTGGGTCCCTGAAATGCGTCCTGGTTAGCACATGGGGTGGGAGCACCTTGCCCGAGCCTTACCTCTCTACCCTCT
CTTCGCCGGTCCGCAGGAGGCTCTGACGCCAGCCAGGTACCCAATGGCAAGAGGATGAGGACGGCGTTCACTAGCACGCAACTCCTGGAGCTGGAGAGAGA
ATTCTCTTCCAACATGTACCTGTCTCGACTCCGGAGGATTGAAATCGCCACTTACCTGAACCTGTCGGAGAAGCAGGTGAAAATCTGGTTTCAGAACCGCCGA
GTGAAGCACAAGAAGGAGGGGAAGGGCACGCAGAGGAACAGTCACGCGGGCTGCAAGTGCGTCGGGAGCCAGGTCCATCGATGAGCGGCAGTGCGCTTCC
GCGCCGGGTTTTGGCGCCTCCCGCGGGCGCCCCCCTCCTCACGGCGAGCGCTGCCACGTCAGACGAAGGGCGCAGCGAGCGTCCTGATCCTTCCGCCCGG
ACGCTCAGGACAGCGGCCCGCTGCTCATAAGACTCGGCCTTAGAACCCCAGTATCAGCAGAAGGACATTTTAGGACGGGACTTGGGTGACTCTAGGGCACTG
GTTTTCTTTCCAGAGAGCGGAACAGGCGAGGAAAAGTAGTCCCTTCTCGGCGATTCTGCGGAGGGATCTCCGTGGGGCGGTGAACGCCGATGATTATATAAG
GACGCGCCGGGTGTGGCACAGCTAGTTCCGTCGCAGCCGGGATTTGGGTCGCGGTTCTTGTTTGTGGATCGCTGTGATCGTCACTTGGTGAGTAGCGGGCT
GCTGGGCTGGCCGGGGCTTTCGTGGCCGCCGGGCCGCTCGGTGGGACGGAAGCGTGTGGAGAGACCGCCAAGGGCTGTAGTCTGGGTCCGCGAGCAAGG
TTGCCCTGAACTGGGGGTTGGGGGGAGCGCAGCAAAATGGCGGCTGTTCCCGAGTCTTGAATGGAAGACGCTTGTGAGGCGGGCTGTGAGGTCGTTGAAAC
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GGACCCTGACGTGAAGTTTGTCACTGACTGGAGAACTCGGTTTGTCGTCTGTTGCGGGGGCGGCAGTTATGGCGGTGCCGTTGGGCAGTGCACCCGTACCTT
TGGGAGCGCGCGCCCTCGTCGTGTCGTGACGTCACCCGTTCTGTTGGCTTATAATGCAGGGTGGGGCCACCTGCCGGTAGGTGTGCGGTAGGCTTTTCTCC
GTCGCAGGACGCAGTGTTCGGGCCTAGGGTAGGCTCTCCTGAATCGACAGGCGCCGGACCTCTGGTGAGGGGAGGGATAAGTGAGGCGTCAGTTTCTTTGG
TCGGTTTTATGTACCTATCTTCTTAAGTAGCTGAAGCTCCGGTTTTGAACTATGCGCTCGGGGTTGGCGAGTGTGTTTTGTGAAGTTTTTTAGGCACCTTTTGAA
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AGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCTGAAGTTCATCTGCACCACCGGCAAGCTGCCCGTGCCCTGGCCCACCCTCG
TGACCACCCTGACCTACGGCGTGCAGTGCTTCAGCCGCTACCCCGACCACATGAAGCAGCACGACTTCTTCAAGTCCGCCATGCCCGAAGGCTACGTCCAGG
AGCGCACCATCTTCTTCAAGGACGACGGCAACTACAAGACCCGCGCCGAGGTGAAGTTCGAGGGCGACACCCTGGTGAACCGCATCGAGCTGAAGGGCATC
GACTTCAAGGAGGACGGCAACATCCTGGGGCACAAGCTGGAGTACAACTACAACAGCCACAACGTCTATATCATGGCCGACAAGCAGAAGAACGGCATCAAG
GTGAACTTCAAGATCCGCCACAACATCGAGGACGGCAGCGTGCAGCTCGCCGACCACTACCAGCAGAACACCCCCATCGGCGACGGCCCCGTGCTGCTGCCC
CGACAACCACTACCTGAGCACCCAGTCCGCCCTGAGCAAAGACCCCAACGAGAAGCGCGATCACATGGTCCTGCTGGAGTTCGTGACCGCCGCCGGGATCA
CTCTCGGCATGGACGAGCTGTACAAGGGATCCGGAGAGGGGAGAGGATCACTGCTGACTTGCGGGGATGTGGAAGAGAACCCAGGGCCCATGGCTCTGCCT
GTGACAGCACTGCTGCTGCCACTGGCCCTGCTGCTGCACGCAGCTCGACCATCCCAGTTCAGAGTCTCTCCTCTGGACCGCACATGGAACCTGGGCGAGACT
GTGGAACTGAAGTGCCAGGTCCTGCTGTCTAATCCTACTTCTGGCTGTAGTTGGCTGTTCCAGCCACGAGGAGCAGCAGCTAGTCCCACCTTTCTGCTGTACC
TGTCACAGAACAAGCCAAAAGCAGCCGAGGGACTGGATACTCAGAGGTTTTCTGGGAAGCGCCTGGGAGACACCTTCGTGCTGACACTGAGTGATTTTCGGA
GAGAGAACGAAGGCTACTATTTCTGCAGCGCCCTGAGCAATTCCATCATGTATTTCTCCCATTTTGTGCCCGTCTTTCTGCCAGCCAAACCCACCACAACTCCT
GCTCCAAGACCCCCTACTCCCGCACCTACCATTGCCTCACAGCCTCTGAGCCTGCGACCAGAAGCATGTAGGCCAGCTGCAGGAGGAGCAGTGCACACAAG
GGGCCTGGACTTCGCCTGCGATATCTACATTTGGGCACCTCTGGCTGGAACCTGTGGCGTGCTGCTGCTGAGCCTGGTCATCACACTGTATTGCAACCATTGA
GGCGCGCCCCGCTGATCAGCCTCGACTGTGCCTTCTAGTTGCCAGCCATCTGTTGTTTGCCCCTCCCCCGTGCCTTCCTTGACCCTGGAAGGTGCCACTCCC
ACTGTCCTTTCCTAATAAAATGAGGAAATTGCATCGCATTGTCTGAGTAGGTGTCATTCTATTCTGGGGGGTGGGGTGGGGCAGGACAGCAAGGGGGAGGATT
GGGAAGACAATAGCAGGCATGCTGGGGATGCGGTGGGCTCTATGGCGTACGCTGCCGCTCATCGCAGGGTATGGGCGTCTCCTTCTTGACCTGTTTATCTAG
GACTCCAACTTGAAGTTACAGATTTTTTTAAAAAATGTAAATAACCTATAATTCAACTCATTCTTGTCGTATAACAGAGGAAAAACAGGGTTGGTTTAAGTTTAAC
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ACAAAAACACCCAAGTTGAAAATAATTTAGAAAATTAGACCTTGTAGGTCTTGCTTTCTGAAATTTCGCCTGGGGAGAATTTAAAATCTAAGTCGCTGGAAGTCC
CTTTGTATGTGAATAGGTTTATATAAAATTTATATTTATATTTATTTAAATAAATGAAACAAAAACCAGAATTTTAAATCTGTGGTGTTTGCTCTCCCTATCTTCTCC
TGCCCCCTCCTCCAATGTCTAGAGAAAGGCATATGCAGGAAAAAGCTGTCTGAGGAATTCGAGGAAAATGTTGAGTAAGAACTTGGTAATGTGGGTCTCTTGA
CTGAGGGAGTTTGTGGCTCAATGGGTTTTCTATGTAACAGAACTTTCGCCAAGGAGACACCTTTAGTCATGATGGCATCTACCAGGCAGTGCCTCTCCATCCTT
AAAATAGGCAACCTCCTCACAGTTGATAGGACAAATCACTCCATTTGGAATGACACTGACCATTAACGACAGGTAAACCTTTATTTAGCAAGGAAGGGTAAAAAT
CCCCCATCTAGTTTTTGTTTTCTTCTTTCTACTTCCTCATTTCTCTCAGTACGAAAACTTGAATTATGTGAAGGAATTTGTAGAGTCAGAATAGTTTTAGGAAGAG
CAACAATCCATCAAACAGGTCAGAAGCAAACAGTGGAAACTTAATAACGATGCTACAAGCAGAATTAGCGGGTTTCCCTCAATGTTAAGAAAACAAAAAGTCAG
GGACAGGAAGTATTCTGTTCAAAGAGCCGCACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCGTAAAAAGGCCGCGTTGCTGGCGTTTTTCCATAGGC
TCCGCCCCCCTGACGAGCATCACAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATAAAGATACCAGGCGTTTCCCCCTGGAAGCTCCC
TCGTGCGCTCTCCTGTTCCGACCCTGCCGCTTACCGGATACCTGTCCGCCTTTCTCCCTTCGGGAAGCGTGGCGCTTTCTCATAGCTCACGCTGTAGGTATCT
CAGTTCGGTGTAGGTCGTTCGCTCCAAGCTGGGCTGTGTGCACGAACCCCCCGTTCAGCCCGACCGCTGCGCCTTATCCGGTAACTATCGTCTTGAGTCCAA
CCCGGTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACAGAGTTCTTGAAGTGGTGGCC
TAACTACGGCTACACTAGAAGAACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGGAAAAAGAGTTGGTAGCTCTTGATCCGGCAAACAAACCA
CCGCTGGTAGCGGTGGTTTTTTTGTTTGCAAGCAGCAGATTACGCGCAGAAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGGGTCTGACGCTCAG
TGGAACGAAAACTCACGTTAAGGGATTTTGGTCATGAGATTATCAAAAAGGATCTTCACCTAGATCCTTTTAAATTAAAAATGAAGTTTTAA

AmpR (orange)
GSX2 Homology arm (blue)
Human Ubc promoter (red)
EGFP (green)
tCD8 (purple)
bGH-polyA (magenta)

SUPPLEMENTARY TABLE 2. gRNA target and donor vector sequence for 2nd editing.

2nd edit gRNA target: AGCGCACTGCCGCTCATCGA

Sequence of GSX2 2nd donor vector (4818 bp):

TACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTTCGTTCATCCATAGTTGCCTGACTCCCCGTCGTGTAGATAACTACGATACGGGAGGG
CTTACCATCTGGCCCCAGTGCTGCAATGATACCGCGAGACCCACGCTCACCGGCTCCAGATTTATCAGCAATAAACCAGCCAGCCGGAAGGGCCGAGCGCAG
AAGTGGTCCTGCAACTTTATCCGCCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGCGCAACGTTGTTGCCA
TTGCTACAGGCATCGTGGTGTCACGCTCGTCGTTTGGTATGGCTTCATTCAGCTCCGGTTCCCAACGATCAAGGCGAGTTACATGATCCCCCATGTTGTGCAA
AAAAGCGGTTAGCTCCTTCGGTCCTCCGATCGTTGTCAGAAGTAAGTTGGCCGCAGTGTTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTACTGTCA
TGCCATCCGTAAGATGCTTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTGAGAATAGTGTATGCGGCGACCGAGTTGCTCTTGCCCGGCGTCAATACG
GGATAATACCGCGCCACATAGCAGAACTTTAAAAGTGCTCATCATTGGAAAACGTTCTTCGGGGCGAAAACTCTCAAGGATCTTACCGCTGTTGAGATCCAGTT
CGATGTAACCCACTCGTGCACCCAACTGATCTTCAGCATCTTTTACTTTCACCAGCGTTTCTGGGTGAGCAAAAACAGGAAGGCAAAATGCCGCAAAAAAGGG
AATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCCTTTTTCAATATTATTGAAGCATTTATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATGT
ATTTAGAAAAATAAACAAATAGGGGTTCCGCGCACATTTCCCCGAAAAGTGCCACCTGACGTTAACTCGAGCACCACGCACCTGTCTGCACCGCCACCACCTA
CAACGTGGCGGACCCGCGGAGATTCCACTGCCTCACCATGGGTAGGGCGGGGTCTTGGGGCACCTGCGCTCCGCGCCTTTCGCGCTCCTGGAGCAAACTTT
CCACCTCCAGTGGAGGAAGTGGGAGCCCGGGGACAGGGTGAAGAGAGAGGACGGGCTTTTAGTGTAACTGTAGAGTCAGCCACAGAAGTTCCACGAAAGTG
GAAGTTAGTTTGCCAGCTTCTCCACTCAGCCTGGTGCGTTTTACTCCTAGTAGTAGGTGCTCGAGTATTGCCTTATTAATACTGGGGCCTTAGGGACCTCGAAC
GTCACGGCGGAGAAACCAGAGGTTAACTGCTTGGGATTTGGGGTGGGTGTGTTTGAACCTGTGTGGCATCCCCGCGTCGGGGCGGCTAAAGCGTCTTGACG
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TCGAAGACCTTTATTTGCTTTGCACGTCTCTTTTCTTCCCCGCTAAGCAACCACGTGCCTTGAAATGGGAAAGGGATACAGATGTTCGGCTGGGCTTCCCCGG
GTGGGTCCCTGAAATGCGTCCTGGTTAGCACATGGGGTGGGAGCACCTTGCCCGAGCCTTACCTCTCTACCCTCTCTTCGCCGGTCCGCAGGAGGCTCTGAC
GCCAGCCAGGTACCCAATGGCAAGAGGATGAGGACGGCGTTCACTAGCACGCAACTCCTGGAGCTGGAGAGAGAATTCTCTTCCAACATGTACCTGTCTCGA
CTCCGGAGGATTGAAATCGCCACTTACCTGAACCTGTCGGAGAAGCAGGTGAAAATCTGGTTTCAGAACCGCCGAGTGAAGCACAAGAAGGAGGGGAAGGG
CACGCAGAGGAACAGTCACGCGGGCTGCAAGTGCGTCGGGAGCCAGGTGCACTACGCGCGCTCCGAGGATGAGGACTCCCTGTCGCCGGCCTCAGCCAAC
GATGACAAGGAGATTTCCCCCTTAGGATCCGGAGAGGGGAGAGGCAGTCTGTTGACATGTGGAGACGTTGACGAAAATCCAGGCCCTATGGTGAGCAAGGG
CGAGGAGGATAACATGGCCATCATCAAGGAGTTCATGCGCTTCAAGGTGCACATGGAGGGCTCCGTGAACGGCCACGAGTTCGAGATCGAGGGCGAGGGCG
AGGGCCGCCCCTACGAGGGCACCCAGACCGCCAAGCTGAAGGTGACCAAGGGTGGCCCCCTGCCCTTCGCCTGGGACATCCTGTCCCCTCAGTTCATGTAC
GGCTCCAAGGCCTACGTGAAGCACCCCGCCGACATCCCCGACTACTTGAAGCTGTCCTTCCCCGAGGGCTTCAAGTGGGAGCGCGTGATGAACTTCGAGGA
CGGCGGCGTGGTGACCGTGACCCAGGACTCCTCCCTGCAGGACGGCGAGTTCATCTACAAGGTGAAGCTGCGCGGCACCAACTTCCCCTCCGACGGCCCC
GTAATGCAGAAGAAGACCATGGGCTGGGAGGCCTCCTCCGAGCGGATGTACCCCGAGGACGGCGCCCTGAAGGGCGAGATCAAGCAGAGGCTGAAGCTGA
AGGACGGCGGCCACTACGACGCTGAGGTCAAGACCACCTACAAGGCCAAGAAGCCCGTGCAGCTGCCCGGCGCCTACAACGTCAACATCAAGTTGGACATC
ACCTCCCACAACGAGGACTACACCATCGTGGAACAGTACGAACGCGCCGAGGGCCGCCACTCCACCGGCGGCATGGACGAGCTGTACAAGTGAGGGAGGG
CCTCCTCCCTCACATCCCCCGCTCCTGGCAGACCAGGCAACGCCAAGGCGTGGGGCACCCAGGGGCCAGAATCCTTGCTCATTGCAGTGGTCCCATCTGGA
GAAGAAACGAACCTGGAAGTTCTGGAATGGACAAGCCGGGACCTGACCCTTCGCGTCTCCTTCTTGACCTGTTTATCTAGGACTCCAACTTGAAGTTACAGATT
TTTTTAAAAAATGTAAATAACCTATAATTCAACTCATTCTTGTCGTATAACAGAGGAAAAACAGGGTTGGTTTAAGTTTAACACTGTATGGGGTTTTTGAAAGCAC
ATGTCAGTTCCCCATCCCTACTCTCTTTCAGAACTCGATAAGAACACAGGATTTATTGATTATTTTCTGTTGTCGTTTTCAAACAAAAACACCCAAGTTGAAAATA
ATTTAGAAAATTAGACCTTGTAGGTCTTGCTTTCTGAAATTTCGCCTGGGGAGAATTTAAAATCTAAGTCGCTGGAAGTCCCTTTGTATGTGAATAGGTTTATATA
AAATTTATATTTATATTTATTTAAATAAATGAAACAAAAACCAGAATTTTAAATCTGTGGTGTTTGCTCTCCCTATCTTCTCCTGCCCCCTCCTCCAATGTCTAGAG
AAAGGCATATGCAGGAAAAAGCTGTCTGAGGAATTCGAGGAAAATGTTGAGTAAGAACTTGGTAATGTGGGTCTCTTGACTGAGGGAGTTTGTGGCTCAATGG
GTTTTCTATGTAACAGAACTTTCGCCAAGGAGACACCTTTAGTCATGATGGCATCTACCAGGCAGTGCCTCTCCATCCTTAAAATAGGCAACCTCCTCACAGTT
GATAGGACAAATCACTCCATTTGGAATGACACTGACCATTAACGACAGGTAAACCTTTATTTAGCAAGGAAGGGTAAAAATCCCCCATCTAGTTTTTGTTTTCTT
CTTTCTACTTCCTCATTTCTCTCAGTACGAAAACTTGAATTATGTGAAGGAATTTGTAGAGTCAGAATAGTTTTAGGAAGAGCAACAATCCATCAAACAGGTCAG
AAGCAAACAGTGGAAACTTAATAACGATGCTACAAGCAGAATTAGCGGGTTTCCCTCAATGTTAAGAAAACAAAAAGTCAGGGACAGGAAGTATTCTGTTCAAA
GAGCAAAAGGCCAGGAACCGTAAAAAGGCCGCGTTGCTGGCGTTTTTCCATAGGCTCCGCCCCCCTGACGAGCATCACAAAAATCGACGCTCAAGTCAGAGG
TGGCGAAACCCGACAGGACTATAAAGATACCAGGCGTTTCCCCCTGGAAGCTCCCTCGTGCGCTCTCCTGTTCCGACCCTGCCGCTTACCGGATACCTGTCC
GCCTTTCTCCCTTCGGGAAGCGTGGCGCTTTCTCATAGCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTCGTTCGCTCCAAGCTGGGCTGTGTGCACGAAC
CCCCCGTTCAGCCCGACCGCTGCGCCTTATCCGGTAACTATCGTCTTGAGTCCAACCCGGTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACA
GGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACAGAGTTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGAACAGTATTTGGTATCTGCGCTCTGCT
GAAGCCAGTTACCTTCGGAAAAAGAGTTGGTAGCTCTTGATCCGGCAAACAAACCACCGCTGGTAGCGGTGGTTTTTTTGTTTGCAAGCAGCAGATTACGCGC
AGAAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGGGTCTGACGCTCAGTGGAACGAAAACTCACGTTAAGGGATTTTGGTCATGAGATTATCAAA
AAGGATCTTCACCTAGATCCTTTTAAATTAAAAATGAAGTTTTAAATCAATCTAAAGTA

AmpR (orange)
GSX2 Homology arm (blue)
T2A (green)
mCherry (magenta)

SUPPLEMENTARY TABLE 3. hiPS cell lines used in various experiments.

Experiment / Line	2242-1	8858-3	1205-4	0524-1	0410-1	1927-1	2631-3	0502-3
qPCR characterization	X	X	X	X	X	X	X	X
2D neuron culture	X	X	X	X				
Single-cell RNAseq	X	X	X					
Immunocytochemistry	X	X	X	X	X	X	X	X
Dendritic spine analysis	X		X	X				
Axon projection	X	X	X	X				
Retrograde viral tracing	X		X	X				
Optogenetics + calcium imaging	X	X	X		X			
Optogenetics & electrophysiology	X		X					
Electrophysiology	X		X	X				
Calcium imaging	X	X	X		X	X	X	X

SUPPLEMENTARY TABLE 4. Primers used for qPCR experiments.

Gene	Forward Primer	Reverse Primer
GAPDH	CATGAGAAGTATGACAACAGCCT	AGTCCTTCCACGATACCAAAGT
FOXG1	AACCTGTGTTGCGCAAATGC	AAACACGGGCATATGACCAC
DLX5	TTCCAAGCTCCGTTCCAGAC	GAATCGGTAGCTGAAGACTCG
GSX2	ATGTCGCGCTCCTTCTATGTC	ATGCCAAGCGGGATGAAGAAA
BCL11B	GGTGCCTGCTATGACAAGG	GGCTCGGACACTTTCCTGAG
MEIS2	ACAGCTGGAGTGGCAAAAAG	AAATTGTCAAGCCCCCGAAC
RAX	GGCCATCCTGGGGTTTACC	GGTCGAGGGGCTTCGTACT
HOXB4	TCCTCGTTTTCAGCTTTGGC	TCATTTGTTAGCGGGTGTCG
NKCC1	TAAAGGAGTCGTGAAGTTTGGC	CTTGACCCACAATCCATGACA
KCC2	AGGAAAGCAGTCCCTTCATCA	GCCTCTTCATGCTCCCTACTT

SUPPLEMENTARY TABLE 5. Comparison of protocols for striatal neuron differentiation from human pluripotent stem cells.

	Ma et al.,[20] 2012	**Carri et al.,[21] 2013**	**Arber et al.,[22] 2015**	**hStrS Miura et al.**
Type of culture	2D	2D	2D	3D
Patterning	SHH	SHHC-25II DKK1	Activin A	Activin A IWP-2 SR11237
Cell lines	2 hES cell lines	1 hiPS and 2 hES cell lines	2 hiPS and 3 hES cell lines	5 control hiPS cell lines
Cell diversity	Progenitors Neurons	Progenitors Neurons	Progenitors Neurons	Progenitors Neurons Astrocytes Oligodendrocytes
Proportion of GABAergic neurons	80%	78.4% (of $MAP2^+$ cells)	Not shown	56.9%
Proportion of $CTIP2^+$ cells	Not shown	60%	50%	50%
Proportion of $DARPP32^+$ neurons	80%	20% (of $MAP2^+$ cells)	20-50%	30% (of $NeuN^+$ cells)
Dendritic spine	Not shown	Not shown	Present	Present (0.02 spines/μm at day 120-130)
Resting membrane potential	–46.9 ± 2.9mV	–43.0 ± 4.9 mV	–44.0 ± 1.7 mV	–75.9 ± 1.8 mV
Slow-ramp depolarization	Not shown	Present	Not shown	Present (at day 160)
Inward rectification	Not shown	Not shown	Not shown	Present (at day 110-120)

±, indicated s.e.m.