

**Table S5. Oligonucleotides for PCR, RNA interference and sgRNAs**

| <b>Primers for quantifying target genes</b> |                              |                            |
|---|------------------------------|----------------------------|
| <b>Name</b>                                 | <b>Forward Primer</b>        | <b>Reverse Primer</b>      |
| qSEELA1                                     | GAGCGTGGTGTCAAGGTC<br>ATC    | AGGCGGAAGGAGCCATAGTG       |
| qSEELA2                                     | CCAGCCTACATCTTTCTCC<br>CAT   | CTTCCAATCTGAACGACCTCATC    |
| qGAPDH                                      | GAGAGACCCTCACTGCTG           | GATGGTACATGACAAGGTGC       |
| qSERINC2                                    | GAGCCGCCTCATCTTCACG          | TAGCCAAGCAGGGAGCCAC        |
| qSEELA1-V1                                  | TGGGGCTGGTCCTTTATTC<br>A     | GCCTCCCTTTGCTTCTCATTC      |
| qSEELA1-V2                                  | CACAGGGCTGGGCATGATA<br>T     | GAGGGACAGCAGGAAGAGGTT<br>A |
| qSEELA1-V3                                  | CACAGGGCTGGGCATGATA<br>T     | CTGATCACTCTCGCCAACTGC      |
| qSEELA2-V1                                  | CACAGGGCTGGGCATGATA<br>T     | ACACCGCATTCTTGGACAC        |
| qBRD4                                       | ACCTCCAACCCTAACAAGC<br>C     | TTCCATAGTGTCTTGAGCACC      |
| qHOXA9                                      | GAGGCAGGTCAAGATCTG<br>GTTCC  | GATGTGGCCTGAGGTTTAGAGC     |
| qHOXA10                                     | CTCACGGACAGACAAGTG<br>AAAATC | CAGCCCTGCACAGATGTAACG      |
| qAGTRAP-ELA1                                | GACAATGACCCATCACATA<br>CTCTG | GCAAAGCCACTTACTCCTCCA      |
| qALDH13-ELA1                                | TCCCTAGCCGTCAACCCTA          | CCGTGCCCTAATTCGTCAG        |
| qATG7-ELA1                                  | CCTTCAAGGTTGTGCGTCT<br>G     | TAGCTGTCACTGCCTGGTACTTC    |
| qATP10B-ELA1                                | CTTCACGGGATCAGAGGG<br>A      | TACAAAGGGACAATGTAGCCC      |
| qBDH1-ELA1                                  | GCAGGCTGGTTGCTCTTCT<br>CA    | TCCACCTCTGGTCGGACATTA      |
| qBRE-ELA1                                   | TCTCAGCGGAAGGATTGG<br>A      | CCGGCTACGCTATTTACGAG       |
| qC1orf64-ELA1                               | GAATGTTTGGACCTACTTA<br>CCCTC | GCTTTATCTCCTTTAGCATCCC     |
| qCDYL-ELA1                                  | CGGGTCCACAGAGTTCCA<br>GAG    | CCTTCAACAAGCGTTTAGCAG      |
| qCMIP-ELA1                                  | AGTGGCAAGGTTGGTGAG<br>TATCT  | CGATCTGCCTGCTTGGGAC        |
| qCOQ2-ELA1                                  | AAGGGACTGAGCTGAGCT<br>TGTA   | ATAATGGAGTGGCAGGGTCTTG     |
| qCXXC5-ELA1                                 | CTGAAATCCCCTGGACTGC          | CTGCTAATGAACCAAACCTTGCT    |

|                      |                               |                                |
|----------------------|-------------------------------|--------------------------------|
| qDLEU7-ELA1          | CCAGGGCAATGTACGACT            | CAATGGCAAAGGACGGA              |
| qDNAJC5B-ELA1        | CCTGAAACACCATCCAGAC<br>AA     | GTAGAGTCCCAGCGATCCGTA          |
| qFGR-ELA1            | GCAGCAGCCTGTATCTCAC<br>C      | TCACTCCTCTTCCAGCCATTT          |
| qFRGIJ-ELA1          | CCTGGAGTGCTCATAACGT<br>GG     | CATTTCTTGAATCTGTGCTGGTC        |
| qJMJD1C-ELA1         | CCTGAGCCAAGGAGTTCG<br>AAGT    | GATGCAAATGACCTACAAAGCC<br>C    |
| qKIF21B-ELA1         | GTTTCCACAGCAGCACAAAT<br>AGA   | GTCTCAAACCTCCTGGCCTCAA         |
| qLERK1-ELA1          | AACTTGAGGAGACAATAG<br>TGACGAA | AGGTGCCGAAATGTTATAGTTAG<br>G   |
| qMEF2C-ELA1          | GGTTCCTTCCTTGGAGTGT<br>TTCT   | GCACTTTGTTTATACCTTAGGAT<br>CCG |
| qMIR181A1HG-<br>ELA1 | TGTTGTAGGCTGCATGTTG<br>G      | AGCTTAGCTGAGTCCTCTGTTTG        |
| qMIR181A1HG-<br>ELA2 | TTCAGTTTTGGGTCTCAGC<br>AC     | ATGGCTGTGGGATGTGAAGA           |
| qNKD2-ELA1           | AGCCGCCCACTGACTCCTA           | CGCCAACTGCCTTCCTTCT            |
| qNUDT7-ELA1          | GTGAACAACATCCCTGTCTG<br>CTT   | AAATCATCCACCAAAGCACG           |
| qRNF32-ELA1          | CGGAGTGAATTGAGGCAA<br>CG      | GAGTCTTCCCGAGCAGGTCT           |
| qSACS-ELA1           | TCCCGATAGCCAAGCAGA<br>A       | TAAACCGCCGAAGGACGA             |
| qSRGAP2C-ELA1        | TTGGACCTGGTACAGTAGT<br>AATGG  | CGTCTAATTGGAATAGTGCATG         |
| qTXND12-ELA1         | GCTCCACGCAATGCCTTCT           | CCAATGGTCGCTCCCTGA             |
| qENST000004135<br>25 | GACCCGCAGGCTGTGGAA            | CAAAGCCCTGAAGCCGAG             |
| qHOTAIRM1            | AGGGGGTTGAAATGTGGG<br>TG      | CTTGAAAGTGGAGAAATAAAGT<br>GCC  |

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**Primers for Chip**

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|            |                               |                                |
|------------|-------------------------------|--------------------------------|
| SATB1-ELA1 | CTGTTTCAGAGGAGAAACCCT<br>TCAC | GTCTTAAGTCACATTCAGTCCCA<br>TGA |
| SMIM2-ELA1 | GTTTGGCATCGCAGTTCCG           | GTGGCTATCTTTTCCCATTTC          |
| HOTAIRM1   | GGAGACGAGGGCAAGAAAA<br>GA     | GGTGCAAACCTGAGTGGGAAA          |
| HOXA6-ELA1 | AGCCGTCCTTCTTTGCCATAG         | GCCGTTATAGACTCGGGTCTT          |
| CALCA-ELA1 | CTCACTGTGCCTTCGGACCTA<br>C    | CAGCCATCTTCTCGCTAACTCG         |

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|--------------------------------------|---|--|
| PCED1B-<br>ELA1                      | CAAGAACAATAAGAGCCAAG<br>GGTC  | CGGAAGACTAATGACCGAAGC  |
| IL10RB-ELA1                          | TTTTGCGATAACCTCTATGGCT<br>G   | TGTCCAGTGTCTTGGGTAATGC   |
| AW361687<br>ARID4B-ELA1              | GGATTCAGTTCCGCCGACA<br>AGGCAGGGGAATCGCTTGA                          | CCCTAGTGGGAGACCGAGATT<br>CTGTCCTTAGGTGGGTGACG                          |
| ENST0000043<br>3764                  | ACCTCACCTCCGTGCGTT  | CCGTTCCGATTTTCCCCTGAG  |
| ENST0000045<br>4595                  | CAACCAGTTTGCCTGAAAGG<br>TG  | CAGCATCTAAGTGAGGATCATAA<br>ACAC  |
| PTGER4P2-<br>CDK2AP2P2-<br>ELA1      | GAAAACCAATGGAGCCCTGA<br>G   | TGCCACCGACTTCGTGTAAA   |
| CLEC6A-<br>ELA1                      | GGTGTAAGTGTTGTATGCTCC<br>CAG  | GTCCACGAATGTTGAAGCCCTA   |
| HOMER2-<br>ELA1                      | GTTTCTCCCACTTCCCCTTTTG  | GCAGGAAGGTGGCTTTGGT  |
| HSPA7-ELA1<br>PARP8-ELA1<br>BRE-ELA1 | ATGAAAAGCCCGTGGAAGC<br>GACCTGAACCACCCTCCCACT<br>TCTCAGCGGAAGGATTGGA | GAGTAGGTGGTGCCCAGGTC<br>CATCACCTGCTGTCTGTCTCCA<br>CCGGCTACGCTATTTACGAG |
| GAPDH:<br>B2M                        | CCCAACTTTCCCGCCTCT<br>CGGGCTCTGCTTCCCTTAGAC<br>T                    | CCTTACACGCTTGGATGAAACA<br>TGCTAGGACATGCGAACTTAGC                       |
| ENST0000041<br>3525                  | CTCCACTGACAGGAACCAGC<br>AA  | ATCAAATGCAGGGACCGAAG   |
| COQ2-ELA1                            | CGTGAAGATGACAAAAGAAG<br>AATGAC                                      | GTGCCTTAGAAAGTAAGAAGTA<br>GTGACTGA                                     |
| LERK1-ELA1                           | AGCCCGCTGTCCCCTTATC   | CCCTCCACCGACTTTAGTTTCG   |
| CDYL-ELA1                            | TTCTGTGGGAGGCAAGTGT   | GAAGCAGGGCACAAAGATGAG<br>T   |
| AGTRAP-<br>ELA1                      | GCAGATTCCAGGCACCGAG   | CCACTCTTGGTGTCTCCAGACA<br>A  |
| NKD2-ELA1                            | CTATTGAAGGCATTTTGAGGA<br>GG   | GGCTACTCCCAAGACAGGAAAA   |
| FRGIJP-ELA1                          | GTAGGCTTTTGGCTTCCCG   | AGGAGGACCTGGGCTTCTG  |
| SACS-ELA1                            | GCCCTCACGGAACCCTAAAA  | CTCCTTGGATGCAAAAACAATG   |
| FGR-ELA1                             | AGCCTATGCTCCCTCATCTTCC  | CCTTCAAGTCCTCAGTCCTACA<br>A  |

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|                     |                                 |                                 |
|---------------------|---------------------------------|---------------------------------|
| KIF21B-ELA1         | CCCACGCTACTGTAGTTAAAA<br>TAATCC | CCCAGTGCTAACCTGAAGAAGA<br>TAA   |
| ALDH1A3-<br>ELA1    | CCACTCAGGAGGGAGCCAAT            | GACAGAGCGGAGACTCCACCTAA<br>A    |
| ATP10B-ELA1         | TGCTATGGATGATTGCTGTGG           | CAGGCGGAACACTGAGAAATCT          |
| C1orf64-ELA1        | CAATCTCCACTCACCACAACC<br>TC     | CTGTTTCTGGTGTTCCTCAAGTC         |
| TXNDC12-<br>ELA1    | AAACACCACGAGCGGCATC             | CAAGAGGGTCTGTAAAAGTCAA<br>GG    |
| MIR181A1HG-<br>ELA1 | GAGGCGAAATGATTGACTTAG<br>G      | GATAGTATTGAGTGAGAATAACC<br>GAGG |
| DLEU7-ELA1          | ACAGACGGGCATTTGGAAATC           | GTATGACAGCTCTGCATGAACC<br>AC    |
| DNAJC5B-<br>ELA1    | CTGGAAAAGCCGCAGACACT            | GATGAAAAGGTAGGTTCCCAT<br>GTC    |
| ENST0000043<br>5695 | CTTCAACATTTCCGCATTCC            | CTTGTCGCTGTGCTGGTGG             |
| CMIP-ELA1           | AAGACAGGCTTTGTGCTGAG<br>GA      | CTTAACCACCATGCCACATTGTC         |
| SRGAP2C-<br>ELA1    | GTCCCTAATCCCAAGCCAGAA<br>G      | CTGGATGGACGCTGAAATACAA<br>C     |
| MEF2C-ELA1          | CACGAATGGTTGGGGTTCTAA<br>G      | ACTGGAGGGGTGAGGAGGGA            |
| RNF32-ELA1          | AACCCGCAACGAGAAGCAA             | TTTCCCTGCGGTGGCTG               |
| NUDT7-ELA1          | CAGAGTTGGACCCCAGGAC             | CAGTAGCAGCCACCCCGTT             |
| MIR181A1HG-<br>ELA2 | GTATGATGGCACCCCTCCTGTA<br>GTC   | CCTCGTCATCTGTAAGTTGGGA<br>A     |
| CXXC5-ELA1          | CCCGACAGCAGCCAGTCTT             | CCAGTACAGCCACAGGACCTAT<br>C     |

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|                      |                                |                              |
|----------------------|--------------------------------|------------------------------|
| JMJD1C-ELA1          | AGCCTGGATGACAGAGCAAA<br>AC     | GCATATTTTCCCCTCTTCCTTGTC     |
| SEELA2               | AACCTGGGTAGTGGGAGCCC<br>TATC   | AGCAAGGGTTGTGAAATCGCAT<br>C  |
| SEELA1               | GGTTCTGGTCCTTCCCTTGCT          | CCCAGTGGTTTCGTGCCTTA         |
| SERINC2-<br>promoter | CTTCTGTTCTGCTCCGAGTAG<br>TTTC  | GGTGCCGAGTGAAGGTCCA          |
| ELA-<br>enhancer1-1  | CTGTTAATGTCCATGCTGCTTT<br>CTAG | GCTACCCACATTTTCTTGCTTTT<br>G |
| ELA-<br>enhancer1-2  | TGCTGAAATGTCTTTCTGCTG<br>G     | TAAACCAAAGGGAGTTGACGC        |
| ELA-enhancer2        | CTGGTTTTCTTGCGGCAC             | ATAGCTGTTGTCCATGTCCCTG       |
| ELA-enhancer3        | GGGTTCTGAGTTAGAGCCAG<br>GGT    | ATGGGGAGTGATTGCTTCATTG       |
| MYC                  | GAGCAGCAGAGAAAGGGAG<br>A       | CAGCCGAGCACTCTAGCTCT         |
| ATG7-ELA1            | CCTTCAAGGTTGTGCGTCTG           | TAGCTGTCACTGCCTGGTACTTC      |
| BDH1-ELA1            | GCAGGCTGGTTGCTCTTCTCA          | TCCACCTCTGGTCCGACATTA        |

#### The primer used in full length amplification

|               |  |   |
|---------------|--|---|
| SEELA1        | ACACAAGCTATCGCTGACTGCCGGT<br>GCATGTTGG                               | TGAAATATGTCTAGATTTTTTAAT<br>ATGGGC            |
| SEELA2-<br>V1 | CTAGCTAGCAAGCTATCGCTGACTG<br>CCGGTGCATG                              | ATAAGAATGCGGCCGCaactgtgcatg<br>catcctttaaattg |
| SEELA2-<br>V2 | CTAGCTAGCAATTTTGCATTCTGTCC<br>CTTAAATCATAAAG                         | ATAAGAATGCGGCCGCaactgtgcatg<br>catcctttaaattg |
| SERINC2       | CGGAATTCATGGGGCCTGCCTGGG<br>AG                                       | ATTTGCGGCCGCATGGGAGCGGA<br>GGGAGC             |
| H3            | CGGAATTCATGTACCCTTATGACGTA<br>CCTGACTATGCTGGA<br>GCCCCGAACCAAGCAGACT | CGGGATCCTTAAGCTCTCTCTCC<br>CCGTA              |
| H4            | CGGAATTCATGTACCCTTATGACGTA<br>CCTGACTATGCTGGATCTGGTCGCGG<br>CAAAGGC  | CGGGATCCTCAGCCGCCGAAGC<br>CATAAC              |
| HOXA9         | ATGCACCATCATCACCACCAT<br>GCCACCACTGGGGCCCTGGG                        | TCACTCGTCTTTTGCTCGGTC                         |

#### The sequences of siRNAs and sh-RNAs

| Name                  | Sense sequence(5'-3')     | Antisense sequence(5'-3') |
|-----------------------|---------------------------|---------------------------|
| si-SERINC2-<br>ELA1-1 | CCACACUGCUUUGUAAAUAT<br>T | UAUUUACAAAGCAGUGUGGTT     |
| si-SERINC2-<br>ELA1-2 | GCGAUCACCAGAACACAAAT<br>T | UUUGUGUUCUGGUGAUCGCTT     |
| si-SERINC2-<br>ELA2-1 | GGGCAAUAAUCUCCUUUCUT<br>T | AGAAAGGAGAUUAUUGCCCTT     |

|                       |   |   |
|-----------------------|---|---|
| si-SERINC2-<br>ELA2-2 | GCCUGAGCUAACCUGGGUAT<br>T   | UACCCAGGUUAGCUCAGGCTT   |
| si-SERINC2-1          | GGTCAGCCCTATCCAGTATTT   | ATACTGGATAGGGCTGACCTT   |
| si-SERINC2-2          | TGACGCTCACCAACTGGTA   | TACCAGTTGGTGAGCGTCA   |
| si-HOXA10-1           | GCCAAAUAUCCCAACAACAT<br>T   | UGUUGUGGGAUAAUUUGGCTT   |
| si-HOXA10-2           | GCAAAGAGUGGUCGGAAGAT<br>T   | UCUCCGACCACUCUUUGCTT  |
| sh-SERINC2-<br>ELA1   | GATCCCCACACTGCTTTGTAA<br>ATATTCTTCCTGTCAGAAATAT<br>TTACAAAGCAGTGTGGTTTTT<br>G | AATCAAAAACCACACTGCTTT<br>GTAAATATTTCTGACAGGAAGA<br>ATATTTACAAAGCAGTGTGG G |
| sh-SERINC2-<br>ELA2   | GATCCGGGCAATAATCTCCTT<br>TCTTTCTTCCTGTCAGAAAAG<br>AAAGGAGATTATTGCC<br>TTTTTG  | AATCAAAAAGGGCAATAATCT<br>CCTTTCTTTTCTGACAGGAAGA<br>AAGAAAGGAGATTATTGCC G  |
| Sh-SERINC2            | GATCCGGTCAGCCCTATCCAG<br>TATCTTCCTGTCAGAATACTG<br>GATAGGGCTGACCTTTTTG         | AATCAAAAAGGTCAGCCCTAT<br>CCAGTATTCTGACAGGAAGATA<br>CTGGATAGGGCTGACC G     |
| si-HOXA9-1            | CCGGCCUUAUGGCAUUA<br>T  | UUUAAUGCCAUAAAGGCCGTT   |
| si-HOXA9-2            | CCAAUAACCCAGCAGCCAAT<br>T   | UUGGCUGCUGGGUUAUUGGTT   |

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**The sgRNA primers**

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|---------------------|-------------------------------|-------------------------------|
| SEELA1-<br>VPR-sg-1 | CACCGCAGGGTGAGTGCCCCTT<br>CGT | AAACACGAAGGGGCACTCACC<br>CTGC |
| SEELA1-<br>VPR-sg-2 | CACCGGCGGTTATCCACAGTCT<br>GTG | AAACCACAGACTGTGGATAACC<br>GCC |
| SEELA1-<br>VPR-sg-3 | CACCGGGCCAACGAGGCACCT<br>ACGA | AAACTCGTAGGTGCCTCGTTGG<br>CCC |
| SEELA2-<br>VPR-sg-1 | CACCGGCAGCTGGTCACATGGT<br>CAT | AAACATGACCATGTGACCAGCT<br>GCC |
| SEELA2-<br>VPR-sg-2 | CACCGACTCAATAAAAACTTGC<br>ACT | AAACAGTGCAAGTTTTTATTGA<br>GTC |
| SEELA2-<br>VPR-sg-3 | CACCGGCTGGTCACATGGTCAT<br>AGG | AAACCCTATGACCATGTGACCA<br>GCC |

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