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# Supplemental Data

# Mitochondrial DNA and Y Chromosome Variation Provides Evidence for a Recent Common Ancestry between Native Americans and Indigenous Altaians

**Matthew C. Dulik, Sergey I. Zhadanov, Ludmila P. Osipova, Ayken Askapuli, Lydia Gau, Omer Gokcumen, Samara Rubinstein, and Theodore G. Schurr**

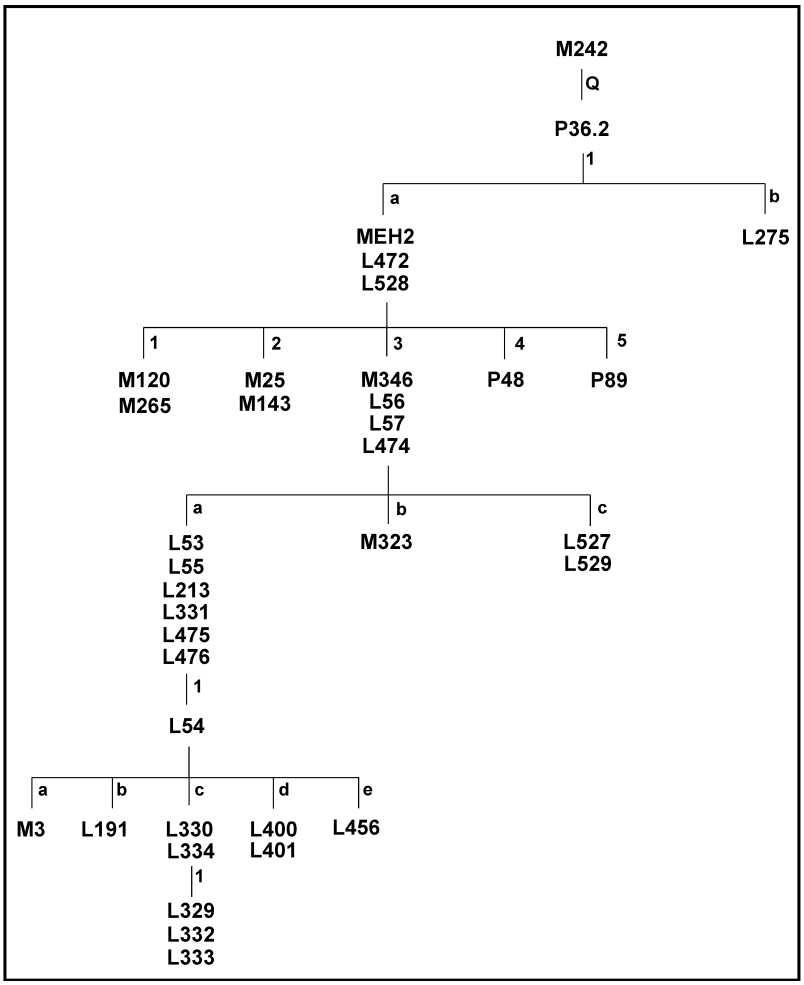


**Figure S1: NRY haplogroup Q phylogeny**

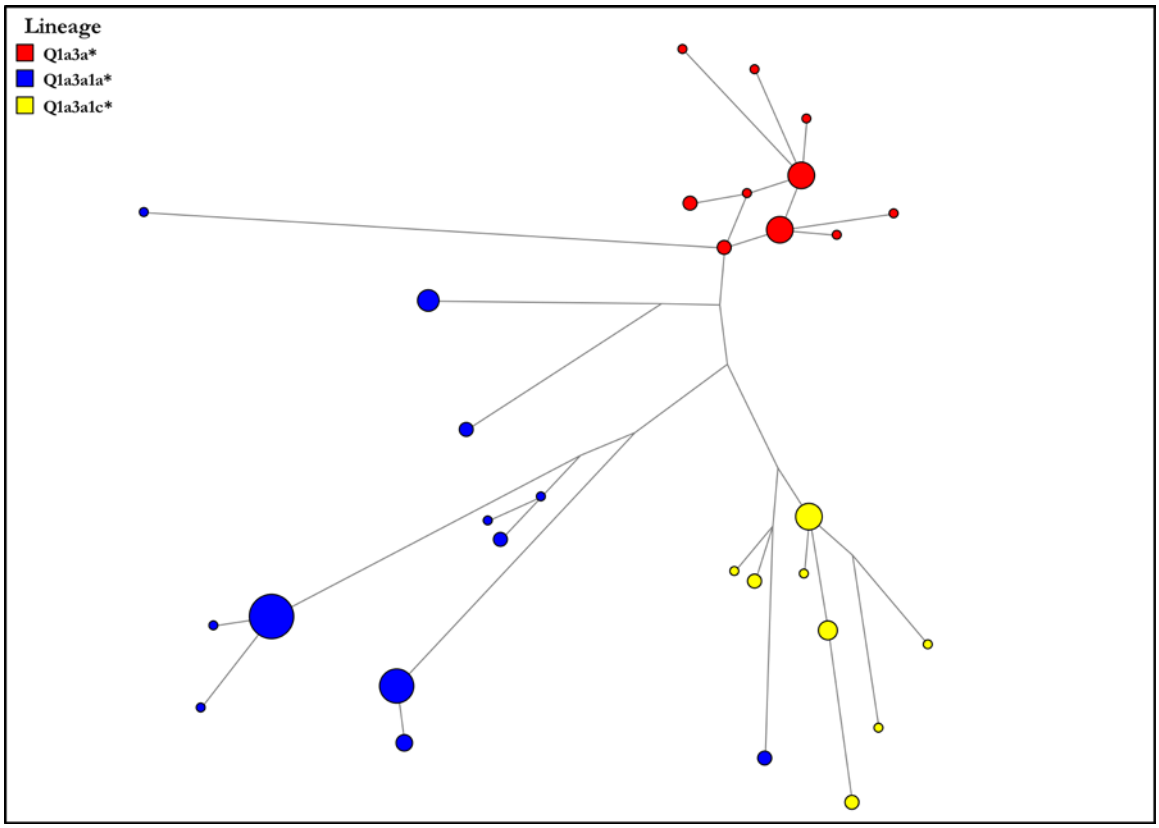


**Figure S2: Reduced median-median joining network of 15 loci Y-STR haplotypes for haplogroup Q in Altaians and Native Americans**

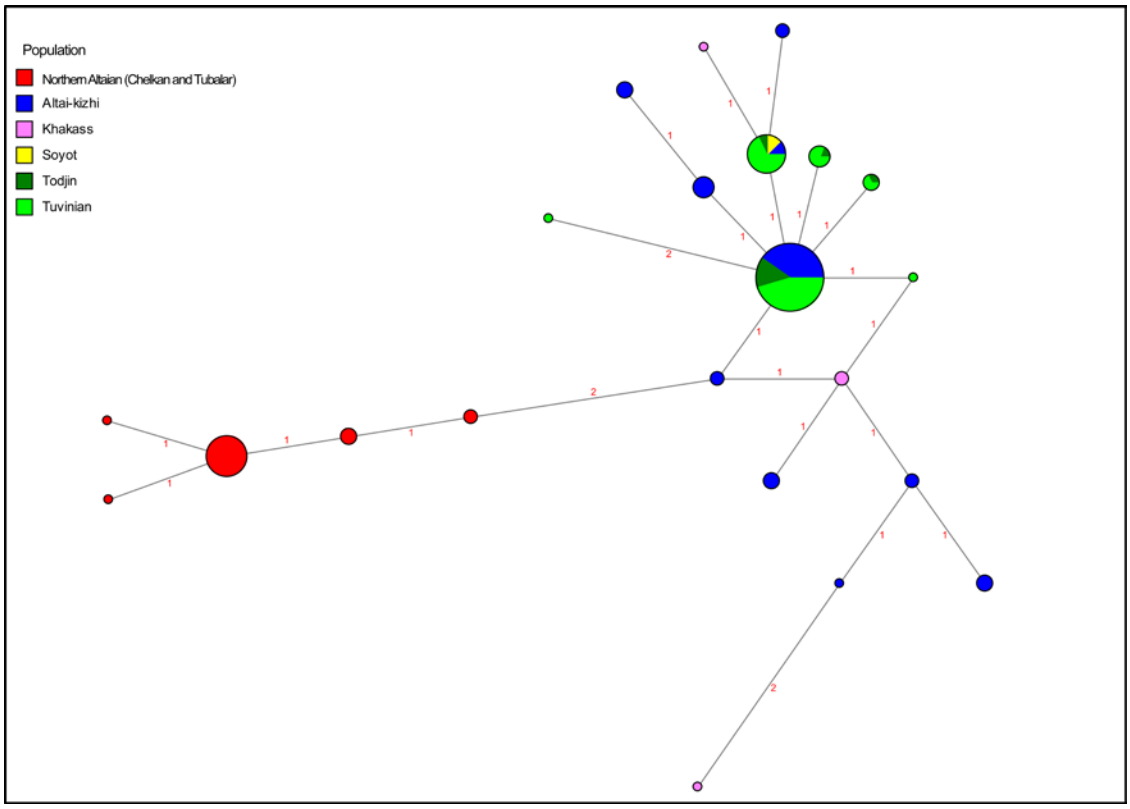


**Figure S3: Reduced median-median joining network of 10 loci Y-STR haplotypes for haplogroup Q in southern Siberians**

## Table S1: PCR-RFLP and deletion tests for mtDNA SNPs

| Hg | SNP/Indel | RFLP Test | Primers (5'-3') | Size | Tm (C°) | Reference |
|---|---|---|---|---|---|---|
| A | 663 | +*Hae*III 663 | 534-553 / 725-706 | 191 | 51 | [1] |
| B | 9-bp deletion | N/A | 8188-8207 / 8366-8345 | 178/169 | 49 | Modified from [1] |
| C | 13263 | -*Hinc*II 13259 | 13001-13020 / 13403-13384 | 402 | 45 | Modified from [1] |
| C | 13263 | +*Alu*I 13262 | 13001-13020 / 13403-13384 | 402 | 45 | Modified from [1] |
| C4 | 15204 | -*Bcc*I 15204 | 15161-15180 / 15676-15658 | 515 | 53 | This study |
| D | 5178A | -*Alu*I 5176 | 5151-5170 / 5481-5464 | 330 | 55 | [1] |
| D5 | 10397 | +*Bsr*I 10396 | 10279-10296 / 10569-10550 | 290 | 51 | This study |
| E | 7598 | -*Hha*I 7598 | 7367-7384 / 7628-7610 | 261 | 51 | Modified from [2] |
| F1 | 12406 | -*Hpa*I 12406 | 12385-12405 / 12576-12595 | 191 | 55 | Modified from [2, 3] |
| F1 | 12406 | -*Hinc*II 12406 | 12385-12405 / 12576-12595 | 191 | 55 | Modified from [2, 3] |
| F2 | 7828 | +*Hha*I 7828 | 6890-6909 / 7131-7115 | 241 | 47 | This study |
| G | 4883 | +*Hae*II 4830 | 4651-4670/ 4952-4934 | 301 | 46 | Modified from [2] |
| H | 7028 | -*Alu*I 7025 | 6890-6909 / 7131-7115 | 241 | 47 | [4] |
| H2 | 4769 | +*Alu*I 4769 | 4651-4670 / 4952-4934 | 303 | 49 | This study |
| H8 | 13101 | +*Hpa*II 13101 | 13001-13020 / 13403-13384 | 402 | 45 | This study |
| HV | 14766 | -*Mse*I 14766 | 14407-14424 / 14810-14791 | 403 | 51 | Modified from [5] |
| V | 4577 | -*Nla*I 4577 | 4500-4519 / 4678-4659 | 178 | 51 | Modified from [4] |
| I, X | 1719 | -*Dde*I 1715 | 1615-1643 / 1899-1879 | 284 | 54 | Modified from [4] |
| J | 13708 | -*Bst*OI 13704 | 13537-13556 / 13851-13832 | 314 | 51 | Modified from [4] |
| K | 9055 | -*Hae*II 9052 | 8925-8953 / 9100-9081 | 175 | 53 | Modified from [4] |
| M/ | 10398 | +*Dde*I 10394 | 10279-10296 / 10569-10550 | 290 | 51 | Modified from [1] |
| M | 10400 | +*Alu*I 10398 | 10279-10296 / 10569-10550 | 290 | 51 | Modified from [1] |
| N9 | 5417 | +*Tsp509*I 5417 | 5151-5170 / 5481-5464 | 330 | 55 | This study |
| R | 12705 | +*Mbo*II12705 | 12599-12618 / 12785-12766 | 186 | 51 | This study |
| R2 | 14305 | -*Alu*I 14304 | 13940-13959/ 14385-14366 | 445 | 57 | This study |
| R6 | 12285 | -*Alu*I 12285 | 12104-12124 / 12338-12309 | 234 | 59 | This study |
| T | 15607 | +*Alu*I 15606 | 15409-15428 / 15728-15709 | 319 | 51 | Modified from [4] |
| U | 12308 | +*Hinf*I 12308 | 12104-12124 / 12338-12309[a] | 234 | 59 | [4] |
| U1 | 13104 | +*Mbo*I 13104 | 13001-13020 / 13403-13384 | 402 | 45 | This study |
| U4 | 4646 | +*Rsa*I 4646 | 4500-4519 / 4678-4659 | 178 | 53 | This study |
| U5 | 13617 | -*Mbo*II 13617 | 13537-13556 / 13851-13832 | 314 | 51 | This study |
| W | 8994 | -*Hae*III 8994 | 8925-8953 / 9100-9081 | 175 | 53 | Modified from [4] |
| X | 14470 | +*Acc*I 14465 | 14407-14424 / 14810-14791 | 403 | 51 | Modified from [5] |
| X2e | 15310 | +*Bsr*DI 15310 | 15161-15180 / 15676-15658 | 515 | 53 | This study |
| Y | 7933 | +*Mbo*I 7933 | 7871-7890 / 8020-8001 | 149 | 51 | This study |

References: [1] Torroni et al. 1993; [2] Torroni et al. 1994; [3] Ballinger et al. 1992; [4] Torroni et al. 1996; [5] Macaulay et al. 1999.

[a]12338-12309 is a mismatch primer.

## Table S2. NRY marker PCR and sequencing primers and conditions

| Hg | Marker | SNP | Primers (5'-3') | Size | Tm (C°) | Reference |
|---|---|---|---|---|---|---|
| C3b | P39 | G95A | AAAATTTGCCAAGCATGGTG | 184 | 59 | Designed from [6] |
| | | | CAAGGGGCAGATTGATTGAT | | | |
| N1b | P43 | G268A | TTTGGAGGGACATTATTCTC | 519 | 53 | [5] |
| | | | GAAGCAATACTCTGAAAAGT | | | |
| N1c | TAT-C M46 | A69G | GACTCTGAGTGTAGACTTGTGA | 112 | 60 | [3] |
| | | | GAAGGTGCCGTAAAAGTGTGAA | | | |
| C3d | M407 | A149G | GTTATACCCTGCTCTAAAGTGCTTC | 418 | 57 | [4] |
| | | | GTAGAGATGGGGCTTCACCGTGTTAC | | | |
| Q1a3 | M346 | C33G | CCCCGTTTTTTCCTCTCTGCC | 419 | 58 | [4] |
| | | | AATCTGCCTTCCAACAAACC | | | |
| R1a1 | M17 | 68G del | CTGGTCATAACACTGGAAATC | 333/ 334 | 51 | [2] |
| | | | TGAACCTACAAATGTGAAACT | | | |
| Q1a | MEH2 | G880T | ATTCATAATATTTGATTCAGAACAG | 938 | 52 | [1] |
| | | | TACCATGAAAATTCATAATCCACA | | | |
| C3e | P53.1 | T112C | GATGTCACCTTCCGTCTA | 476 | 51 | [1] |
| | | | ACATGGTCATCTGTAGCTCC | | | |
| C3f | P62 | 443C insert | AACCCCTGCCACAAATACAT | 623/ 624 | 58 | [1] |
| | | | TCTGGAACCCCTGGAGAGATC | | | |
| N1c | P105 | G580A | TTATTCCACCCAGCACTGTTA | 1090 | 56 | [1] |
| | | | AGGCACAAATGGTAAGGTCTT | | | |
| R1b | M343 | C402A | TTTAACCTCCTCCAGCTCTGCA | 424 | 59 | [1] |
| | | | ACCCCCACATATCTCCAGG | | | |
| Q1a4 | P48 | 428T insert | TGAAGGACAGTAAGTACACA | 637/ 638 | 47 | [1] |
| | | | TAAGTCCATTGATCTACAGA | | | |
| Q1a5 | P89 | G258T | ACATTACAGGACCTTGAT | 857 | 47 | [1] |
| | | | TGCCTAACAATACTCCC | | | |
| R1a1d | P98 | C504T | TGGAGGGTAAGTGAGTAG | 954 | 47 | [1] |
| D3 | P99 | C533T | TTTTAATGGAACACCGTAG | | | |
| O3a3c2 | P101 | G360A | TGAGGTTGATGTTTACTAAGATC | 506 | 51 | [1] |
| | | | CCTGCTAAATCAGTTTCCACAC | | | |
| R1a1e | PK5 | C186T | TTCCAAACACATGCTTCTGC | 393 | 57 | [1] |
| | | | TAAAAAGGAGGAGGGACTGC | | | |

Table 3.5 References: [1] Karafet et al. 2008; [2] Underhill et al. 1997; [3] Zerjal et al. 1997; [4] Sengupta et al. 2006; [5] Karafet et al. 2002; [6] Zegura et al. 2004

**Table S3. Altaian mtDNA haplotypes**

| Hg | SNPs | HVS1 (16024-16400) 16,000+ | Chelkan | Kumandin | Tubalar | Altai-kizhi |
|---|---|---|---|---|---|---|
| A4 | 663; 10873 | 223-290-319-362 | | | | 4 |
| A4 | 663; 10873 | 192-223-290-319-362 | | 1 | | 1 |
| A4a1 | 663; 10873 | 223-249-290-319-362 | | | | 3 |
| B4b1 | 9-bp del; 10873; 12705 | 086-136-189-217 | 3 | 2 | 2 | 4 |
| C1a | 10398; 10400; 13263 | 223-298-325-327-356 | | | | 2 |
| C4 | 10398; 10400; 13263 | 223-298-327 | 1 | 8 | 10 | 5 |
| C4 | 10398; 10400; 13263 | 223-242-298-327 | | | | 1 |
| C4 | 10398; 10400; 13263 | 093-223-298-327 | | | | 1 |
| C4 | 10398; 10400; 13263 | 223-298-311-327 | | 1 | 3 | |
| C4 | 10398; 10400; 13263 | 223-298-327-329 | | | | 1 |
| C4 | 10398; 10400; 13263 | 223-298-327-329h(A/G) | | | | 1 |
| C4a1 | 10398; 10400; 13263 | 129-150-223-298-327 | | | | 1 |
| C4a1b | 10398; 10400; 13263 | 129-223-298-327 | | | | 2 |
| C4a1c | 10398; 10400; 13263 | 093-129-223-298-327 | 3 | | | 19 |
| C4a1c | 10398; 10400; 13263 | 093-129-223-298-311-327 | | | | 2 |
| C4a1c | 10398; 10400; 13263 | 093-129-223-298-312-327 | | | | 1 |
| C4a2 | 10398; 10400; 13263 | 171-223-298-327-344-357 | | | | 6 |
| C4a2 | 10398; 10400; 13263 | 171-223-278-298-327-344-357 | | | | 4 |
| C4a2 | 10398; 10400; 13263 | 171-223-278-298-344-357 | | | | 2 |
| C4a2 | 10398; 10400; 13263 | 171-223-278-298-344h(T/C)-357 | | | | 1 |
| C4a2 | 10398; 10400; 13263 | 171-223-298-327-344 | 3 | | 1 | |
| C4b3 | 10398; 10400; 13263 | 223-291-298-327 | | | 5 | 22 |
| C5 | 10398; 10400; 13263 | 223-288-291-298-327 | | | 1 | |
| C5 | 10398; 10400; 13263 | 148-223-288-298-327 | | | | 3 |
| C5a | 10398; 10400; 13263 | 223-261-288-298 | | | | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| C5b | 10398; 10400; 13263 | 093-223-288-291-298-327 | 7 | 11 | 3 | 2 |
| C5b | 10398; 10400; 13263 | 093-223-288-291-298-311-327 | | 1 | | |
| C5b | 10398; 10400; 13263 | 093-223-288-291-298-327-362 | | | 1 | |
| C5c | 10398; 10400; 13263 | 093-223-288-298-327-390 | | | | 6 |
| D | 5178A; 10398; 10400 | 223-362 | 3 | | 3 | 8 |
| D | 5178A; 10398; 10400 | 218-223-362 | | | | 1 |
| D | 5178A; 10398; 10400 | 140-223-274-311-362 | | | | 8 |
| D | 5178A; 10398; 10400 | 082-147A-223-362 | 3 | | 2 | 1 |
| D4 | 5178A; 10398; 10400 | 223-319-362 | | | | 5 |
| D4b1 | 5178A; 10398; 10400 | 093-172-173-215-223-319-362 | | 3 | 6 | 3 |
| D4j | 5178A; 10398; 10400 | 223-291-362 | | | | 3 |
| D4m | 5178A; 10398; 10400 | 042-214-223-362 | 4 | 5 | 4 | 3 |
| D4o | 5178A; 10398; 10400 | 223-290-362 | | | | 3 |
| D4o1 | 5178A; 10398; 10400 | 176-183-223-274-290-319-342-362 | 3 | | 2 | |
| D4o1 | 5178A; 10398; 10400 | 129-176-183-223-274-290-319-342-362 | | | 1 | |
| D5a2a | 5178A; 10397; 10398; 10400 | 092-126-164-189-223-266-362 | | | 3 | 2 |
| D5c2 | 5178A; 10397; 10398; 10400 | 129-188.1C-193.1C-362-390 | 8 | 2 | | |
| F1a1 | 10873; 12406; 12705 | 162-172-304 | 3 | 1 | | |
| F1b | 10873; 12406; 12705 | 189-232A-249-304-311 | 7 | 1 | | 4 |
| F1b | 10873; 12406; 12705 | 189-232A-249-294-304-311 | | | | 2 |
| F1b | 10873; 12406; 12705 | 189-270-304 | | | | 1 |
| F1d'e | 10873; 12406; 12705 | 189-304 | | | | 16 |
| F2 | 7828; 10873; 12705 | 092A-291-304 | 14 | | 2 | 7 |
| G1a1 | 4833; 10398; 10400 | 223-325-362 | | | | 9 |
| G2a | 4833; 10398; 10400 | 223-227-278-362 | 2 | | | |
| G2a | 4833; 10398; 10400 | 223-227 h(G/A)-278-362 | 1 | | | |
| G2a | 4833; 10398; 10400 | 223-278-304-362 | | | | 1 |
| G2a | 4833; 10398; 10400 | 223-278-287-304-362 | | | | 2 |
| H | 7028; 10873; 12705; 14766 | CRS | | | 1 | |
| H | 7028; 10873; 12705; 14766 | 311 | | | | 2 |
| H | 7028; 10873; 12705; 14766 | 092-245-362 | | | | 1 |
| H | 7028; 10873; 12705; 14766 | 092h(A/C)-245-362 | | | | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| H | 7028; 10873; 12705; 14766 | 169-184 | | | | 1 |
| H | 7028; 10873; 12705; 14766 | 261-311 | | | | 1 |
| H1b | 7028; 10873; 12705; 14766 | 189-356 | | | 1 | |
| H1b | 7028; 10873; 12705; 14766 | 080-189-356 | 1 | | | 1 |
| H2a1 | 4769; 7028; 10873; 12705; 14766 | 354 | | | | 8 |
| H2a1 | 4769; 7028; 10873; 12705; 14766 | 311-354 | | | | 1 |
| H8 | 7028; 10873; 12705; 13101; 14766 | 288-362 | | 3 | 2 | 4 |
| I | 1719; 8251; 10398; 10873 | 129-223-391 | | | | 4 |
| J | 10398; 10873; 12705; 13708 | 069-126-241 | | | | 3 |
| J | 10398; 10873; 12705; 13708 | 069-126-241-301 | | | | 1 |
| J | 10398; 10873; 12705; 13708 | 069-126-189-260 | | | | 1 |
| J | 10398; 10873; 12705; 13708 | 069-126-145-261-290 | | | | 4 |
| J1b | 10398; 10873; 12705; 13708 | 069-126-145-172-222-261 | | | | 1 |
| J1b | 10398; 10873; 12705; 13708 | 069-126-145-172-222-261-304G | | | | 1 |
| K1a1a | 9055; 10398; 10873; 12308; 12705 | 093-224-311 | | | | 7 |
| K1a1a | 9055; 10398; 10873; 12308; 12705 | 093-189-224-311 | | | | 2 |
| M8a | 10398; 10400; 14470 | 184-223-298-319 | | | | 6 |
| M8a | 10398; 10400; 14470 | 184 h(T/C)-223-298-319 | | | | 1 |
| M8a | 10398; 10400; 14470 | 134-184-223-298-319 | | | | 2 |
| M8a1 | 10398; 10400; 14470 | 172-184-189-223-298-319 | | | | 1 |
| M9a1a | 10398; 10400 | 223-234-316-362 | | | | 3 |
| M9a1a | 10398; 10400 | 223-234-316-344-362 | | | | 1 |
| M10 | 10398; 10400 | 129-186-223-311-362 | 1 | | | |
| M10a1 | 10398; 10400 | 093-193-223-311-357-381 | | | | 1 |
| N1b | 10873 | 145-176G-223-258-291-390 | | | | 1 |
| N9a | 5417; 10873 | 223-248-257A-261-311 | 16 | 1 | 2 | |
| R9b1 | 10873; 12705 | 093-207-304-362-399 | | | | 6 |
| R9b1 | 10873; 12705 | 145-192-243-304-309-390 | 1 | 2 | | |
| T1a | 10873; 12705; 15607 | 126-163-186-189-294 | | 1 | | |
| T2b | 10873; 12705; 15607 | 111-126-294-296-304-311-327 | | | | 1 |
| U2e | 10398; 10873; 12308; 12705 | 051-129C-189-214-258-362 | | | | 2 |
| U4 | 4646; 10398; 10873; 12308; 12705 | 356 | 1 | | 6 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| U4 | 4646; 10398; 10873; 12308; 12705 | 129-356 | | | 1 | |
| U4b1b | 4646; 10398; 10873; 12308; 12705 | 311-356 | 3 | 2 | 4 | 2 |
| U5a1 | 10398; 10873; 12308; 12705; 13617 | 192-241-256-270-287-304-325-399 | 2 | 5 | 2 | 3 |
| U5a1 | 10398; 10873; 12308; 12705; 13617 | 192-256-270-319-320-399 | | | 1 | |
| U5b2 | 10398; 10873; 12308; 12705; 13617 | 192-249-311 | | | | 5 |
| U5b2 | 10398; 10873; 12308; 12705; 13617 | 093-192-249-311 | | | | 1 |
| W6 | 1719; 8994; 10873 | 192-223-292-325 | 1 | | | |
| X2e | 10873; 14470; 15310 | 189-223-278 | | 2 | | 6 |
| Z | 10398; 10400 | 185-223-260-298 | | | | 8 |
| Z1a | 10398; 10400 | 129-185-223-224-260-298 | | | 2 | 4 |
| | | | 91 | 52 | 71 | 276 |

## Table S4. Altaian Y-chromosome STR haplotypes

| Haplotype # | Haplogroup | DYS19 | DYS385 | DYS389I | DYS389b | DYS390 | DYS391 | DYS392 | DYS393 | DYS437 | DYS438 | DYS439 | DYS448 | DYS456 | DYS458 | DYS635 | Y GATA H4 | Chelkan | Kumandin | Tubalar | Altai-kizhi |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | C3* | 15 | 12-15 | 13 | 16 | 24 | 9 | 11 | 13 | 14 | 11 | 11 | null | 16 | 16 | 21 | 11 | | | | 2 |
| 2 | C3* | 15 | 12-13 | 13 | 16 | 25 | 10 | 11 | 13 | 14 | 10 | 10 | 22 | 15 | 18 | 21 | 11 | | | | 3 |
| 3 | C3* | 16 | 12-15 | 13 | 16 | 24 | 9 | 11 | 13 | 14 | 11 | 11 | null | 16 | 16 | 21 | 11 | | | | 6 |
| 4 | C3* | 15 | 12-15 | 13 | 16 | 24 | 9 | 11 | 13 | 14 | 12 | 11 | null | 16 | 16 | 21 | 11 | | | | 1 |
| 5 | C3* | 16 | 12-15 | 11 | 16 | 24 | 9 | 11 | 13 | 14 | 11 | 11 | null | 16 | 16 | 21 | 11 | | | | 1 |
| 6 | C3* | 15 | 13-13 | 13 | 16 | 25 | 10 | 11 | 13 | 14 | 10 | 10 | 22 | 15 | 18 | 21 | 11 | | | | 1 |
| 7 | C3* | 16 | 12-15 | 13 | 16 | 24 | 9 | 11 | 13 | 14 | 11 | 11 | null | 16 | 16 | 21 | 11 | | | | 1 |
| 8 | C3* | 16 | 12-16 | 13 | 16 | 24 | 9 | 11 | 13 | 14 | 11 | 11 | null | 16 | 16 | 21 | 11 | | | | 1 |
| 9 | C3* | 16 | 12-15 | 13 | 16 | 24 | 9 | 11 | 13 | 14 | 11 | 11 | null | 15 | 16 | 21 | 11 | | | | 1 |
| 10 | C3* | 15 | 12-15 | 13 | 16 | 24 | 9 | 11 | 13 | 14 | 11 | 11 | null | 16 | 16 | 21 | 11 | | | | 1 |
| 11 | C3* | 16 | 12-15 | 13 | 16 | 24 | 9 | 11 | 13 | 14 | 11 | 11 | null | 16 | 16 | 20 | 11 | | | | 1 |
| 12 | C3c | 16 | 12-12 | 14 | 17 | 23 | 9 | 11 | 13 | 14 | 10 | 11 | 20 | 15 | 19 | 23 | 10 | | | | 1 |
| 13 | C3c | 15-17 | 12-12 | 14 | 17 | 24 | 9 | 11 | 13 | 14 | 10 | 11 | 20 | 15 | 18 | 22 | 10 | | | | 1 |
| 14 | C3c | 15-17 | 12-12 | 14 | 17 | 24 | 9 | 11 | 13 | 14 | 10 | 11 | 20 | 15 | 18 | 23 | 10 | | | | 1 |
| 15 | C3c | 15-16 | 12-12 | 14 | 17 | 23 | 9 | 11 | 13 | 14 | 10 | 11 | 20 | 15 | 18 | 23 | 10 | | | | 1 |
| 16 | C3c | 15-17 | 12-12 | 14 | 17 | 24 | 9 | 11 | 13 | 15 | 10 | 11 | 20 | 15 | 18 | 23 | 10 | | | | 1 |
| 17 | D3a | 15 | 11-11 | 14 | 16 | 25 | 11 | 7 | 13 | 14 | 11 | 13 | 18 | 15 | 17 | 21 | 11 | | | | 1 |
| 18 | D3a | 15 | 11-11 | 14 | 16 | 26 | 11 | 7 | 13 | 14 | 11 | 12 | 19 | 15 | 17 | 21 | 11 | | | | 2 |
| 19 | D3a | 15 | 11-11 | 14 | 16 | 25 | 11 | 7 | 13 | 14 | 11 | 11 | 19 | 15 | 17 | 21 | 11 | | | | 2 |
| 20 | D3a | 15 | 11-11 | 14 | 16 | 25 | 11 | 7 | 13 | 14 | 11 | 12 | 19 | 15 | 17 | 21 | 11 | | | | 1 |
| 21 | E1b1b1c | 13 | 17-18 | 13 | 18 | 25 | 9 | 11 | 14 | 14 | 10 | 12 | 20 | 15 | 17 | 21 | 11 | | | 1 | |
| 22 | I2a | 16 | 14-16 | 13 | 20 | 24 | 11 | 11 | 13 | 15 | 10 | 13 | 20 | 15 | 18 | 25 | 11 | | | 1 | |
| 23 | J2a | 14 | 15-16 | 13 | 16 | 23 | 10 | 11 | 12 | 15 | 9 | 11 | 21 | 15 | 18 | 23 | 11 | | | | 3 |
| 24 | L | 15 | 9-16 | 13 | 17 | 24 | 10 | 14 | 12 | 16 | 10 | 11 | 19 | 15 | 17 | 22 | 11 | 1 | | | |
| 25 | NO*(xN1,O) | 14 | 12-12 | 13 | 17 | 23 | 11 | 14 | 13 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 11 | | | | 1 |
| 26 | N1* | 17 | 11-13 | 14 | 17 | 24 | 10 | 14 | 14 | 15 | 9.* | 11 | 20 | 17 | 17 | 23 | 11 | | 1 | 3 | |
| 27 | N1b* | 14 | 12-13 | 13 | 16 | 23 | 10 | 14 | 12 | 14 | 10 | 10 | 19 | 15 | 17 | 23 | 12 | | | | 1 |
| 28 | N1b* | 15 | 12-13 | 13 | 16 | 23 | 10 | 14 | 13 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 12 | 2 | | | |
| 29 | N1b* | 14 | 12-13 | 13 | 16 | 23 | 10 | 14 | 13 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 13 | 1 | | | |
| 30 | N1b* | 14 | 12-13 | 13 | 16 | 23 | 10 | 14 | 13 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 12 | 1 | | | |
| 31 | N1b* | 14 | 12-12 | 13 | 16 | 23 | 11 | 14 | 13 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 12 | 1 | | | |
| 32 | N1b* | 14 | 12-12 | 13 | 16 | 23 | 10 | 15 | 12 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 12 | | 3 | | |
| 33 | N1b* | 14 | 12-12 | 13 | 16 | 23 | 10 | 15 | 12 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 13 | | 2 | | |
| 34 | N1b* | 14 | 12-12 | 13 | 16 | 23 | 10 | 14 | 12 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 12 | | 2 | | |
| 35 | N1b* | 14 | 11-12 | 13 | 16 | 23 | 10 | 15 | 12 | 14 | 10 | 10 | 19 | 15 | 17 | 24 | 12 | | 1 | | |
| 36 | N1c(xN1c1) | 14 | 11-12 | 13 | 15 | 24 | 11 | 15 | 13 | 14 | 10 | 11 | 20 | 16 | 18 | 21 | 13 | | | | 1 |
| 37 | N1c1 | 14 | 11-11 | 13 | 16 | 23 | 11 | 14 | 14 | 14 | 10 | 10 | 19 | 14 | 17 | 22 | 12 | | | | 1 |
| 38 | N1c1 | 15 | 12-13 | 14 | 16 | 23 | 11 | 14 | 14 | 14 | 10 | 11 | 20 | 15 | 18 | 23 | 11 | | | | 1 |
| 39 | O3a3c* | 15 | 13-18 | 12 | 17 | 23 | 10 | 13 | 12 | 15 | 10 | 12 | 19 | 15 | 17 | 19 | 12 | | | | 1 |

| Haplotype # | Haplogroup | DYS19 | DYS385 | DYS389I | DYS389b | DYS390 | DYS391 | DYS392 | DYS393 | DYS437 | DYS438 | DYS439 | DYS448 | DYS456 | DYS458 | DYS635 | Y GATA H4 | Chelkan | Kumandin | Tubalar | Altai-kizhi |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | O3a3c1* | 14 | 12-17 | 12 | 15 | 23 | 10 | 15 | 12 | 15 | 11 | 13 | 20 | 15 | 17 | 20 | 12 | | | 1 | 1 |
| 41 | Q1a2 | 13 | 13-16 | 13 | 15 | 24 | 10 | 15 | 13 | 14 | 11 | 13 | 22 | 16 | 17 | 24 | 11 | | | 1 | |
| 49 | Q1a3a1c* | 13 | 15-19 | 14 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 12 | 19 | 17 | 16 | 22 | 11 | 1 | | | |
| 50 | Q1a3a1c* | 13 | 15-18 | 14 | 19 | 23 | 10 | 15 | 14 | 13 | 11 | 12 | 19 | 15 | 16 | 22 | 11 | | | | 1 |
| 51 | Q1a3a1c* | 13 | 14-14 | 13 | 18 | 23 | 10 | 14 | 13 | 13 | 11 | 12 | 19 | 15 | 16 | 22 | 11 | | | | 8 |
| 52 | Q1a3a1c* | 13 | 15-16 | 13 | 18 | 23 | 10 | 14 | 13 | 13 | 11 | 12 | 19 | 15 | 18 | 22 | 11 | | | | 4 |
| 53 | Q1a3a1c* | 13 | 15-16 | 13 | 19 | 23 | 10 | 14 | 13 | 13 | 11 | 11 | 18 | 15 | 18 | 22 | 11 | | | | 2 |
| 54 | Q1a3a1c* | 13 | 15-16 | 13 | 17 | 23 | 10 | 14 | 13 | 13 | 11 | 12 | 19 | 15 | 18 | 22 | 11 | | | | 2 |
| 55 | Q1a3a1c* | 13 | 15-16 | 13 | 17 | 23 | 9 | 14 | 13 | 13 | 11 | 12 | 19 | 15 | 17 | 22 | 11 | | | | 1 |
| 56 | Q1a3a1c* | 13 | 14-14 | 13 | 18 | 23 | 10 | 14 | 13 | 13 | 11 | 12 | 19 | 14 | 16 | 22 | 11 | | | | 1 |
| 57 | Q1a3a1c* | 13 | 15-16 | 14 | 18 | 23 | 10 | 14 | 13 | 13 | 11 | 12 | 19 | 15 | 18 | 22 | 11 | | | | 1 |
| 58 | Q1a3a1c* | 13 | 15-19 | 14 | 17 | 23 | 10 | 14 | 13 | 14 | 11 | 12 | 19 | 17 | 16 | 22 | 11 | 2 | | | |
| 59 | Q1a3a1c* | 10 | 15-19 | 14 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 13 | 19 | 17 | 16 | 22 | 11 | 1 | | | |
| 60 | Q1a3a1c* | 13 | 15-19 | 14 | 17 | 25 | 10 | 14 | 13 | 14 | 11 | 13 | 19 | 17 | 16 | 22 | 11 | 1 | | | |
| 42 | Q1a3a* | 13 | 15-19 | 14 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 13 | 19 | 18 | 16 | 22 | 10 | 1 | | | |
| 43 | Q1a3a* | 13 | 15-19 | 14 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 13 | 19 | 17 | 16 | 22 | 11 | 6 | | 1 | |
| 44 | Q1a3a* | 13 | 15-16 | 14 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 13 | 19 | 16 | 16 | 22 | 11 | 1 | | 1 | |
| 45 | Q1a3a* | 13 | 15-18 | 14 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 13 | 19 | 16 | 16 | 22 | 11 | 1 | | 4 | |
| 46 | Q1a3a* | 13 | 15-18 | 14 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 13 | 19 | 17 | 16 | 22 | 11 | 1 | | | |
| 47 | Q1a3a* | 13 | 15-18 | 15 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 13 | 19 | 16 | 16 | 22 | 12 | | | 1 | |
| 48 | Q1a3a* | 13 | 15-17 | 14 | 17 | 24 | 10 | 14 | 13 | 14 | 11 | 12 | 19 | 16 | 16 | 22 | 11 | | | 2 | |
| 61 | R1a1a1* | 17 | 11-17 | 14 | 17 | 26 | 11 | 11 | 13 | 14 | 11 | 11 | 19 | 15 | 15 | 23 | 11 | | | | 2 |
| 62 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 16 | 15 | 23 | 10 | | | | 5 |
| 63 | R1a1a1* | 15 | 11-15 | 12 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 15 | 15 | 23 | 12 | | | | 1 |
| 64 | R1a1a1* | 16 | 11-17 | 14 | 17 | 26 | 11 | 11 | 13 | 14 | 11 | 11 | 19 | 15 | 15 | 23 | 11 | | | | 4 |
| 65 | R1a1a1* | 16 | 11-18 | 14 | 17 | 25 | 11 | 11 | 13 | 14 | 11 | 11 | 19 | 15 | 15 | 23 | 10 | | | | 2 |
| 66 | R1a1a1* | 16 | 11-17 | 13 | 17 | 26 | 11 | 11 | 13 | 15 | 11 | 11 | 19 | 15 | 15 | 23 | 11 | | | | 1 |
| 67 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 16 | 15 | 23 | 12 | | | | 9 |
| 68 | R1a1a1* | 16 | 11-14 | 15 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 17 | 15 | 23 | 12 | | | | 2 |
| 69 | R1a1a1* | 16 | 11-14 | 14 | 18 | 26 | 10 | 11 | 13 | 14 | 11 | 10 | 21 | 16 | 15 | 23 | 12 | | | | 3 |
| 70 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 11 | 11 | 13 | 14 | 12 | 10 | 21 | 16 | 15 | 23 | 12 | | | | 1 |
| 71 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 16 | 15 | 24 | 12 | | | | 2 |
| 72 | R1a1a1* | 16 | 11-14 | 14 | 17 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 15 | 15 | 23 | 12 | | | | 1 |
| 73 | R1a1a1* | 16 | 11-14 | 14 | 17 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 17 | 15 | 23 | 12 | | | | 1 |
| 74 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 12 | 11 | 13 | 14 | 11 | 10 | 21 | 17 | 15 | 23 | 12 | | | | 2 |
| 75 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 17 | 15 | 23 | 12 | | | | 5 |
| 76 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 15 | 15 | 23 | 12 | | | | 1 |
| 77 | R1a1a1* | 16 | 11-17 | 14 | 18 | 26 | 10 | 11 | 13 | 14 | 11 | 11 | 19 | 15 | 15 | 23 | 11 | | | | 3 |
| 78 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 17 | 15 | 23 | 11 | | | | 1 |
| 79 | R1a1a1* | 16 | 11-17 | 14 | 18 | 26 | 11 | 11 | 13 | 14 | 11 | 12 | 19 | 15 | 15 | 23 | 11 | | | | 1 |
| 80 | R1a1a1* | 16 | 11-17 | 14 | 18 | 26 | 11 | 11 | 13 | 14 | 11 | 11 | 19 | 15 | 15 | 23 | 11 | | | | 1 |
| 81 | R1a1a1* | 16 | 11-17 | 14 | 18 | 26 | 10 | 11 | 13 | 14 | 11 | 12 | 19 | 15 | 15 | 23 | 11 | | | | 1 |
| 82 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 16 | 15 | 23 | 11 | | | | 1 |

| Haplotype # | Haplogroup | DYS19 | DYS385 | DYS389I | DYS389b | DYS390 | DYS391 | DYS392 | DYS393 | DYS437 | DYS438 | DYS439 | DYS448 | DYS456 | DYS458 | DYS635 | Y GATA H4 | Chelkan | Kumandin | Tubalar | Altai-kizhi |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83 | R1a1a1* | 17 | 11-13 | 12 | 18 | 25 | 10 | 11 | 13 | 14 | 11 | 10 | 20 | 16 | 15 | 23 | 13 | | | | 1 |
| 84 | R1a1a1* | 16 | 11-17 | 14 | 17 | 26 | 11 | 11 | 13 | 14 | 11 | 11 | 19 | 15 | 16 | 23 | 11 | | | | 1 |
| 85 | R1a1a1* | 16 | 11-18 | 14 | 18 | 26 | 10 | 11 | 13 | 14 | 11 | 11 | 19 | 15 | 15 | 23 | 11 | | | | 1 |
| 86 | R1a1a1* | 16 | 11-17 | 14 | 17 | 26 | 11 | 11 | 13 | 14 | 11 | 11 | 20 | 15 | 15 | 23 | 11 | | | | 1 |
| 87 | R1a1a1* | 16 | 11-14 | 14 | 17 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 16 | 15 | 23 | 12 | | | | 1 |
| 88 | R1a1a1* | 16 | 11-14 | 14 | 18 | 25 | 10 | 11 | 13 | 14 | 11 | 10 | 21 | 16 | 15 | 23 | 12 | | | | 1 |
| 89 | R1a1a1* | 16 | 12-14 | 14 | 17 | 24 | 10 | 11 | 13 | 14 | 11 | 10 | 20 | 17 | 14 | 23 | 12 | | | | 1 |
| 90 | R1a1a1* | 16 | 14-15 | 14 | 19 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 21 | 17 | 15 | 23 | 12 | | | | 1 |
| 91 | R1a1a1* | 15 | 11-15 | 13 | 19 | 25 | 10 | 11 | 13 | 14 | 11 | 10 | 20 | 15 | 16 | 23 | 13 | | | | 1 |
| 92 | R1a1a1* | 16 | 12-14 | 14 | 18 | 24 | 9 | 11 | 13 | 14 | 11 | 10 | 20 | 18 | 14 | 23 | 12 | 3 | | | |
| 93 | R1a1a1* | 16 | 11-14 | 14 | 17 | 25 | 11 | 11 | 13 | 14 | 11 | 11 | 20 | 16 | 17 | 23 | 13 | 1 | | | |
| 94 | R1a1a1* | 15 | 11-14 | 13 | 17 | 25 | 11 | 11 | 13 | 14 | 11 | 10 | 20 | 16 | 15 | 23 | 11 | | 1 | | |
| 95 | R1a1a1* | 15 | 11-15 | 13 | 17 | 24 | 10 | 11 | 13 | 14 | 11 | 10 | 20 | 16 | 15 | 23 | 12 | | 1 | | |
| 96 | R1a1a1* | 16 | 11-14 | 14 | 17 | 24 | 11 | 11 | 13 | 14 | 11 | 11 | 20 | 16 | 16 | 23 | 14 | | | 2 | |
| 97 | R1a1a1* | 16 | 12-14 | 14 | 18 | 24 | 10 | 11 | 13 | 14 | 11 | 10 | 20 | 17 | 14 | 23 | 12 | | | 1 | |
| 98 | R1a1a1* | 16 | 11-14 | 14 | 17 | 24 | 11 | 11 | 13 | 14 | 11 | 11 | 20 | 16 | 16 | 23 | 13 | | | 1 | |
| 99 | R1a1a1* | 16 | 12-14 | 14 | 19 | 24 | 9 | 11 | 13 | 14 | 11 | 10 | 20 | 17 | 14 | 23 | 12 | | | 2 | |
| 100 | R1a1a1* | 16 | 11-14 | 13 | 17 | 25 | 10 | 11 | 13 | 14 | 11 | 11 | 20 | 17 | 16 | 23 | 11 | | | 1 | |
| 101 | R1a1a1* | 16 | 11-14 | 13 | 17 | 25 | 11 | 11 | 14 | 14 | 11 | 12 | 21 | 16 | 17 | 23 | 14 | | | 1 | |
| 102 | R1a1a1* | 16 | 12-14 | 14 | 18 | 24 | 10 | 11 | 13 | 14 | 11 | 10 | 20 | 16 | 14 | 23 | 12 | | | 1 | |
| 103 | R1a1a1* | 16 | 11-14 | 14 | 17 | 25 | 11 | 11 | 13 | 14 | 11 | 11 | 20 | 16 | 16 | 23 | 14 | | | 1 | |
| 104 | R1b1b1 | 14 | 13-13 | 13 | 16 | 19 | 10 | 13 | 13 | 15 | 10 | 13 | 19 | 15 | 18 | 24 | 11 | | 2 | | |
| 105 | R1b1b1 | 14 | 13-13 | 13 | 16 | 19 | 10 | 13 | 13 | 15 | 10 | 13 | 19 | 15 | 17 | 24 | 11 | | 3 | | |
| 106 | R1b1b1 | 14 | 13-16 | 13 | 17 | 22 | 11 | 13 | 13 | 15 | 10 | 13 | 20 | 15 | 16 | 23 | 11 | | 1 | | |

**Table S5. $F_{ST}$ values estimated from mtDNA data for Altaian ethnic groups**

| | Chelkan | Kumandin | Tubalar | Altai-kizhi |
|---|---|---|---|---|
| Chelkan | * | 0.000 | 0.000 | 0.000 |
| Kumandin | 0.046 | * | 0.097 | 0.007 |
| Tubalar | 0.041 | 0.011 | * | 0.028 |
| Altai-kizhi | 0.037 | 0.017 | 0.008 | * |

$F_{ST}$ values are displayed in the lower matrix. P-values are located in the upper matrix

**Table S6. $R_{ST}$ values estimated from NRY data for Altaian ethnic groups**

| | Chelkan | Kumandin | Tubalar | Altai-kizhi |
|---|---|---|---|---|
| Chelkan | * | 0.000 | 0.146 | 0.000 |
| Kumandin | 0.316 | * | 0.000 | 0.000 |
| Tubalar | 0.024 | 0.331 | * | 0.000 |
| Altai-kizhi | 0.237 | 0.414 | 0.124 | * |

$R_{ST}$ values are displayed in the lower matrix. P-values are located in the upper matrix.