

**Supplementary Table 4.** List of primers used for quantitative reverse-transcription PCR (RT-PCR), chromatin immunoprecipitation-PCR (ChIP-PCR) and bisulfite sequencing PCR (BSP).

| Gene Name                | Primers | Sequence 5' to 3'      | Experiment |
|--------------------------|---------|------------------------|------------|
| <i>Rattus Norvegicus</i> |         |                        |            |
| <i>Hdac1</i>             | Forward | CCTGGAGAAGATCAAGCAGCGG | RT-PCR     |
|                          | Reverse | CCGCTCTCTTCTGGGATGGCA  |            |
| <i>Hdac2</i>             | Forward | CCATAGGATCCGGATGACTC   | RT-PCR     |
|                          | Reverse | ACTGGACAGTCTTCTCCGAC   |            |
| <i>Hdac4</i>             | Forward | TGAGCTCCCAAAGCCATCCA   | RT-PCR     |
|                          | Reverse | CAGGTCCATGGGTACTGCTG   |            |
| <i>Hdac5</i>             | Forward | AGCCGTGATGACTTTCCCT    | RT-PCR     |
|                          | Reverse | GCACTGTTACACACGGACGA   |            |
| <i>Ezh2</i>              | Forward | TCCTGGATGCCGGTGCAAAGC  | RT-PCR     |
|                          | Reverse | TCCCAGTGGTCAGCAGCTCCA  |            |
| <i>G9a (Ehmt2)</i>       | Forward | TGTGCGACCCCAACATCATCCC | RT-PCR     |
|                          | Reverse | ATCCCAGAACCGGTCGCCGT   |            |
| <i>Kcna4</i>             | Forward | CACCTGCCAAATCCGAGTGA   | RT-PCR     |
|                          | Reverse | GGGCAAACCTCAACACTGAGG  |            |
| <i>Kcnd2</i>             | Forward | CAGAGAACTCTAGACCGACG   | RT-PCR     |
|                          | Reverse | CCGCCAAAGGCGTCTCAAAA   |            |
| <i>Kcnq2</i>             | Forward | CGTTCATCTACCACGCCTAC   | RT-PCR     |
|                          | Reverse | CCGAATACCACGATGGTCAC   |            |
| <i>Kcnma1</i>            | Forward | ATGCCGCTTCGTGCTAGCAA   | RT-PCR     |
|                          | Reverse | CCATATTGCCTGGTACGCCA   |            |
| <i>Gapdh</i>             | Forward | TGCCACTCAGAAGACTGTGG   | RT-PCR     |
|                          | Reverse | TTCAGCTCTGGGATGACCTT   |            |
| <i>Kcna4</i> "TSS"       | Forward | GCAATCTGCTTAAGGCTTCC   | ChIP-PCR   |
|                          | Reverse | GAAATGGCTGGTTCCAGTTG   |            |
| <i>Kcna4</i> "-500bp"    | Forward | GCTGCAGACTCTTGATGTTCC  | ChIP-PCR   |
|                          | Reverse | GGTGCATCTCTGGCAAGACT   |            |

|                         |         |  |          |
|-------------------------|---------|--|----------|
| <i>Kcna4</i> "+500bp"   | Forward | AAAGGGGGAAACAAATCACC                   | ChIP-PCR |
|                         | Reverse | GCCAAAAGAGTAAGGTGAAGGA                 |          |
| <i>Kcnd2</i> "TSS"      | Forward | GACGTGAGGGGACAGAGAAC                   | ChIP-PCR |
|                         | Reverse | CTGGCCTCCTCTACTCAACG                   |          |
| <i>Kcnd2</i> "-500bp"   | Forward | GTAAGTTGGCAGGAGCGAGT                   | ChIP-PCR |
|                         | Reverse | CTCCTTGTCACCTTCCCAA                    |          |
| <i>Kcnd2</i> "+500bp"   | Forward | CCACCTTGAATAACCGTGT                    | ChIP-PCR |
|                         | Reverse | TCAGGGGTCACCCAAAGTAA                   |          |
| <i>Kcnq2</i> "TSS"      | Forward | AGCGTCCCCGCGCGGCCG                     | ChIP-PCR |
|                         | Reverse | GGCGGGGCCCCAGCCCAGGC                   |          |
| <i>Kcnq2</i> "-500bp"   | Forward | CCCAGGTCTAGTTGGCTCAG                   | ChIP-PCR |
|                         | Reverse | TCCATTTCTCCTCTGGGTGT                   |          |
| <i>Kcnq2</i> +500bp"    | Forward | AAAGCGCAACGCCTTCTA                     | ChIP-PCR |
|                         | Reverse | CACGTAGGCGTGGTAGATGA                   |          |
| <i>Kcnma1</i> "TSS"     | Forward | CAGTCTGGGGGAGGAAGG                     | ChIP-PCR |
|                         | Reverse | GCTCTCTCGGGTGATGAGAA                   |          |
| <i>Kcnma1</i> "-500bp"  | Forward | GGGCGCTATACTCTGTGTCC                   | ChIP-PCR |
|                         | Reverse | AGAGGGGAGGAGGCTTACC                    |          |
| <i>Kcnma1</i> " +500bp" | Forward | GTTGCTAGCTATGGCAAACG                   | ChIP-PCR |
|                         | Reverse | GCGTGGATATTGCTGCTCAT                   |          |
| <i>Gapdh</i>            | Forward | AGACAGCCGCATCTTCTTGT                   | ChIP-PCR |
|                         | Reverse | CCCCATTCTAATTTCCAT                     |          |
| <i>Slc12a5</i>          | Forward | TAGGGCCCTGTCTGTGGTAG                   | ChIP-PCR |
|                         | Reverse | TGGCTGCCACTAGAGGAGTT                   |          |
| <i>Kcna4</i>            | Forward | GGGATGGATATTGGAGAAGGA                  | BSP      |
|                         | Reverse | TCCCCCTTCAAACCTACAACA                  |          |
| <i>Kcnd2</i>            | Forward | TTTGAATAGAGAGTGAAGGGGTTT               | BSP      |
|                         | Reverse | CCTTTTCACCTTCCCCCTTCT                  |          |
| <i>Kcnq2</i>            | Forward | AGAGATGATAGTAGGGTTGGATTTT              | BSP      |
|                         | Reverse | AACCCCAACCCAAACCCC                     |          |
| <i>Kcnma1</i>           | Forward | GAAGGGGTTAGGTAGGGTATT                  | BSP      |
|                         | Reverse | GGGACACCGCTGATCGTTTACTTCTCCCCCAAACCTAC |          |

Mus Musculus

|                  |                |                            |            |
|------------------|----------------|----------------------------|------------|
| <i>G9a/Ehmt2</i> | Forward        | TGATCTCTGATGCCGAGGCT       | RT-PCR     |
|                  | Reverse        | GATGTTGGGGTCACACAGGT       |            |
| <i>Kcna4</i>     | Forward        | GCCCGAGAGAGACTTCATAC       | RT-PCR     |
|                  | Reverse        | CGGCTGCTGAACGTTACTTC       |            |
| <i>Kcnd2</i>     | Forward        | AACCCAGACCCTGCAAACAC       | RT-PCR     |
|                  | Reverse        | CCTCTGCATTCCAGTTGTCC       |            |
| <i>Kcnaq2</i>    | Forward        | CCTCTACAACGTGCTAGAGC       | RT-PCR     |
|                  | Reverse        | TGCAGCCCAGATCCTCACAA       |            |
| <i>Kcnma1</i>    | Forward        | AAGACGAAGGAGGCCAGAA        | RT-PCR     |
|                  | Reverse        | TCAGTGTCTGGGCGGATATC       |            |
| <i>Gapdh</i>     | Forward        | TGAAGGTCGGTGTGAACGGA       | RT-PCR     |
|                  | Reverse        | ACAAGCTTCCCATTCTCGGC       |            |
| <i>Cre</i>       | Forward WT     | CCCTGTTCACTGTGAGTAGG       | Genotyping |
|                  | Reverse WT     | AGTATCTGGTAGGTGCTTCCAG     | Genotyping |
|                  | Reverse mutant | GCGATCCCTGAACATGTCCATC     | Genotyping |
| G9a              | Forward WT     | TGCAGACTCTGCACCTTGCTCTTCTG | Genotyping |
|                  | Reverse WT     | GTGTGAGCCTGTGTTCTGGGGATTA  | Genotyping |
|                  | Reverse mutant | CCGGAGATGAGGAAGAGGAGAACAG  | Genotyping |

---