Supplementary Table 1: Primers and antibodies list:

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| **qPCR primers for gene expression** | |
| N6amt1 LP | GAAGGGGAAAGTAGACCTGCT |
| N6amt1 RP | TCTTCAGGCGGAGTCACTACA |
| N6amt2 LP | CAGTGGTCGCAGACACTTTGT |
| N6amt2 RP | CTGGGGTTGACGGATTGCTT |
| B-actin LP | GGCTGTATTCCCCTCCATCG |
| B-actin RP | CCAGTTGGTAACAATGCCATGT |
| BDNF exon4 LP | GTGGACTCCCACCCACTTT |
| BDNF exon 4 RP | TATTACCTCCGCCATGCAAT |
| **qPCR primers for chIP** | |
| BDNF proximal GATC LP | GTGGACTCCCACCCACTTT |
| BDNF proximal GATC RP | ATTGCATGGCGGAGGTAATA |
| BDNF distal GATC LP | GTTTAACAAAGCAGCAATCCA |
| BDNF distal GATC RP | AGTGGTCTTTGGACCGTTTTT |
| **shRNA or scrambled control sequence** | |
| N6amt1 shRNA scrambled control | GCACATTCTCTGATTAGTTAT |
| N6amt1 shRNA | TGTTCTACTTAGTTACCGTAA |
| N6amt2 shRNA scrambled control | GCATCTGACAGGCTTAACCT |
| N6amt2 shRNA | CCGCTGTTACACGAACTATG |

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| List of antibody | | | |
| Name | HOST | Cat# | Company |
| H4K4me3 | rabbit | 39915 | active motif |
| YY1 | rabbit | ab38422 | Abcam |
| Pol II | rabbit | sc-899X | Santa Cruz |
| m6dA | rabbit | 61495 | active motif |
| N6amt1 | rabbit | SC-83304 | Santa Cruz |
| N6amt2 | rabbit | SC-84221 | Santa Cruz |