

Supplementary Fig. 1.

DNA sequences of the Kdm4dl knockout allele.

The gRNA target sequences and start codons are indicated in blue and green, respectively.

Supplementary Fig. 2,

DNA sequences of the Kdm4d knockout allele.

The gRNA target sequences and start codons are indicated in blue and green, respectively.

Supplementary Fig. 1

Kdm4dl locus (Wild-type)

CAGTTTTTCCATCCTGTGTACCTTCCAATTAGAAGGCAAGGGGCAGAGCCAGCGGTGGTGGTACACGCCTTTAATCCCAGCACTT
GGGAGGCAGAGGCAGGCGGATTTCTGAGTTTGAGGCCAGCCTGCTCTACAAAGTGAGTTCCTGGACAGCCAGGGCTACACAGAGA
AACACTTTCTCAAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAAGGAAGGGGT
CTGAGCCTCCCCAATCCCATACAGTGACCAAGGGGGACCAAGCGTGTGGGAATCAAGTGAGTGCTCCAGGAGTGGTACAGGG
ACTGTGCTTCATAGAAGCTGTTTTTCAAGGTAAAAGTCTGAGCAAGAAGAGGATGCCTGGGAAATCAAGCCAGCAAGGCTTC
TCTTTCTTACATTTTCTGTCTTTTCTTTTATTATAGAGATTGGAAGGGTCTTGCTACATAGATAAGGGGCTGCTCATACTG
TTAGTCTCCTGAGAGCCATATTTAATCTTTAAAATGTTATCTTGTCCACCAGGAAACAAAACCATAGGAAAAGAAAAGAAAGGAA
CGAAAGAAAGAACTTAAGGACAGATAAGAGACTGAAGAAAATCCAACAGGAAGGCAGGGGAAGCTTACACAGAGAGAGACTAAAA
GGTTCCTCTGAAAAGCCCAAAGCTCCAGACAGTCAGGACCCAGGCTGAGCTCCTGAATTGCTGTGGCCATGACAGCCACTGAGC
AGGATGGGTCCCAGAACCAGGCTGTACAATCATGACCTTCTGCCAAACATGGAAGAGTTCCTCAGACTTCAACAAATACATTGC
CTACATGGAGTCCCAAGGAGCACACCGAGCTGGACTGGCCAAGTGCATCCCACCAAGGAGTGGAAAGGCAGGCTGTCTATGAG
GATGTGATGGCTATGGCAATCCCCTGAGCAAGTGGTCTCTGGGCAGGCAGGCGTGTTCACCAATACCATAAGAAGA
AGAAAGGCATGACAGTGGGGAGTATCGTGAGCTGGCCGACAGCAAAAAGTACCAGACCCACACCTGGATTTTGAAGATTT
GGAGCGAAAATACTGGAAGAATCGCCTGTTTGGGTACCGATTTATGGTGTGACGTCAGCGGCTCCCTGTTTGGTGAGAACACT
CAACATTTGGAACATGGCCATCTGGGAAGCCTTTTGGATGTGTTGAAGCAGGATCACGACATAGTGATTGAGGGTGTCAACACGC
CCTACCTGTACTTTGGCATGTGGAAGACCACCTTTGCGTGGCACACGGAGGACATGGACCTGTACAGTATCAACTACCTACACTT
TGGGCAGCCCAAGACCTGGTATGCTGTGCCCCCTGAGCATGGCAGGCGCTGGAGCGCTGGCCAGGGAACCTTTCCCTGGCAGC
TCCCAGGGCTGCCAGGCTTCTGAGGCACAAGGTGGCGCTCATCTCACCCACTGTGCTTAAGGAGAATGGCATCCCTTTGGTC
GCATACCCAGGAGGCTGGGGAGTTTATGGTCACTTTCCCTATGGCTACCACGCAGGCTTCAACCATGGCTTCAACTGCGCAGA
GGCCATCAATTTTGGCACCCTAAGGTGGATTGACTATGGCAAGGTGGCATCTCAGTGCAGCTGTGGGGAGGCCAGGGTGAAGCTTC
TCCATGGACGCCTTTGAAGGCCTCCTGACGCTGAGAGCTATGAGCTGTGGAACAGCAAGGGGATCCTGGAGCTATGGACCACC
TGGAGCTCACCTCCTGCCCTGGGAAGGAGCTGACCCCTGGGACCTACACACTGGATCAAGGGAAGCCCACTTCAACCCGGAGGCA
TTACCATTGGGACCCCTCAGGAGTGGGTGAGCAGAGGCCACAACAGCTGTCTTACACAAAGGTGCCCTCAAAGTCCCTGTAC
CTTTTCCATTACAGGCTTTTGGCTCCTCAATCTACTCCGCAAGGGACAGGATCTCCAAGCAAGCTTCTGGAGCTCTGGGATCC
CTGTGATCCTGTTAATGTTATAGCTGTGAACTACCCACAGGCTGTAGAATCTTGATAGGAGCCCCAAGTCTCCCTGCCGCTC
ACGGTGGTGGACATGAACTAAGTACATGCAGGATCACCTCCCAAGTCTGAGGCCATTTGGTCACAAGTGGATATTCCTGATCACT
TGGACAAACAGGTGTCCAAGTTGTTGACAAATCAAACCTCCTTTGGATGATGCATTTGAGTCTCCTTTTGGTTTGGCCAGGATC
TCCTTCAGAATTCATGCAGAAGGTGGATCTCCAAGTCTGTGCCATTGCATGAAGAGAAAAGAGCTACCAGCTCTTATCTCTTG
AGAGTATCCTGCCATTCACCAATCTCAGACTTAGCTACACTCAAAGGAAATGCGTGTGCTGAGGCTACTCAATGCTTTCTCCTA
CTCTGCCACTGAACCTCCATTGACTTGAACGTCCCACAGTGGCATGCCACAGTGAAGAGCAGGTCAGGCTCTCAGCACCAG
TGTCTGGCCACATTCACCTGAAATCATTTGTCTTCAGAACATCAGAAAGGACCTGCAAGAGACCAGAAAGATTCACTAACTGTG
ACTTTTCCCTCATAGAAGCAGGAGGGAGGTGAGACCTAGAGGCTGCAGGCTGCTCCCTTCTGTATTTTCCAGACATTTGGATGC
AATGCTGTTCTAATTATCTTAT

Kdm4dl knockout allele

CAGTTTTTCCATCCTGTGTACCTTCCAATTAGAAGGCAAGGGGCAGAGCCAGCGGTGGTGGTACACGCCTTTAATCCCAGCACTT
GGGAGGCAGAGGCAGGCGGATTTCTGAGTTTGAGGCCAGCCTGCTCTACAAAGTGAGTTCCTGGACAGCCAGGGCTACACAGAGA
AACACTTTCTCAAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAAGGAAGGGGT
CTGAGCCTCCCCAATCCCATACAGTGACCAAGGGGGACCAAGCGTCAAGGACAGGATTCCTCAAGCAAGCTTCTGGAGCCTCT
GGGATCCCTGTCGATCCTGTTAATGTTATAGCTGTGAACTACCCACAGGCTGTAGAATCTTGATAGGAGCCCCAAGTCTCCCT
GCCGCTCACGGTGGTGGACATGAACTAAGTACATGCAGGATCACCTCCCAAGTCTGAGGCCATTTGGTCACAAGTGGATATTCCT
GATCACTTGGACAAACAGGTGTCCAAGTTGTTGACAAATCAAACCTCCTTTGGATGATGCATTTGAGTCTCCTTTTGGTTTGGC
CAGGATCTCCTTCAGAATTCATGCAGAAGGTGGATCTCCAAGTCTTGTGCCATTGCATGAAGAGAAAAGAGCTACCAGCTTTTA
TCTTCTGAGAGTATCCTGCCATTCACCAATCTCAGACTTAGCTACACTCAAAGGAAATGCGTGTGCTGAGGCTACTCAATGCTT
TCTCCTACTCTGCCACTGAACCTCCATTGACTTGAACGTCCCACAGTGGCATGCCACAGTGAAGAGCAGGTCAGGCTCTCAGC
ACCCAGTGTCTGGCCACATTCACCTGAAATCATTTGTCTTCAGAACATCAGAAAGGACCTGCAAGAGACCAGAAAGATTCACT
AACTGTGACTTTTCCCTCATAGAAGCAGGAGGGAGGTGAGACCTAGAGGCTGCAGGCTGCTCCCTTCTGTATTTTCCAGACATTT
TGGATGCAATGCTGTTCTAATTATCTTAT

Supplementary Fig. 2

Kdm4d locus (around Exon 2 of the wild-type allele)

CACCCAGTAGCCTACAAGAGGAAAGAACCAGGTTCCAACGGAACATATTAGACCAAGGCTCCCTGACTGAGCTGCTGCCCTGAGT
GCTGGCTCTGGGTTAGTCAGCAAGCCTAACAAAAGTTAGTCCCATCACATGCACAGAGGCTGTCAGGAGATTCGGCTCCATCACA
GCCACAGCAAGTCTTCTTTATTTATTTTAAATCCCCTTCCCTCAATCCTGTGTGTATATTGGAGTTTGGTGTATACATTGAAGC
TATGAAGACGAAGTCCACATGTGCTCAGAATCCAAATTGCAGCATAATGATATTTTCGTCCAACCAAAGAAGAGTTAATGATTTT
GACAAATACATTGCTTACATGGAGTCCCAAGGGGCACACCGAGCTGGACTGGCCAAGGTCATCCCACCAAAGAATGGAGGGCCA
GGCAGTCTTATGACAATATCAGCAACATCTTAATAGCAACTCCCCTGCAGCAAGTGGTCTCTGGGCAGGCAGGCGTGTTCACCCA
ATACCATAAGAAGAAGAAAGGCATGACAGTGGGGGAGTACCGTGAGCTGGCCAACAGCAAAAAGTACCAGACCCCGCCACACCTG
GATTTTGAAGATTTGGAGCGAAAATACTGGAAGAATCGCCTGTATGAGTCACCGATTTATGGTGTGACGTACAGCGGCTCCCTGT
TTGATGGGAAGACTCAACAGTGAATGTGGGTACCTGGGAACAATTCAAGACCTATTGGAACAGGAATGTGGCATAGTGATTGA
GGGCGTCAACACGCCCTACCTGTACTTTGGCATGTGGAAGACCACCTTTGCGTGGCACACGGAGGACATGGACCTGTACAGTATC
AACTACCTACACTTTGGGCAGCCCAAGACCTGGTATGCTGTGCCCCCTGAGCATGGCAGGCGCCTGGAGCGCCTGGCCAGGGAAC
TCTTCCCTGGCAGCTCCCAGGCTGCCAGGCCTTCCCTGAGGCACAAGGTGGCGCTCATCTCGCCCACTGTGCTTAAGGAGAATGG
CATCCCCTTTGGTTCGCATCACCCAGGAGGCTGGGGAGTTCATGGTACCTTTCCCTATGGCTACCACGCGGGCTTCAACCATGGC
TTCAACTGCGCAGAGGCCATCAATTTTGCCACCCCAAGGTGGATTGACTATGGCAAGGTGGCATCTCAGTGCAGCTGTGGGGAGG
CCAGGGTGAGCTTCTCCATGGACGCCTTTGTGAGGATCTTGACGCTGAGCGATATGAACTGTGGAACGTGGCCAAGATCAGGC
AGTTGTGGACCACACAGAGACTATGGTGTCTACCAGTCAGGAGCTCACCACCCGGCGGGTGACCAAAGCACCAGAAAAACTTGG
GGCTTGAAAGCGTCTCCGGCTTCGCCAGGTCTCACGATCTCTTCTGCCTATAGCCACGGTAAGTAA

Kdm4d knockout allele

CACCCAGTAGCCTACAAGAGGAAAGAACCAGGTTCCAACGGAACATATTAGACCAAGGCTCCCTGACTGAGCTGCTGCCCTGAGT
GCTGGCTCTGGGTTAGTCAGCAAGCCTAACAAAAGTTAGTCCCATCACATGCACAGAGGCTGTCAGGAGATTCGGCTCCATCACA
GCCACAGCAAGTCTTCTTTATTTATTTTAAATCCCCTTCCCTCAATCCTGTGTGTATATTGGAGTTTGGTGTATACATTGAAGC
ACTGTGGAACGTGGCCAAGATCAGGCGATTGTGGACCACACAGAGACTATGGTGTCTACCAGTCAGGAGCTCACCACCCGGCGG
GTGACCAAAGCACCAGAAAACTTGGGGCTTGAAGCGTCTCCGGCTTCGCCAGGTCTCACGATCTCTTCTGCCTATAGCCACGG
TAAGTAA