### Supplementary table 1

**AID target motifs at Sµ and Sy3 regions**

Various nomenclatures are used for AID target motifs, which lead to different numbers of the motifs at Sµ and Sy3 regions. Therefore, we report the numbers according to each nomenclature by highlighting the hot agct motif. It is difficult to delineate precisely the borders of the core S sequence. Therefore, the numbering is based on the whole intron sequence.

#### WRCW

| S region (129Sv) | Intron size (bp) | agca | agct | aaca | aact | tgca | tgct | tact | taca | tctc | Total WRCW | WRCW/100 bp | agct/100 bp |
|-----------------|------------------|------|------|------|------|------|------|------|------|------|-------------|--------------|-------------|
| Sµ              | 5625             | 11   | 432  | 7    | 29   | 4    | 15   | 9    | 13   |      | 520         | 9.24         | 7.68        |
| Sy3             | 4918             | 30   | 108  | 13   | 19   | 11   | 11   | 20   | 4    |      | 216         | 4.39         | 2.19        |

#### WGCW

| S region (129Sv) | Intron size (bp) | agca | agct | tgca | tgct | Total WGCW | WGCW/100 bp | agct/100 bp |
|-----------------|------------------|------|------|------|------|-------------|--------------|-------------|
| Sµ              | 5625             | 11   | 432  | 4    | 15   | 462         | 8.21         | 7.68        |
| Sy3             | 4918             | 30   | 108  | 11   | 11   | 160         | 3.25         | 2.19        |

#### RGYW

| S region (129Sv) | Intron size (bp) | agca | agct | agta | agtt | ggca | ggct | ggta | ggtt | Total RGYW | RGYW/100 bp | agct/100 bp |
|-----------------|------------------|------|------|------|------|------|------|------|------|-------------|--------------|-------------|
| Sµ              | 5625             | 11   | 432  | 11   | 15   | 7    | 60   | 10   | 14   | 560         | 9.95         | 7.68        |
| Sy3             | 4918             | 30   | 108  | 19   | 14   | 46   | 44   | 39   | 30   | 330         | 6.71         | 2.19        |

#### DGYW

| S region (129Sv) | Intron size (bp) | agca | agct | agta | agtt | ggca | ggct | ggta | ggtt | tgca | tgct | tgta | tgtt | Total DGYW | DGYW/100 bp | agct/100 bp |
|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------------|--------------|-------------|
| Sµ              | 5625             | 11   | 432  | 11   | 15   | 7    | 60   | 10   | 14   | 4    | 15   | 12   | 9    | 600         | 10.66        | 7.68        |
| Sy3             | 4918             | 30   | 108  | 19   | 14   | 46   | 44   | 39   | 30   | 11   | 11   | 13   | 4    | 369         | 7.5          | 2.19        |
### Supplementary table 2

**Primers used in this study**

**CSR-HTGTS**

| Primer Name | Sequence | Target TAACAA | Temperature |
|-------------|----------|---------------|-------------|
| ZXF840_5'Sm2-bio | /5BIosg/GAAAAATGGTCTGTGAATCT | 63°C |
| ZXF841_5'Sm2-red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF888_5'Sm2_red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF889_5'Sm2_red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF890_5'Sm2_red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF891_5'Sm2_red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF892_5'Sm2_red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF893_5'Sm2_red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF894_5'Sg3-red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF895_5'Sg3-red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF896_5'Sg3-red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF897_5'Sg3-red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF898_5'Sg3-red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |
| ZXF899_5'Sg3-red | ACACTCTTTCCCTACACGACGCTCTTCCGATCT | 63°C |

**ChIP**

| Primer Name | Sequence | Target TAACAA | Temperature |
|-------------|----------|---------------|-------------|
| Sµ-1 5'Sµ3F | CAGGTCGGCTGGACTAATCT | 63°C |
| SµH3R1 | GGCTCTCAACCGTGTCCGTA | 63°C |
| Sµ-1 Fw | TAAAATTCGCTAAACTGAGGATGATTACT | 63°C |
| Sµ-1 Rev | CATCTCAGCTCAAGCAGTGCACTTCAGTT | 63°C |
| Sγ3-1 Sg3F1 | CTGGGTCAAGGTTAGGGAAT | 63°C |
| Sg3R1 | CCTCTGAAACTGCTTACGCTT | 63°C |
| Sγ3-2 Sg3F1N | GGTTGTTCCGCTGTTGAGG | 63°C |
| Sg3R1N | CCTCTGAAACTGCTTACGCTT | 63°C |