

Supplementary Table 1 (related to Fig.1 and Extended data Fig.1)

Primers specific to rat Chr.X			
primer	sequence (5'-3')	primer	sequence (5'-3')
rX1- <i>forward</i>	AGGATTTGTTGCTAGATGTCTGAG GT	rX1- <i>reverse</i>	TTCATTAGCTGCATAACCCAAGTGTG
rX2- <i>forward</i>	TACTGCTCTACGTGTTGAGGTAAG AC	rX2- <i>reverse</i>	AAGTCATCACGCTTGTGCTCTTATTC
rX3- <i>forward</i>	ATGCTCCATTGACAGAGTAGACAA GT	rX3- <i>reverse</i>	AACGTGCCCTCATTAAACTTCAGAG G
rX4- <i>forward</i>	AGGGCTGTGGTGAAGACTAATGTA AT	rX4- <i>reverse</i>	TACCTGGGAATGTGAAGGTCATGAT T
rX5- <i>forward</i>	AATGGAGAAGCTGGGAGCCCTTTAT TA	rX5- <i>reverse</i>	GATTACTTTCCCTACCTCCACACCAT
rX6- <i>forward</i>	CAAACCTCAGAGAAGGGCCACATT TAC	rX6- <i>reverse</i>	TCATCCTGGTTCCTAATTGTCCTCTG
rX7- <i>forward</i>	TGACCTAGAGGTCTACCTGTCTCA AT	rX7- <i>reverse</i>	CTTGACGATCTCTGTGACTTTGGAC
rX8- <i>forward</i>	ACCTACTGCCTATGTTGTGGTGTTA T	rX8- <i>reverse</i>	ATGACTAATCGTAGCCTTGTGGAGTT
rX9- <i>forward</i>	GGGCAAATACTGGCAATTCACAAA AG	rX9- <i>reverse</i>	TTAATGGAATGTGAGCTGAGGCAAAA G
rX10- <i>forward</i>	CGCACAGAAACAGGCACATATGTT TA	rX10- <i>reverse</i>	CCCATAGGCTCTCCTTATTTTCGGTTA
rX11- <i>forward</i>	TTCCATTGGACTTGATTCTTGATGG C	rX11- <i>reverse</i>	GTAGTCGAAGGCATCCATATCTCCAT
rX12- <i>forward</i>	AGAATTCAGTTGCCATGCTTACTG TC	rX12- <i>reverse</i>	TTGGGCCAGACTATGATTAGGAACA A
rX13- <i>forward</i>	GTAAGGAAATGGCTGTGCTTATCT G	rX13- <i>reverse</i>	ATGCAAGGGTATCTGTATTGCCCTAT
rX14- <i>forward</i>	TCATGACTTCGTTTCATAACAGCCA AC	rX14- <i>reverse</i>	TGACTACCATCTGGGAATACAAGCA A
rX15- <i>forward</i>	CCTGAAACTGACATGTAAGGAAC GTC	rX15- <i>reverse</i>	AGACGGGAAATTTCTCAGATACCAC A
rX16- <i>forward</i>	AGAGTTGCATGTTTTTCAACTGGT CA	rX16- <i>reverse</i>	ATCAAGCCTTTCCTCCTTTGATTTGG
rX17- <i>forward</i>	ATAGCATGTTTGTGTCATCAGCGA AA	rX17- <i>reverse</i>	CATGTTTATTCCACTGGGGAAACCTC

Supplementary Table 2 (related to Fig.1 and Extended data Fig.1)

Primers specific to mouse Chr.X			
primer	sequence (5'-3')	primer	sequence (5'-3')
mX1- <i>forward</i>	TGGGGTGTGCTTGCCATTCTTA GTC	mX1- <i>reverse</i>	AGAGGGGACAGAGAAAACAATGCA TCC
mX2- <i>forward</i>	TTTCTTACTCGTTGGAGGCCATGT CAG	mX2- <i>reverse</i>	GTCTTGGCTGTGCCATTGAATTGCT G
mX3- <i>forward</i>	AGCAAGGAACTACCCTAATCCCTG ACA	mX3- <i>reverse</i>	TGCTTGTGTCCTCATTGCTACTGTTG T
mX4- <i>forward</i>	ACATACTGTGGACCTGAAATGCAA GAC	mX4- <i>reverse</i>	ACTTGGGGATGACTAGATGTGGTTT CT
mX5- <i>forward</i>	CCAGACTTACCTGAATTGCATCAG CCT	mX5- <i>reverse</i>	CCCAGGCAGACGGACATAATTTCTT GA
mX6- <i>forward</i>	AGAAAGGAGAGGTTAAAGAGACT GGG	mX6- <i>reverse</i>	CTAAGGGTAGGGCATAGTGAGGAAT G

Supplementary Table 3 (related to Fig.1 and Extended data Fig.1)

Primers specific to rat autosomes (rat Chr.1~20)			
primer	sequence (5'-3')	primer	sequence (5'-3')
rChr.1- <i>forward</i>	ATGACCAGGAGCAGGTTACATTTACT	rChr.1- <i>reverse</i>	CCTCTAAAGCTACACAAAAGGCTGT C
rChr.2- <i>forward</i>	CCAAGGAGGCAAGCAATTCAGATAAA	rChr.2- <i>reverse</i>	CCACAGACTCCTTTTCATCCTTCTA
rChr.3- <i>forward</i>	GTGTTGTTCCAGACACTGAGAAAGAG	rChr.3- <i>reverse</i>	TAATCGTCGTCGCCATTACAGCTAA
rChr.4- <i>forward</i>	GTCCAAAAACAAAAGGGAACCAAA C	rChr.4- <i>reverse</i>	ACAATGTCACCAAACCTTGCTTGATC T
rChr.5- <i>forward</i>	TCTCAGGTCACCTATAGGAAGTCAGT	rChr.5- <i>reverse</i>	TGTGATTCCACCCGGTTACTCTTATT
rChr.6- <i>forward</i>	AATATTCTGTTGTGACTGTTTCGCAGG	rChr.6- <i>reverse</i>	TCTGGTTAGCTCTCTGTAAGGTGAA C
rChr.7- <i>forward</i>	ACAGATTGTGGCTCATGAAATGAGTG	rChr.7- <i>reverse</i>	CAAGGGCTTTGACTTGATCCTTCTG
rChr.8- <i>forward</i>	CATAGACCCCTCCCTTAAGTTTGA	rChr.8- <i>reverse</i>	TCAGGATTAAGTATGTTTGCCAGGG A
rChr.9- <i>forward</i>	CAGGACTCGCAGAAATGGGATAATTC	rChr.9- <i>reverse</i>	CTGACAGCTTCCTTCATAAACCA G
rChr.10- <i>forward</i>	GGTTTCCACTAAGATGTCTGTACCCT	rChr.10- <i>reverse</i>	TTCACCTGCATTACATTTAGAGCTG
rChr.11- <i>forward</i>	TCTTCTGGGAAGCACTCATCACATA	rChr.11- <i>reverse</i>	GAAGAGCATCAACTCCACTTTCTTC C
rChr.12- <i>forward</i>	CAGGCACATGTCTCAAACCTAAAGT	rChr.12- <i>reverse</i>	GGAGGATTCTAAGCAAGTACACCAC T
rChr.13- <i>forward</i>	GCTCACTGAGTTCTAGAGAGGAGTTT	rChr.13- <i>reverse</i>	GGATTAGAGAGGAGGGGTCAATTGT T
rChr.14- <i>forward</i>	GAAGAGTTTGTTCCTGTGGCTGTATC	rChr.14- <i>reverse</i>	ACAGGAACTAGGGGAACTAATGTCA C
rChr.15- <i>forward</i>	TCTTCATCTCCTCTCCAGGACATTG	rChr.15- <i>reverse</i>	CAACTACAGCTGCTATACTGAAGGG A
rChr.16- <i>forward</i>	TGAGAAAGAAAAGTCTTCACCTGGGA	rChr.16- <i>reverse</i>	GGTGTAGGAAATGGCTCTGAAGACT A
rChr.17- <i>forward</i>	AAAATGTCCACTGTTCTGCATAGCTC	rChr.17- <i>reverse</i>	GTTTACAAAAGCTTGCAATTACCGG G
rChr.18- <i>forward</i>	ATGTGTATCACAAAGGACCATGAGGA	rChr.18- <i>reverse</i>	CTACCTTCAAGGCCATTCAAATG T
rChr.19- <i>forward</i>	AGGGTACATCTTTACCCTGACTTTC	rChr.19- <i>reverse</i>	AATCACTGCTCCTGGTAATCGTTTTG
rChr.20- <i>forward</i>	AGGACTTCCCTAAGCAGTCTCAATTC	rChr.20- <i>reverse</i>	CAGGAATCGTAGCAATTTGCAAACA C

Supplementary Table 4 (related to Fig.1, Fig.5, and Extended data Fig.6)

SgRNAs used for CRISPR/Cas9 mediated targeting			
aim	sgRNA	spacer sequence (5'-3')	PAM
Label rat X chromosome	Rat chr.X sgRNA 1	TGTTGCGGGGTTTTATGG	CGG
	Rat chr.X sgRNA 2	GCAACAACCTATCCAATGTA	GGG
Label mouse X chromosome	Mouse <i>Hprt</i> sgRNA	AACAAATCTAGGTCATAACC	TGG
Knockout <i>Rhox5</i> gene on rat X chromosome	Rat rhox5 sgRNA-1	TTTCAGGATATGGAGGCTCA	AGG
	Rat rhox5 sgRNA-2	GAGCGCATTTTGCTAAGCAG	TGG
	Rat rhox5 sgRNA-3	CAAATTACCTACCTGCACTC	TGG

Supplementary Table 5 (related to Fig.5 and Extended data Fig.6)

Quantitative real-time PCR primers			
primer	sequence (5'-3')	primer	sequence (5'-3')
<i>Gapdh</i> - <i>forward</i>	AGGTCGGTGTGAACGGATTTG	<i>Gapdh</i> - <i>reverse</i>	TGTAGACCATGTAGTTGAGGTCA
<i>Nanog</i> - <i>forward</i>	AGGATGAAGTGCAAGCGGTG	<i>Nanog</i> - <i>reverse</i>	TGCTGAGCCCTTCTGAATCAG
<i>Oct4</i> - <i>forward</i>	GCAGATCACTCACATCGCCAAT	<i>Oct4</i> - <i>reverse</i>	CCTGGGAAAGGTGTCCCTGTAG
<i>Nestin</i> - <i>forward</i>	CCCTGAAGTCGAGGAGCTG	<i>Nestin</i> - <i>reverse</i>	CTGCTGCACCTCTAAGCGA
<i>T</i> - <i>forward</i>	ATGTTCTACAGCCTCTTGTGGATACC	<i>T</i> - <i>reverse</i>	TAGCAAAGGACTCTGATTAAGTCC
<i>Ext1</i> - <i>forward</i>	GGACACTGTGCTTCAACTACGG	<i>Ext1</i> - <i>reverse</i>	ACCGCTCCTTTGAGTTATCCAG
<i>Rex1</i> - <i>forward</i>	GAAGAGAGAGGTCACGCAAGAGACG	<i>Rex1</i> - <i>reverse</i>	TCGATAAGACACCACAGTACACACC G
<i>Esrrb</i> - <i>forward</i>	CTGCAGCTGGTGCAGGTA	<i>Esrrb</i> - <i>reverse</i>	CCTGGAGCTTCTGCACCGCC
<i>Prdm14</i> - <i>forward</i>	GCATCCTGGTCCACAGAG	<i>Prdm14</i> - <i>reverse</i>	CTGCAGAACACGCCAAAGTG
<i>mTcl1</i> - <i>forward</i>	TCTGGCCAGGCCAGATCA	<i>mTcl1</i> - <i>reverse</i>	GTGAGGCCATAGGCCAGGT
<i>Laptm5</i> - <i>forward</i>	CCAGCACCTGGAGGCTGGGA	<i>Laptm5</i> - <i>reverse</i>	ACCTCACCACTGTGTGGCCCT
<i>Rhox5</i> - <i>forward</i>	GAGTCAAGGAAGACTCGGAAGAACAGC	<i>Rhox5</i> - <i>reverse</i>	TTCTTCTCCTTCGCCTTCTGTTCCC