

Data S1. Sequence information. (A) KPNA4 sequencing profile. (B) LINC00467 sequence and LINC00467-Wt/Mut fragment. (C) KPNA4 3'-UTR sequence and KPNA4-Wt/Mut fragment. KPNA4, karyopherin subunit $\alpha 4$; Wt, wild-type; Mut, mutant; UTR, untranslated region. The bold and underlined text at the top and bottom of the sequences represent the indicated restriction sites.

(A) KPNA4 sequencing profile

*Nhe*I restriction site

CTAG**CTAGC**ATGGCGGACAACGAGAACTGGACAAC
CAACGGCTCAAGAATTTCAAGAACAAAGGCCGCGAC
TTGGAGACTATGAGAAGACAACGAAATGAAGTTGTAG
TTGAATTAAGGAAGAATAAAAGAGATGAACATCTCT
TAAAGAGAAGGAATGTACCACATGAAGATATCTGTG
AAGACTCTGATATAGATGGTGATTATAGAGTGCAAA
ATACCTCTCTAGAAGCTATTGTTCAAATGCTTCAA
GTGATAACCAAGGAATTCAATTAAGTGCAGTTCAAG
CTGCTAGGAAGCTTTTGTCCAGTGATCGAAATCCAC
CAATTGATGACTTAATAAAATCTGGAATATTGCCCA
TTTTAGTCCATTGTCTTGAAAGAGATGACAATCCTT
CTTTACAGTTTGAAGCTGCATGGGCTTTGACAAACA
TTGCATCTGGAACCTTCTGAACAACTCAAGCAGTAG
TTCAGTCCAATGCTGTGCCACTTTTCTGAGGCTTC
TCCATTACCCCATCAGAATGTCTGTGAGCAAGCAG
TGTGGGCATTGGGAAATATCATAGGTGATGGGCCCC
AGTGTAGAGATTATGTCATAAGTCTTGGAGTTGTGA
AACCTTTACTTTCTTCATAAGTCCATCTATTCTATAA
CATTCTTAAGAAATGTTACTTGGGTTATGGTCAACT
TATGTCGCCACAAAGACCCACCACCACCAATGGAAA
CCATTACAGGAGATTCTTCCAGCCCTTTGTGTTTTAA
TTCATCACACAGATGTAAATATACTGGTAGACACAG
TCTGGGCCCTCTCTTACCTTACTGATGCTGGCAATG
AACAAATACAGATGGTAATAGACTCTGGAATAGTTCC
TCATTTGGTTCCTCTGCTCAGCCACCAGGAAGTTAA
AGTTCAGACTGCTGCACTTAGAGCTGTGGGCAACAT
TGTTACTGGAAGTATGATGAGCAAACACAAGTAGTTT
TGAAGTGTGATGCTCTTTCACACTTCCAGCACTCC
TGACACATCCCAAAGAGAAAATTAATAAGAAGCAG
TGTGGTTCCTCTCCAACATCACTGCAGGAAATCAGC
AGCAGGTACAGGCAGTAATTGATGCCAATCTTGTAC
CAATGATAATACACCTTTTGGATAAGGGGGATTTTG
GCACTCAAAAAGAAGCTGCTTGGGCCATAAGTAACT
TAACAATTAGTGGAAGGAAAGATCAAGTGGCTTACC
TTATCCAACAAAATGTTATCCCACCTTTTGTGCAACT
TGCTGACTGTAAAAGATGCACAAGTTGTGCAAGTAG
TACTCGATGGACTAAGTAATATATTAATAAAATGGCTG
AAGATGAGGCAGAAACCATAGGCAATCTTATAGAAG
AATGTGGAGGGCTGGAGAAAATTGAACAACCTTCAA
AATCATGAAAATGAAGACATCTACAAATTGGCCTA
TGAGATCATTGATCAGTTCTTCTCTTCAGATGATAT
TGATGAAGACCCTAGCCTTGTTCAGAGGCAATTCA
AGGCGGAACATTTGGTTTTCAATTCATCTGCCAATGT
ACCAACAGAAGGGTTCCAGTTTTAG**GGATCCGC**

*Bam*H I restriction site

(B) LINC00467 sequence and LINC00467-Wt/Mut fragment

GTGACGTTCCCTACGCGGTTCGGGCGTTGGGTTTCGC
GGCGCTCGCCGCACTGGTTGTTTCAGCACCTTCGGTC
CGGTTGAGGTTGTCAAGTCGGACCAACAGGTTGTT
TCTCTGCAGTTTCCAACATGGCAGGGAGGTTTAATA
GACATGGATAAGAAGTCCACTCACAGAAATCCTGAA
GATGCCAGGGCTGGCAAATATGAAGATGATCCTAT
GTTTCTTCTTCTCATCATCGTCTTCAGGAAGCCAG
ACAGATTCAAGTATTGAAGATGCTGCCAAGGGAAAA
ATTAAGAAGAAGAGAAGAGAGAAAACAAATAAATG
GGAAAAAAGAAAGGTGCGGTGAAACATCAATCGGC
TTGGTCCACAGATAAGCGTGTTCAACTCCCCGACGA
GTGGACAAAATATGAAACACCAAGAAAAAGAGAAG
GAAAAAAAGGAGGAAACAACCACATATGTCACCTT
TCCAAGGAATATAATTCAATATCAGAATGATTTGGA
AGGAAAAAACCTACAGGAAGCTATTGTAGCCTAGT
GAGGAAGATAAATATTAATACAGCCAATTTATAGAT
CAGACTAAAGACAATGATTGGGGCATTGAAAAGAA
CAGATAGAAGAAATATTGCAAAGAGGGACTGAAA
CTGGGCTGACCCCTTTTGAATTTCAAAGCTCAGCGTT
TTGGTGTAAAGGCGGCCAAAGAAGGATGCGGAGCC
CAGCACTGTGAAGCCTACAAAAACATTGATGCGCT
GGCTTGGGGATTTGAATTTGAACATCTTTCACACT
AAGTTCAGACTCATGAAACCAATCTTCAGATGCTCT
GTAAACCACATAATAAAGAGTTTGGAAATTATATTT
TGTTTTTGAAGGCCACGTGCAAACTTGAGAGCCT
CAAGTCCAAGCCAGTTGTGGCAATTCTAGCCTACTT
TTTTTTTATATTCAAGTGTGTGTAGGGAAGGAGGA
GAATAAGTCTGCTTCTTGAATATTATGCCTAATTA
ATTACGTATAAAATACTTTTACCAAAGTCTATGCA
AGGTAGAAGACTTACAGATGGCATGAAAAAGATAA
AGTCTTTTCCATGTTTTTTTTTTTTTTTTTTTTTTT
TTGAGACAGAGTTTCACTCTGGTTCGCCAGGCTGGA
GTGCAGTGGGCCAGTGTGCGCTCACGGCAACCTCC
GCCTCCCAGGTTCAAGTGTCTTCTCCTGCCTCAGCCT
CCTGAGTATCTGGGACTACAGGTCCATGCCACCACA
CCCAGCTGATTTTGTATTTCTAGTAGAGACATGGTTT
CGCTATTTTGTCCAGGCTGCTCTCGAACTCCTGACC
TCAGGTTATCTGTTCCCCACGGCATCCCAAAGTGCT
GGGATTACAGGCGTGAACCTACCGTGTCTGGCCTCTG
TGACTTCTTTTTTGTGTTATTGTTTTTGTAGATGGAG
TTTCACTCTTGTATACAGGCTGGAGTGCAGTGGCG
CCATCTCAGCTCACTGCAACCTCTGTCTCTGGGTTT
AAGCGATTCTCATGCCTCAGCCTCCCAAGTAGCTGG
GATTACAGGTGTGCACCACCACGCCAGCTAATTT
TTGTATTTTAGTAAAGACAGGGTTTCACCATGTT
GGCCAGGCTGGTCTCGAACTCCTAACCTCAGGTGA
TCTACCACCTCAGTCTCCCAAAGCGCTGGGATTAC
AGGTGTGAGCCACCCTACCTGGCCCATGTACTTCTT
ACTAGTTTTTCTTCCCCTGCTTATGTTTACATTT
GCAATTATGCTTCTTCTTTCAACAAATATTACAGGT
TTTCATAATCTCAAATATTTGTTTTTGTAGAGCATGATG
TAATGTTCTTTGCAATTAGGTACACTGATTGTGGGTT
TCCAACAAAAAGTTTTTCAGGTCTAAAAATGATCACA
TCATGCAGTATACCCAGGAATCAAACCTGCACATCTAT
CCCCTAAGTCTAAAAATGAAAGTTGAAAAAATAAAA
AATTATATAAGAAAAAAATTATCACAGTGTTTTTATAA
AATAAGAAAGCAGACCACGCGTGGTGACTGAGG
CTTGTAATCCAGCACTTTAGGAGGCCAAGGCAGGC
GGATTGCTTTAGCTCAGGAGTTTGTAGGCCAGCCTGG
CCGAAATGGTGAAACTCTGTCTCTACAAACACACAC

ACACACACACGGTGAAACTCTGTCTCTACAAACACA
CACACACACACACACACACACACAAATTTAGCCA
GGCATGGTGGCACATGCCTGTAGTCCCAGCTACTC
GGGAGGCTGAGGTGGGAGGATTGCTTGAGCTTGGG
AGGCAGAGGCTGCGGTGAGCGAAGATCACACCACT
GCACTCCAGCCTGGGCGCCAGAGCAAGACTCTGTCT
ACAAAAACAACAAACAGAAACAGCAATTTGCCAG
GTAAGCCTTTTATGTTGCCTTTGATAGTTTTATAGAT
CCTTGGGATTTTTGCTCACTTAGGTTTATGATTGAAT
GTGTATCCCATCTAACTGTGTACTTGATATTTGCTTTT
AAAACAAACTCCTGTTAGAAGTAAATGTTGAAAGAGA
GGGCTAGGTTGTTTTTTTTATATTCATTCAGTCATTGA
TTCATTTATTTATTTATTCAGGGTCTTGGCTGTGTTACC
TAGGCTGGAGTGTGAGAGTATGATCATGGCTCACTGCA
GCCTAGACCTCTTGGATTCAAATGATGCTCCCCTT
CAGCCTCCCAAGTAGCTGGGACCACAGGTGCACACC
ACCATGTCCAGCTAATTTTTAGATTTTTTTGTAGAG
ACATGGTCTTCTGTGTTGCCCGGCTGGTCTCGTA
CTCCTGGCTTCAAGCAATGGCCCCACCTTGGCCTCC
CAAATGAAGATTACAAGTGTGAGCCACTGTGCCTA
ATTGATTTTTTTATTTGAAATTTTGATACTGTTACGT
TGTCACTGAGGCAGACA ACTTAAAATAATCTTGA
GTATCATTCTGTGCCGATGTTAGAATTTAATATGCT
GTTCTGAGGCCAGGCTCAGTAGCTCACGCCTGTAAT
CTCAGCACTTTGGGACGCCAAAAGCAGGAGGATC
TCTTGAGCCCCCAGGAGTTTGAGACAAGCCTGGGC
AGCATAAAGAGACCCCCATCTCTAAAAA
ATAGAAAAATTAGCCAGACATGATGATGCCAACCTG
TAGTCCCTGGCTACTTGGGAAGCTGAGGTAGGAGGAT
CGCTTGAGCCCAGGAATTTGAGGCTGCAGTGA ACTA
TGATTACCACTGTACTCCAGCCAGGGTGACAGAG
CAAGACCCTATCTCTAAACTATTTTTAAAATAAA
ACAATATGTTGTTTCATATTATCCTAATGTAGTGTTTTAC
TGAATAGAATTCCTTAAAGGATTCTTTTCCCCAAGGA
TATTA ACTCAAGGTAAATTATAATAGGATTGCAGATAA
ATTAAGCATCTTTATCTTTGATTACAGAGATATTTAGCA
TATGACTATAGATAATTTCCCTTCATATTTCTTGGGC
TTCTAGTATTTATGTATCAAGAAAATTATTTCTTATGT
TTGAAATGGTGACATTTCTGAAATGTACCAGCAGAG
GATACAGGGATTTTTGTTTTGTTTTTCATTTCTTATTTA
CTGAAGAAATAAAGGCATTTTAGTTTATAAATGGACT
GTTTCTTTTTTCCAGGAAACTAATATTCATAATTATG
GAAAACCGTGGTCTCTTCAAAG

Inserted fragment

LINC00467-Wt

5'-KpnI

GGGGTACCGCAATTATGTCTTCTTCTTTCAACAATA
TTACAGGTTTTTCATAATCTCAAATATTTGTTTTTGA
GCATGATGTAATGTTCCCTTGCATTAGGTACACTGAT
TGTGGGTTTTCCAACAAAAAGTTTTTCAGGTCTAAAAA
TGATCATCATGCAGTATACCCAGGAATCAAACCTG
CACATCTATCCCCTAAGTCTAAAAATGAAAGTTGAA
AAAAATAAAAATTATATAAGAAAAAAATTATCACCT
CGAGCCG

XhoI-3'

LINC00467-Mut

5'-KpnI

GGGGTACCGCAATTATGTCTTCTTCTTTCAACAATA
ATTACAGGTTTTTCATAATCTCAAATATTTGTTTTTGA
AGCATGATGTAATGTTCCCTTGCATTAGGTACACTGA
TTGTGGGTTTTCCAACAAAAAGTTTTTCAGGTCTAAAT
TAGTTCAGAACTACGTCAATACCCAGGAATCAAACCT
GCACATCTATCCCCTAAGTCTAAAAATGAAAGTTGA
AAAAATAAAAATTATATAAGAAAAAAATTATCAC
CTCGAGCCG

XhoI-3'

(C) KPNA4 3'-UTR sequence and KPNA4-Wt/Mut fragment

AAAGATGTTGTGGAAGTTAGGTACAATGCAGCACTG
AGACATATATATATATATGTGTGTGTGTGTATATGT
GTGTGTGTATATATATATATATACACACATATATAT
AAAAGGTTTTGATCCATCCAGCTTGGCTCATGGGAT
CTGCTGCTGCATTAATCGGGAAAGAAAATGTGAAG
ATTTCAATTTGGAATCACCGAAAATGCCCGAATGAGG
TCAAGATGGCGAGTGGGTGCGAGTGAGAATGAGTG
GCAAATGTAATGAAA ACTTTACATGGATGCTTATTT
AGGTTGTTCAAAGTAAAAGGGCTACAGGTCACAG
ATCTCCAGTGCCTGAGAAGGAACATTGACTTACTCT
ATATCAATTGAGGGGAAAGTGAAGTACTGTCACTT
TAAGCCTTGTAAGCATAAAAGAAAACAGAATGCC
ATATAAGTCAAGGAAATGAGCCCAGGCCTTGCTATG
AAGCAGTGTGTGAATGGACGATGTTGAATGAATGTC
TGGCTCAGTGAGAGAGCCAGGTTTCATCTTTCAAATC
TAGGGCTCTTCACTCATGAAGCAGACTCCCTAGTCC
TGGAGTGA CTGTGTACGAGAGAGTGTGTTGTGGTGTCT
GTATGTGAACGCATGCAAGCTTGATTTCGCTGCAG
GGGCTGATAACAAACCTAGTAAATCATCAAATGAG
ATCACAGGTGTTAATGTACTGGACATGAAAAAA
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ACTTTACCTAGTATGGCTTTTTTAGTTGTTTCTCAAG
TCAGAAA ACTTCAGGAAGGTTTCCCTGGCATTGCA
CCAGATGAATGTTTGATGCTATGAAAAGCTTTCCATA
TCATCAAACTAATTGTGTAGATTTTTGCATGAAAAA
AATCATAAATTTCCCTCAAATAGACTGTGTTGCATA
CACAAGTTGCCATAATAGTATAAAACAATAAAATGTG
CTTAAAAGGCCATCCTTTTCTTTTCAGAGTTAACATA
AAGATCTTTGCATGAGATAAATCTACAGCATAGTTCA
TTTTTGATTTTTGTTGAATCCTGTAACGAAGAAGAAA
AAGTTTCAGTTGTGATAGAATACCGTGCGTGTTTAA
ATGTTACTTGTTTTTCAA ACTTTGTTTTCTATGAAAAT
GATATGGAAACTTCAAATGGAATTTGGTGCATATG
TACTGCTGAATAAAGACCGGTTGAAGAGGTTTGAGTA
CTGTACAAATCAAGTAATGGTTTGAACA ACTTTAAT
AATATGCCTAATCTGTTTCAGTTGTTTAGAATCTTTTT
ATCTTAGATGTAGGCAGCCATGAACAATCTATTTTGA
GCCACTTTAGGAGAAA ACTTTGTATTTTTTAAA ACTT
GCATAAAAGTTATGCAAGTGTTTTTTATAAATGGAA
TAATGCCTCAGTTTTGAGGTTATGCACACTAAATTA
AATGTGACATAAATTAATTGTAAAATAAAA ACTC

TTTATAAGGTGGCTCATTGTAGGAAATCCTGTGCCT
TCCCCTT

Inserted fragment

KPNA4 Wt

5'-*Kpn*I

GGGGTACCGGTTTCCCTGGCATTTCACCAGATGAA
TGTTTGATGCTATGAAAAGCTTCCATATCATCAA
ACTAATTGTGTAGATTTTGCATGAAAAAATCATA
AATTTCCCTCAAATAGACTGTGTTGCATACACAAG
TTGCCATAATAGTATAAAACAATAAAATGTGCTTAA
AAGGCCATCCTTTTCTTTTCAGAGTTAACATAAAGAT
CTTTGCATGAGATAAATCTCGAGCCG

*Xho*I-3'

KPNA4 Mut

5'-*Kpn*I

GGGGTACCGGTTTCCCTGGCATTTCACCAGATGAA
TGTTTGATGCTATGAAAAGCTTCCATATCATCAA
ACTAATTGTGTAGATTTTGCATGAAAAAATCATA
AATTTCCCTTAGUCACGGACTACGTCACACAAGTTG
CCATAATAGTATAAAACAATAAAATGTGCTTAAAG
GCCATCCTTTTCTTTTCAGAGTTAACATAAAGATCTT
TGCATGAGATAAATCTCGAGCCG

*Xho*I-3'

Figure S1. Examination of transfection efficiency. (A) Knockdown efficiency of the miR-217 inhibitor was validated by RT-qPCR. (B) Overexpression efficiency of LINC00467 was validated by RT-qPCR. * $P < 0.05$. RT-qPCR, reverse transcription-quantitative PCR; miR, microRNA; NC, negative control.

