**Supplementary materials**

This appendix has been provided by the authors to give readers additional information about their work and is submitted to the journal *Clinical and Diagnostic Pathology.*

Supplement to: High frequency of IKZF1 deletions in Chinese adult patients with acute lymphoblastic leukemia detected by multiplex real-time quantitative PCR,

Genomic breakpoint sequences of the IKZF1 deletion in the 113 ALL cases.

**Table S1 Proximal breakpoints in IKZF1 intron 3**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. of  patients | | Type of  deletion | | | | | |  | Proximal | | |  | | | | | Position | | |  | | | | Additional  nucleotides | | | | |
| 1 | | △（4-7） | | | | | |  | catccagggatc | | |  | | | | | 50345175 | | |  | | | | atcaggg | | | | |
| 2 | | △（4-7） | | | | | |  | catccagggatc | | |  | | | | | 50345175 | | |  | | | | ccccg | | | | |
| 3 | | △（4-7） | | | | | |  | catccagggatctcagaaattattagtac | | |  | | | | | 50345192 | | |  | | | | ccccg | | | | |
| 4 | | △（4-7） | | | | | |  | catccagggatctcagaaattatta | | |  | | | | | 50345188 | | |  | | | | ccacatcagac | | | | |
| 5 | | △（4-7） | | | | | |  | catccagggatctcagaaattat | | |  | | | | | 50345186 | | |  | | | | ga | | | | |
| 6 | | △（4-7） | | | | | |  | catccagggatctcagaaattattagtacatcc | | |  | | | | | 50345196 | | |  | | | | tc | | | | |
| 7 | | △（4-7） | | | | | |  | catccagggatctcagaaattattagtacatcc | | |  | | | | | 50345196 | | |  | | | | ggatcaa | | | | |
| 8 | | △（4-7） | | | | | |  | catccagggatctcagaaattattagtaca | | |  | | | | | 50345193 | | |  | | | | cccc | | | | |
| 9 | | △（4-7） | | | | | |  | catccagggatctcagaaattattagtacatcc | | |  | | | | | 50345196 | | |  | | | | gggcccct | | | | |
| 10 | | △（4-7） | | | | | |  | catccagggatctcagaaat | | |  | | | | | 50345183 | | |  | | | | cctggg | | | | |
| 11 | | △（4-7） | | | | | |  | catccagg | | |  | | | | | 50345171 | | |  | | | | ag | | | | |
| 12 | | △（4-7） | | | | | catccagggatctcagaaattatta | | | | | |  | | | | | 50345188 | |  | | | | | ttcc | | | | |
| 13 | | △（4-7） | | | | | catccagggatctcagaaattattagtac | | | | | |  | | | | | 50345192 | |  | | | | | ccccgggg | | | | |
| 14 | | △（4-7） | | | | | catccagggatctcagaaattattagtaca | | | | | |  | | | | | 50345193 | |  | | | | | ccacgg | | | | |
| 15 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatccc | | | | | |  | | | | | 50345197 | |  | | | | | gaaa | | | | |
| 15 | | △（4-7） | | | | | catccagggatctcagaaat | | | | | |  | | | | | 50345183 | |  | | | | | ggg | | | | |
| 16 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatcc | | | | | |  | | | | | 50345196 | |  | | | | | aaaaa | | | | |
| 17 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatcc | | | | | |  | | | | | 50345196 | |  | | | | | aagaagggggaacg | | | | |
| 18 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatcc | | | | | |  | | | | | 50345196 | |  | | | | | ga | | | | |
| 19 | | △（4-7） | | | | | catccaggga | | | | | |  | | | | | 50345173 | |  | | | | | aggccg | | | | |
| 20 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatcc | | | | | |  | | | | | 50345196 | |  | | | | | gga | | | | |
| 21 | | △（4-7） | | | | | catccagggatctcagaaattattagtac | | | | | |  | | | | | 50345192 | |  | | | | | gc | | | | |
| 22 | | △（4-7） | | | | | catccagggatctcagaa | | | | | |  | | | | | 50345181 | |  | | | | | cctattttg | | | | |
| 23 | | △（4-7） | | | | | catccagggatctcagaaattattagtac | | | | | |  | | | | | 50345192 | |  | | | | | tcc | | | | |
| 24 | | △（4-7） | | | | | catccagggatctcagaaat | | | | | |  | | | | | 50345183 | |  | | | | | ccgaa | | | | |
| 25 | | △（4-7） | | | | | catccagggatctcagaaattattagtac | | | | | |  | | | | | 50345192 | |  | | | | | ccccgcgg | | | | |
| 26 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatcc | | | | | |  | | | | | 50345196 | |  | | | | | aggg | | | | |
| 27 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatc | | | | | |  | | | | | 50345195 | |  | | | | | g | | | | |
| 28 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatcc | | | | | |  | | | | | 50345196 | |  | | | | | gg | | | | |
| 29 | | △（4-7） | | | | | catccagggatctcagaaattattagtac | | | | | |  | | | | | 50345192 | |  | | | | | tccgag | | | | |
| 30 | | △（4-7） | | | | | catccagggatctcagaaattattagtacatc | | | | | |  | | | | | 50345195 | |  | | | | | ggagtggggggaa | | | | |
| 31 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | aa | | | | |
| 32 |  | | | | △（4-7） | | catcc | | | |  | | | | | 50345168 | | | | |  | | cccggg | | | | |
| 33 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | agg | | | | |
| 34 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | taa | | | | |
| 35 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacat | | | |  | | | | | 50345194 | | | | |  | |  | | | | |
| 36 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | taa | | | | |
| 37 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | tccgg | | | | |
| 38 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | ggagg | | | | |
| 39 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | |  | | | | |
| 40 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatc | | | |  | | | | | 50345195 | | | | |  | | aacg | | | | |
| 41 |  | | | | △（4-7） | | catccaggg | | | |  | | | | | 50345172 | | | | |  | | ccaagg | | | | |
| 42 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatccc | | | |  | | | | | 50345197 | | | | |  | |  | | | | |
| 43 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatc | | | |  | | | | | 50345195 | | | | |  | | acttcttacgg | | | | |
| 44 |  | | | | △（4-7） | | catccagggatctcagaaattattagtac | | | |  | | | | | 50345192 | | | | |  | | ggag | | | | |
| 45 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatc | | | |  | | | | | 50345195 | | | | |  | | agg | | | | |
| 46 |  | | | | △（4-7） | | catccagggatctcagaaat | | | |  | | | | | 50345183 | | | | |  | | ccctg | | | | |
| 47 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacat | | | |  | | | | | 50345194 | | | | |  | | tccactc | | | | |
| 48 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | tt | | | | |
| 49 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | gggg | | | | |
| 50 |  | | | | △（4-7） | | catccagggatctcagaaattattagtacatcc | | | |  | | | | | 50345196 | | | | |  | | gggggagg | | | | |
| 51 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatcc | | | | |  | | | | 50345196 |  | | | | | | aag | | | | |
| 52 | | |  | | | △（4-7） | | | | catccagggatctc | | | | |  | | | | 50345177 |  | | | | | | tcctcgg | | | | |
| 53 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatcc | | | | |  | | | | 50345196 |  | | | | | | aag | | | | |
| 54 | | |  | | | △（4-7） | | | | catccagggatct | | | | |  | | | | 50345176 |  | | | | | | tgggg | | | | |
| 55 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatc | | | | |  | | | | 50345195 |  | | | | | | ggcccggccac | | | | |
| 56 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatc | | | | |  | | | | 50345195 |  | | | | | | tcaaacgg | | | | |
| 57 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatcc | | | | |  | | | | 50345196 |  | | | | | |  | | | | |
| 58 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatcc | | | | |  | | | | 50345196 |  | | | | | | gaag | | | | |
| 59 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtaca | | | | |  | | | | 50345193 |  | | | | | | ccc | | | | |
| 60 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtac | | | | |  | | | | 50345192 |  | | | | | | cttt | | | | |
| 61 | | |  | | | △（4-7） | | | | catccagggatctcag | | | | |  | | | | 50345179 |  | | | | | | gctttagg | | | | |
| 62 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattag | | | | |  | | | | 50345189 |  | | | | | | g | | | | |
| 63 | | |  | | | △（4-7） | | | | catccagggatctcagaaatt | | | | |  | | | | 50345184 |  | | | | | | cccc | | | | |
| 64 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatccc | | | | |  | | | | 50345197 |  | | | | | | gccag | | | | |
| 65 | | |  | | | △（4-7） | | | | catccagggatctcagaaattat | | | | |  | | | | 50345186 |  | | | | | | gcttcc | | | | |
| 66 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatcc | | | | |  | | | | 50345196 |  | | | | | | tgg | | | | |
| 67 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtac | | | | |  | | | | 50345192 |  | | | | | | ccttagg | | | | |
| 68 | | |  | | | △（4-7） | | | | ca | | | | |  | | | | 50345165 |  | | | | | | ccg | | | | |
| 69 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacat | | | | |  | | | | 50345194 |  | | | | | |  | | | | |
| 70 | | |  | | | △（4-7） | | | | catccagggatctcagaaattattagtacatccc | | | | |  | | | | 50345197 |  | | | | | | g | | | | |
| 70 | | | | △（4-7） | | | catccagggatctcagaaattattagtacatccc | | | | | | | 50345197 | | | | | | | | g | | | | |
| 71 | | | | △（4-7） | | | catccagggatctcagaaattattagtaca | | | | | | | 50345193 | | | | | | | | cccct | | | | |
| 72 | | | | △（4-7） | | | catccagggatctcagaaattattagtacatccc | | | | | | | 50345197 | | | | | | | | c | | | | |
| 73 | | | | △（4-7） | | | catccagggatctcagaaattattagtacatccc | | | | | | | 50345197 | | | | | | | | gg | | | | |
| 74 | | | | △（4-7） | | | catccagggatctcagaaattattagtacatcc | | | | | | | 50345196 | | | | | | | | g | | | | |
| 75 | | | | △（4-7） | | | catccagggatctcagaaattattagtacatcc | | | | | | | 50345196 | | | | | | | | -- | | | | |
| 76 | | | | △（4-8） | | | catccaggg | | | | | | | 50345172 | | | | | | | | tcttgaaggg | | | | |
| 77 | | | | △（4-8） | | | catccagggatctcagaaattattagtacat | | | | | | | 50345194 | | | | | | | | gggggcatgg | | | | |
| 78 | | | | △（4-8） | | | catccagggatctcagaaattattagtacat | | | | | | | 50345194 | | | | | | | | -- | | | | |
| 79 | | | | △（4-8） | | | catccagggatctcagaaattattagtac | | | | | | | 50345192 | | | | | | | | gcca | | | | |
| 80 | | | | △（4-8） | | | catccagggatctcagaaattattagtaca | | | | | | | 50345193 | | | | | | | | ac | | | | |
| 81 | | | | △（4-8） | | | catccagggatctcagaaattattagtacatccc | | | | | | | 50345197 | | | | | | | | taaaa | | | | |
| 82 | | | | △（4-8） | | | catccagggatctcagaaattattagtaca | | | | | | | 50345193 | | | | | | | | ccc | | | | |

**Table S2 Proximal breakpoints in IKZF1 intron 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. of  patients |  | Type of  deletion | Proximal |  | Position | |  | | | Additional  nucleotides | | |
| 83 |  | △（2-7） | tctaggtcttagaaacgtagagt |  | 50307777 | |  | | | gg | | |
| 84 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagaggatcagc |  | 50307787 | |  | | | ccgggacatc | | |
| 85 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagaggatca |  | 50307785 | |  | | | tccc | | |
| 85 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagaggatca |  | 50307785 | | |  | | | tcct | | |
| 86 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagaggatca |  | 50307785 | | |  | | | gggg | | |
| 87 |  | △（2-7） | tctaggtcttagaaac |  | 50307766 | | |  | | | cctaggg | | |
| 88 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcattat |  | 50307792 | | |  | | | ctg | | |
| 89 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcattata |  | 50307793 | | |  | | |  | | |
| 90 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagagga |  | 50307782 | | |  | | | ccaacgcggt | | |
| 91 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcat |  | 50307789 | | |  | | |  | | |
| 92 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcattat |  | 50307792 | | |  | | |  | | |
| 93 |  | △（2-7） | tctaggtcttagaaacgtagagt |  | 50307773 | | |  | | | ctcagggttc | | |
| 94 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcatt |  | 50307790 | | |  | | | ccg | | |
| 95 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagaggatcagc |  | 50307787 | | |  | | | cctccccaggggg | | |
| 96 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagaggatca |  | 50307785 | | |  | | | ctccccc | | |
| 97 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcatt |  | 50307790 | | |  | | | cccccg | | |
| 98 |  | △（2-7） | tctaggtcttagaaacgtagagtttcag |  | 50307778 | | |  | | | gggagg | | |
| 99 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcattatac |  | 50307794 | | |  | | | gggg | | |
| 100 |  | △（2-7） | tctaggtcttagaaacgtagagt |  | 50307773 | | |  | | | ctcagggttc | | |
| 101 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcattatac |  | 50307794 | | |  | | | g | | |
| 102 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagaggatcagc |  | 50307787 | | |  | | | ccct | | |
| 103 |  | △（2-7） | tctaggtcttagaaacgtagagtt |  | 50307774 |  | | | c | | |
| 104 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagaggatc |  | 50307784 |  | | | ggcggga | | |
| 105 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcatt |  | 50307790 |  | | | aagc | | |
| 105 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcatt |  | 50307790 |  | | | acccgtacatca | | |
| 106 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcatt |  | 50307790 |  | | | ccctgaag | | |
| 107 |  | △（2-7） | tctaggtcttagaaacgtagagtttcagagg |  | 50307781 |  | | | tccccgggg | | |
| 108 |  | △（2-7） | cttagaaacgtagagtttcagaggatcagcatt |  | 50307790 |  | | | cagg | | |
| 109 |  | △（2-7） | taagtggctccactccagcttacagaagg |  | 50307382 |  | | | gggggggggtcgaa | | |
| 109 |  | △（2-7） | taagtggctccactccagcttacagaagg |  | 50307382 |  | | | ggggggggggtcgaa | | |
| 110 |  | △（2-7） | taagtggctccactccagcttacagaaggt |  | 50307383 |  | | | ccctt | | |
| 111 |  | △（2-8） | agagtttcagaggatcagcatt |  | 50307790 |  | | | gggg | | |
| 112 |  | △（2-8） | tctaggtcttagaaacgtagagtttca |  | 50307777 |  | | | cccctgggg | | |
| 113 |  | △（2-8） | tctaggtcttagaaacgtagagtttcagaggatcagc |  | 50307787 |  | | | cctcccca | | |

**Table S3 Distal breakpoints centromeric to IKZF1 exon 7**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. of  patients | | | | |  | | | | | Type of  deletion | | | | | |  | | | | | | Additional  nucleotides | | | | |  | | | | | | | Distal | | | |  | | | | | | | Position | | | | |
| 1 | | | | |  | | | | | △（4-7） | | | | | |  | | | | | | atcaggg | | | | |  | | | | | | | gtctagtgtaactgtttcttcttcaag | | | |  | | | | | | | 50395942 | | | | |
| 2 | | | | |  | | | | | △（4-7） | | | | | |  | | | | | | ccccg | | | | |  | | | | | | | gtctagtgtaactgtttcttcttc | | | |  | | | | | | | 50395942 | | | | |
| 3 | | | | |  | | | | | △（4-7） | | | | | |  | | | | | | ccccg | | | | |  | | | | | | | catcaagtctagtgtaactgttt | | | |  | | | | | | | 50395936 | | | | |
| 4 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ccacatcagac | | | | | | | | |  | | | | | acatcaagtctagtgtaactg | | | | |  | | | | | | 50395935 | | | | |
| 5 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ga | | | | | | | | |  | | | | | agtgtaactgtttcttcttcaagg | | | | |  | | | | | | 50395946 | | | | |
| 6 |  | | | | | | △（4-7） | | | | | | |  | | | | | | tc | | | | | | | | |  | | | | | acatcaagtctagtgtaactgtttctt | | | | |  | | | | | | 50395935 | | | | |
| 7 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ggatcaa | | | | | | | | |  | | | | | gtctagtgtaactgtttcttcttca | | | | |  | | | | | | 50395942 | | | | |
| 8 |  | | | | | | △（4-7） | | | | | | |  | | | | | | cccc | | | | | | | | |  | | | | | gaaacatcaagtctagtgtaa | | | | |  | | | | | | 50395932 | | | | |
| 9 |  | | | | | | △（4-7） | | | | | | |  | | | | | | gggcccct | | | | | | | | |  | | | | | tctagtgtaactgtttcttcttcaa | | | | |  | | | | | | 50395941 | | | | |
| 10 |  | | | | | | △（4-7） | | | | | | |  | | | | | | cctggg | | | | | | | | |  | | | | | gtgtaactgtttcttcttcaaggtga | | | | |  | | | | | | 50395947 | | | | |
| 11 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ag | | | | | | | | |  | | | | | gtttcttcttcaaggtgatttgcat | | | | |  | | | | | | 50395955 | | | | |
| 12 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ttcc | | | | | | | | |  | | | | | agtgtaactgtttcttcttcaaggtg | | | | |  | | | | | | 50395946 | | | | |
| 13 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ccccgggg | | | | | | | | |  | | | | | catcaagtctagtgtaactgtttcttc | | | | |  | | | | | | 50395936 | | | | |
| 14 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ccacgg | | | | | | | | |  | | | | | atcaagtctagtgtaactgtttcttc | | | | |  | | | | | | 50395937 | | | | |
| 15 |  | | | | | | △（4-7） | | | | | | |  | | | | | | gaaa | | | | | | | | |  | | | | | catcaagtctagtgtaactgtttctt | | | | |  | | | | | | 50395936 | | | | |
| 15 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ggg | | | | | | | | |  | | | | | gtaactgtttctt | | | | |  | | | | | | 50395949 | | | | |
| 16 |  | | | | | | △（4-7） | | | | | | |  | | | | | | aaaaa | | | | | | | | |  | | | | | aaacatcaagtctagtgtaactgtttc | | | | |  | | | | | | 50395933 | | | | |
| 17 |  | | | | | | △（4-7） | | | | | | |  | | | | | | aagaagggggaacg | | | | | | | | |  | | | | | catcaagtctagtgtaactgtttctt | | | | |  | | | | | | 50395936 | | | | |
| 18 |  | | | | | | △（4-7） | | | | | | |  | | | | | | ga | | | | | | | | |  | | | | | gaaacatcaagtctagtgtaactg | | | | |  | | | | | | 50395932 | | | | |
| 19 |  | | | | | | △（4-7） | | | | | | |  | | | | | | aggccg | | | | | | | | |  | | | | | tcaagtctagtgtaactgtttctt | | | | |  | | | | | | 50395938 | | | | |
| 20 |  | | | | | | △（4-7） | | | | | | |  | | | | | | gga | | | | | | | | |  | | | | | acatcaagtctagtgtaactgtttc | | | | |  | | | | | | 50395935 | | | | |
| 21 |  | | | | | | △（4-7） | | | | | | |  | | | | | | gc | | | | | | | | |  | | | | | ctagtgtaactgtttcttcttcaag | | | | |  | | | | | | 50395944 | | | | |
| 22 |  | | | | | | △（4-7） | | | | | | |  | | | | | | cctattttg | | | | | | | | |  | | | | | actgtttcttcttcaaggtgattt | | | | |  | | | | | | 50395952 | | | | |
| 23 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | tcc | | | | | | |  | | | | | catcaagtctagtgtaactgtttct | | | | | | | | |  | | | | 50395936 | | | | |
| 24 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | ccgaa | | | | | | |  | | | | | acatcaagtctagtgtaactgtttc | | | | | | | | |  | | | | 50395935 | | | | |
| 25 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | ccccgcgg | | | | | | |  | | | | | atcaagtctagtgtaactgtttctt | | | | | | | | |  | | | | 50395937 | | | | |
| 26 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | aggg | | | | | | |  | | | | | gtctagtgtaactgtttcttcttc | | | | | | | | |  | | | | 50395942 | | | | |
| 27 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | g | | | | | | |  | | | | | caagtctagtgtaactgtttctt | | | | | | | | |  | | | | 50395939 | | | | |
| 28 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | gg | | | | | | |  | | | | | acatcaagtctagtgtaactgttt | | | | | | | | |  | | | | 50395935 | | | | |
| 29 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | tccgag | | | | | | |  | | | | | acatcaagtctagtgtaactgttt | | | | | | | | |  | | | | 50395935 | | | | |
| 30 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | ggagtggggggaa | | | | | | |  | | | | | acatcaagtctagtgtaactgttt | | | | | | | | |  | | | | 50395935 | | | | |
| 31 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | aa | | | | | | |  | | | | | acatcaagtctagtgtaactgttt | | | | | | | | |  | | | | 50395935 | | | | |
| 32 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | cccggg | | | | | | |  | | | | | gtaactgtttcttcttcaaggtga | | | | | | | | |  | | | | 50395949 | | | | |
| 33 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | agg | | | | | | |  | | | | | acatcaagtctagtgtaactgttt | | | | | | | | |  | | | | 50395935 | | | | |
| 34 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | taa | | | | | | |  | | | | | acatcaagtctagtgtaactgtt | | | | | | | | |  | | | | 50395935 | | | | |
| 35 | |  | | | | | △（4-7） | | | | | | | |  | | | | | |  | | | | | | |  | | | | | aagtctagtgtaactgtttcttct | | | | | | | | |  | | | | 50395940 | | | | |
| 36 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | taa | | | | | | |  | | | | | ggaaacatcaagtctagtgtaact | | | | | | | | |  | | | | 50395931 | | | | |
| 37 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | tccgg | | | | | | |  | | | | | actgtttcttcttcaaggtgatt | | | | | | | | |  | | | | 50395952 | | | | |
| 38 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | ggagg | | | | | | |  | | | | | catcaagtctagtgtaactgtttc | | | | | | | | |  | | | | 50395936 | | | | |
| 39 | |  | | | | | △（4-7） | | | | | | | |  | | | | | |  | | | | | | |  | | | | | aaacatcaagtctagtgtaactgttt | | | | | | | | |  | | | | 50395933 | | | | |
| 40 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | aacg | | | | | | |  | | | | | acatcaagtctagtgtaactgttt | | | | | | | | |  | | | | 50395935 | | | | |
| 41 | |  | | | | | △（4-7） | | | | | | | |  | | | | | | ccaagg | | | | | | |  | | | | | atcaagtctagtgtaactgtttctt | | | | | | | | |  | | | | 50395937 | | | | |
| 42 | |  | | | | | △（4-7） | | | | | | | |  | | | | | |  | | | | | | |  | | | | | aaacatcaagtctagtgtaactgtt | | | | | | | | |  | | | | 50395933 | | | | |
| 43 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | acttcttacgg | |  | | | | | | | | | | catcaagtctagtgtaactgtttc | | | | | | |  | | | | 50395936 | | | | |
| 44 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | ggag | |  | | | | | | | | | | catcaagtctagtgtaactgtttct | | | | | | |  | | | | 50395936 | | | | |
| 45 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | agg | |  | | | | | | | | | | acatcaagtctagtgtaactgtttct | | | | | | |  | | | | 50395935 | | | | |
| 46 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | ccctg | |  | | | | | | | | | | acatcaagtctagtgtaactgtttc | | | | | | |  | | | | 50395935 | | | | |
| 47 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | tccactc | |  | | | | | | | | | | gaaacatcaagtctagtgtaactg | | | | | | |  | | | | 50395932 | | | | |
| 48 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | tt | |  | | | | | | | | | | gaaacatcaagtctagtgtaactgtt | | | | | | |  | | | | 50395932 | | | | |
| 49 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | gggg | |  | | | | | | | | | | catcaagtctagtgtaactgtttct | | | | | | |  | | | | 50395936 | | | | |
| 50 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | gggggagg | |  | | | | | | | | | | acatcaagtctagtgtaactgttt | | | | | | |  | | | | 50395935 | | | | |
| 51 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | aag | |  | | | | | | | | | | catcaagtctagtgtaactgtttc | | | | | | |  | | | | 50395936 | | | | |
| 52 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | tcctcgg | |  | | | | | | | | | | gtctagtgtaactgtttcttcttca | | | | | | |  | | | | 50395942 | | | | |
| 53 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | aag | |  | | | | | | | | | | catcaagtctagtgtaactgtttc | | | | | | |  | | | | 50395936 | | | | |
| 54 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | tgggg | |  | | | | | | | | | | acatcaagtctagtgtaactgttt | | | | | | |  | | | | 50395935 | | | | |
| 55 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | ggcccggccac | |  | | | | | | | | | | catcaagtctagtgtaactgtttc | | | | | | |  | | | | 50395936 | | | | |
| 56 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | tcaaacgg | |  | | | | | | | | | | caagtctagtgtaactgtttcttct | | | | | | |  | | | | 50395939 | | | | |
| 57 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | |  | |  | | | | | | | | | | gaaacatcaagtctagtgtaactgt | | | | | | |  | | | | 50395932 | | | | |
| 57 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | gcaagg | |  | | | | | | | | | | gtgtaactgtttcttcttcaaggt | | | | | | |  | | | | 50395947 | | | | |
| 58 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | gaag | |  | | | | | | | | | | acatcaagtctagtgtaactgtttc | | | | | | |  | | | | 50395935 | | | | |
| 59 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | ccc | |  | | | | | | | | | | aaacatcaagtctagtgtaactgtt | | | | | | |  | | | | 50395933 | | | | |
| 60 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | cttt | |  | | | | | | | | | | aaacatcaagtctagtgtaactg | | | | | | |  | | | | 50395933 | | | | |
| 61 | | | | | |  | | | | | △（4-7） | | | | |  | | | | | | gctttagg | |  | | | | | | | | | | acatcaagtctagtgtaactgtt | | | | | | |  | | | | 50395935 | | | | |
| 62 | | |  | | | | | △（4-7） | | | | |  | | | | | | g | | | | | |  | | | | | | | agtgtaactgtttcttcttcaag | | | | |  | | | | | | | 50395946 | | | | |
| 63 | | |  | | | | | △（4-7） | | | | |  | | | | | | cccc | | | | | |  | | | | | | | gtctagtgtaactgtttcttcttc | | | | |  | | | | | | | 50395942 | | | | |
| 64 | | |  | | | | | △（4-7） | | | | |  | | | | | | gccag | | | | | |  | | | | | | | acatcaagtctagtgtaactgttt | | | | |  | | | | | | | 50395935 | | | | |
| 65 | | |  | | | | | △（4-7） | | | | |  | | | | | | gcttcc | | | | | |  | | | | | | | gaaacatcaagtctagtgtaactg | | | | |  | | | | | | | 50395932 | | | | |
| 66 | | |  | | | | | △（4-7） | | | | |  | | | | | | tgg | | | | | |  | | | | | | | atcaagtctagtgtaactgtttctt | | | | |  | | | | | | | 50395937 | | | | |
| 67 | | |  | | | | | △（4-7） | | | | |  | | | | | | ccttagg | | | | | |  | | | | | | | catcaagtctagtgtaactgtttct | | | | |  | | | | | | | 50395936 | | | | |
| 68 | | |  | | | | | △（4-7） | | | | |  | | | | | | ccg | | | | | |  | | | | | | | aacatcaagtctagtgtaactgtt | | | | |  | | | | | | | 50395934 | | | | |
| 69 | | |  | | | | | △（4-7） | | | | |  | | | | | |  | | | | | |  | | | | | | | aagtctagtgtaactgtttctt | | | | |  | | | | | | | 50395940 | | | | |
| 70 | | |  | | | | | △（4-7） | | | | |  | | | | | | g | | | | | |  | | | | | | | acatcaagtctagtgtaactgttt | | | | |  | | | | | | | 50395935 | | | | |
| 70 | | |  | | | | | △（4-7） | | | | |  | | | | | | tcgg | | | | | |  | | | | | | | gtctagtgtaactgttt | | | | |  | | | | | | | 50395942 | | | | |
| 71 | | |  | | | | | △（4-7） | | | | |  | | | | | | cccct | | | | | |  | | | | | | | aaacatcaagtctagtgtaactg | | | | |  | | | | | | | 50395933 | | | | |
| 72 | | |  | | | | | △（4-7） | | | | |  | | | | | | c | | | | | |  | | | | | | | gaaacatcaagtctagtgtaactg | | | | |  | | | | | | | 50395932 | | | | |
| 73 | | |  | | | | | △（4-7） | | | | |  | | | | | | gg | | | | | |  | | | | | | | gtctagtgtaactgtttcttcttcaa | | | | |  | | | | | | | 50395942 | | | | |
| 74 | | |  | | | | | △（4-7） | | | | |  | | | | | | g | | | | | |  | | | | | | | ggaaacatcaagtctagtgtaactg | | | | |  | | | | | | | 50395931 | | | | |
| 75 | | |  | | | | | △（4-7） | | | | |  | | | | | | -- | | | | | |  | | | | | | | gaaacatcaagtctagtgtaactgt | | | | |  | | | | | | | 50395932 | | | | |
| 83 | | |  | | | | | △（2-7） | | | | |  | | | | | | gg | | | | | |  | | | | | | | ctagtgtaactgtttcttcttcaag | | | | |  | | | | | | | 50395944 | | | | |
| 84 | | |  | | | | | △（2-7） | | | | |  | | | | | | ccgggacatc | | | | | |  | | | | | | | agtctagtgtaactgtttct | | | | |  | | | | | | | 50395941 | | | | |
| 85 | | |  | | | | | △（2-7） | | | | |  | | | | | | tccc | | | | | |  | | | | | | | aaacatcaagtctagtgtaactgt | | | | |  | | | | | | | 50395933 | | | | |
| 85 | | |  | | | | | △（2-7） | | | | |  | | | | | | tcct | | | | | |  | | | | | | | acatcaagtctagtgtaactgt | | | | |  | | | | | | | 50395935 | | | | |
| 86 | | |  | | | | | △（2-7） | | | | |  | | | | | | gggg | | | | | |  | | | | | | | aacatcaagtctagtgtaactg | | | | |  | | | | | | | 50395934 | | | | |
| 87 |  | | | | | | △（2-7） | | | | |  | | | | | | cctaggg | | | | | | | |  | | | | | cctgaatgcctgagggttcttt | | | | |  | | | | | | | 50395986 | | | | |
| 88 |  | | | | | | △（2-7） | | | | |  | | | | | | ctg | | | | | | | |  | | | | | acatcaagtctagtgtaactgtt | | | | |  | | | | | | | 50395935 | | | | |
| 89 |  | | | | | | △（2-7） | | | | |  | | | | | |  | | | | | | | |  | | | | | gaaacatcaagtctagtgtaa | | | | |  | | | | | | | 50395932 | | | | |
| 90 |  | | | | | | △（2-7） | | | | |  | | | | | | ccaacgcggt | | | | | | | |  | | | | | catcaagtctagtgtaactgtt | | | | |  | | | | | | | 50395936 | | | | |
| 91 |  | | | | | | △（2-7） | | | | |  | | | | | |  | | | | | | | |  | | | | | catcaagtctagtgtaactgttt | | | | |  | | | | | | | 50395936 | | | | |
| 92 |  | | | | | | △（2-7） | | | | |  | | | | | |  | | | | | | | |  | | | | | aaacatcaagtctagtgtaact | | | | |  | | | | | | | 50395933 | | | | |
| 93 |  | | | | | | △（2-7） | | | | |  | | | | | | ctcagggttc | | | | | | | |  | | | | | gcattttattcctgaatgc | | | | |  | | | | | | | 50395976 | | | | |
| 94 |  | | | | | | △（2-7） | | | | |  | | | | | | ccg | | | | | | | |  | | | | | catcaagtctagtgtaactgtt | | | | |  | | | | | | | 50395936 | | | | |
| 95 |  | | | | | | △（2-7） | | | | |  | | | | | | cctccccaggggg | | | | | | | |  | | | | | acatcaagtctagtgtaactg | | | | |  | | | | | | | 50395935 | | | | |
| 96 |  | | | | | | △（2-7） | | | | |  | | | | | | ctccccc | | | | | | | |  | | | | | aacatcaagtctagtgtaactgt | | | | |  | | | | | | | 50395934 | | | | |
| 97 |  | | | | | | △（2-7） | | | | |  | | | | | | cccccg | | | | | | | |  | | | | | aacatcaagtctagtgtaactg | | | | |  | | | | | | | 50395934 | | | | |
| 98 |  | | | | | | △（2-7） | | | | |  | | | | | | gggagg | | | | | | | |  | | | | | agtgtaactgtttcttcttcaa | | | | |  | | | | | | | 50395946 | | | | |
| 99 |  | | | | | | △（2-7） | | | | |  | | | | | | gggg | | | | | | | |  | | | | | acatcaagtctagtgtaactgt | | | | |  | | | | | | | 50395935 | | | | |
| 100 |  | | | | | | △（2-7） | | | | |  | | | | | | ctcagggttc | | | | | | | |  | | | | | gcattttattcctgaatgcc | | | | |  | | | | | | | 50395976 | | | | |
| 101 |  | | | | | | △（2-7） | | | | |  | | | | | | g | | | | | | | |  | | | | | ggaaacatcaagtctagtgta | | | | |  | | | | | | | 50395931 | | | | |
| 102 |  | | | | | | △（2-7） | | | | |  | | | | | | ccct | | | | | | | |  | | | | | gaaacatcaagtctagtgtaac | | | | |  | | | | | | | 50395932 | | | | |
| 103 |  | | | | | | △（2-7） | | | | |  | | | | | | c | | | | | | | |  | | | | | ttcttcttcaaggtgatttgca | | | | |  | | | | | | | 50395957 | | | | |
| 104 |  | | | | | | △（2-7） | | | | |  | | | | | | ggcggga | | | | | | | |  | | | | | agtgtaactgtttcttcttcaag | | | | |  | | | | | | | 50395946 | | | | |
| 105 |  | | | | | | △（2-7） | | | | |  | | | | | | aagc | | | | | | | |  | | | | | aacatcaagtctagtgtaactgtttctt | | | | |  | | | | | | | 50395934 | | | | |
| 105 |  | | | | | | △（2-7） | | | | |  | | | | | | acccgtacatca | | | | | | | |  | | | | | aagtctagtgtaactgtttctt | | | | |  | | | | | | | 50395940 | | | | |
| 106 | | | |  | | | | | △（2-7） | | | | | | | |  | | | | | | ccctgaag | | | | | | |  | | | | | catcaagtctagtgtaactgtt | | | | |  | | | | | | | 50395936 | | | | |
| 107 | | | |  | | | | | △（2-7） | | | | | | | |  | | | | | | tccccgggg | | | | | | |  | | | | | catcaagtctagtgtaactgtt | | | | |  | | | | | | | 50395936 | | | | |
| 108 | | | |  | | | | | △（2-7） | | | | | | | |  | | | | | | cagg | | | | | | |  | | | | | aaacatcaagtctagtgtaactgt | | | | |  | | | | | | | 50395933 | | | | |
| 109 | | | |  | | | | | △（2-7） | | | | | | | |  | | | | | | gggggggggtcgaa | | | | | | |  | | | | | tgtaactgtttcttcttcaaggtg | | | | |  | | | | | | | 50395948 | | | | |
| 109 | | | |  | | | | | △（2-7） | | | | | | | |  | | | | | | ggggggggggtcgaa | | | | | | |  | | | | | tgtaactgtttcttcttcaaggtg | | | | |  | | | | | | | 50395948 | | | | |
| 110 | | | |  | | | | | △（2-7） | | | | | | | |  | | | | | | ccctt | | | | | | |  | | | | | gtgtaactgtttcttcttcaaggtg | | | | |  | | | | | | | 50395949 | | | | |

**Table S4 Distal breakpoints centromeric to IKZF1 exon 8**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. of  patients |  | Type of  deletion |  | Additional  nucleotides |  | Distal |  | Position |
| 111 |  | △（2-8） |  | gggg |  | gtgggctgacatgctggctctctt |  | 50416753 |
| 112 |  | △（2-8） |  | cccctgggg |  | tctcttccctgtatgccgagacat |  | 50416771 |
| 113 |  | △（2-8） |  | cctcccca |  | tgggctgacatgctggctctcttc |  | 50416754 |
| 76 |  | △（4-8） |  | tcttgaaggg |  | gacatgctggctctcttccctgta |  | 50416760 |
| 77 |  | △（4-8） |  | gggggcatgg |  | tggctctcttccctgtatgccga |  | 50416767 |
| 78 |  | △（4-8） |  | -- |  | gtgggctgacatgctggctctct |  | 50416753 |
| 79 |  | △（4-8） |  | gcca |  | tgggctgacatgctggctctcttc |  | 50416754 |
| 80 |  | △（4-8） |  | ac |  | gggctgacatgctggctctcttc |  | 50416755 |
| 81 |  | △（4-8） |  | taaaa |  | gggctgacatgctggctctcttcc |  | 50416755 |
| 82 |  | △（4-8） |  | ccc |  | tgggctgacatgctggctctcttcc |  | 50416754 |