Figures

Figure S1
Figure S2

The bar chart illustrates the sensitivity (%) for different conditions: "augmented", "augmented+filter", "standard", and "standard+filter". The bars are color-coded to represent different LLR (Log Likelihood Ratio) categories: blue for "inner-LLR" and green for "outer-LLR". The y-axis represents sensitivity percentage, ranging from 50% to 80%.
Figure Legends

Figure S1

*Applying Parente2 on the 184 MKK samples from the HapMap Phase III panel.* We applied Parente2 to detect IBD segments shared by 1,000 pairs of MKK samples. Among these sample pairs, 68 were reported as parent/offspring pairs (PO), 16 were reported as full sibling pairs (FS), 80 were reported as second-degree relative pairs (SD), and the remaining 836 were randomly selected from the sample pairs that were not reported as relatives in previous publications. We used color from light to dark to demonstrate the IBD score from low to high along all the chromosomes. The IBD scores of the regions in grey were below 0.
### Tables

#### Table S1

| Relatedness                | Mean % genome IBD | Minimum % genome IBD | Mean # IBD segments | Minimum # IBD segments |
|----------------------------|-------------------|----------------------|---------------------|------------------------|
| Parent-offspring           | 99.29             | 99.05                | 68.40               | 60                     |
| Sibling                    | 74.89             | 66.24                | 83.00               | 77                     |
| Second-degree relative     | 49.01             | 28.81                | 61.55               | 32                     |
| First individual | Second individual | % genome IBD | # IBD segments | Length of longest IBD |
|------------------|-------------------|--------------|----------------|---------------------|
| NA21737          | NA21344           | 99.33%       | 70             | 172.889             |
| NA21737          | NA21366           | 99.09%       | 68             | 224.522             |
| NA21737          | NA21301           | 78.39%       | 81             | 150.805             |
| NA21737          | NA21302           | 55.20%       | 64             | 103.931             |
| NA21520          | NA21513           | 35.70%       | 56             | 96.577              |
| NA21378          | NA21455           | 34.88%       | 43             | 109.554             |
| NA21318          | NA21678           | 34.26%       | 48             | 74.345              |
| NA21318          | NA21597           | 34.08%       | 43             | 116.053             |
| NA21351          | NA21352           | 33.54%       | 46             | 110.66              |
| NA21513          | NA21686           | 33.33%       | 44             | 163.807             |
| NA21316          | NA21597           | 33.08%       | 41             | 119.878             |
| NA21740          | NA21479           | 32.35%       | 49             | 72.019              |
| NA21514          | NA21615           | 32.32%       | 51             | 102.832             |
| NA21391          | NA21485           | 32.29%       | 42             | 93.219              |
| NA21316          | NA21678           | 32.03%       | 41             | 92.0555             |
| NA21382          | NA21389           | 31.75%       | 57             | 60.1301             |
| NA21363          | NA21473           | 31.37%       | 42             | 74.7021             |
| NA21370          | NA21528           | 31.24%       | 42             | 126.283             |
| NA21314          | NA21423           | 31.08%       | 49             | 63.0164             |
| NA21520          | NA21614           | 30.67%       | 54             | 127.556             |
| NA21513          | NA21613           | 30.61%       | 53             | 78.5561             |
| NA21526          | NA21650           | 30.40%       | 52             | 73.2615             |
| NA21740          | NA21578           | 30.32%       | 48             | 110.406             |
| NA21475          | NA21478           | 30.19%       | 39             | 89.1235             |
| NA21309          | NA21379           | 30.13%       | 54             | 78.1501             |
| NA21614          | NA21686           | 29.95%       | 54             | 72.6317             |
| NA21513          | NA21614           | 29.78%       | 48             | 104.895             |
| NA21512          | NA21608           | 29.64%       | 51             | 64.0533             |
| NA21425          | NA21447           | 29.62%       | 53             | 73.428              |
| NA21478          | NA21490           | 29.46%       | 37             | 84.5835             |
| NA21311          | NA21313           | 29.32%       | 39             | 143.81              |
| NA21587          | NA21682           | 29.21%       | 35             | 129.401             |
| NA21473          | NA21686           | 29.21%       | 48             | 103.39              |
| NA21438          | NA21488           | 29.19%       | 48             | 56.7491             |
| NA21391          | NA21438           | 29.18%       | 54             | 51.6331             |
| NA21613          | NA21648           | 29.17%       | 53             | 66.1674             |
| NA21487          | NA21488           | 29.16%       | 46             | 80.6225             |
| NA21317          | NA21519           | 29.16%       | 44             | 95.294              |
| NA21351          | NA21363           | 29.08%       | 49             | 88.2178             |
| NA21370          | NA21587           | 29.07%       | 40             | 89.584              |
| NA21312          | NA21520           | 29.07%       | 37             | 86.457              |
| NA21309          | NA21616           | 29.03%       | 47             | 75.9994             |
| NA21351          | NA21473           | 29.01%       | 53             | 60.137              |
| NA21423          | NA21439           | 28.85%       | 40             | 65.3065             |
| NA21520          | NA21648           | 28.84%       | 50             | 79.2117             |
| NA21313          | NA21320           | 28.78%       | 42             | 117.354             |
| NA21420          | NA21440           | 28.71%       | 50             | 76.0468             |
| NA21316          | NA21635           | 28.63%       | 37             | 93.2165             |
| NA21362          | NA21587           | 28.39%       | 34             | 76.744              |
| NA21318          | NA21635           | 28.37%       | 33             | 93.2165             |
| NA21370          | NA21520           | 28.30%       | 45             | 55.1538             |
| NA21356          | NA21599           | 28.05%       | 47             | 65.3203             |
| NA21417          | NA21596           | 27.95%       | 41             | 119.243             |
| NA21523 | NA21509 | 27.69% | 54 | 86.7893 |
|---------|---------|--------|----|---------|
| NA21448 | NA21455 | 27.68% | 34 | 81.223  |
| NA21351 | NA21614 | 27.66% | 50 | 53.519  |
| NA21517 | NA21575 | 27.63% | 43 | 62.8103 |
| NA21391 | NA21488 | 27.54% | 46 | 74.3765 |
| NA21313 | NA21617 | 27.39% | 43 | 87.3216 |
| NA21382 | NA21384 | 27.20% | 57 | 52.4865 |
| NA21363 | NA21614 | 26.91% | 47 | 91.0546 |
| NA21385 | NA21526 | 26.80% | 41 | 65.2061 |
| NA21309 | NA21517 | 26.78% | 40 | 104.613 |
| NA21414 | NA21682 | 26.55% | 38 | 79.6255 |
| NA21473 | NA21613 | 26.52% | 55 | 65.508  |
| NA21514 | NA21608 | 26.48% | 45 | 95.5382 |
| NA21362 | NA21528 | 26.20% | 45 | 63.901  |
| NA21435 | NA21636 | 26.19% | 47 | 54.6173 |
| NA21473 | NA21520 | 26.12% | 52 | 67.1698 |
| NA21313 | NA21370 | 25.97% | 44 | 81.1639 |
| NA21363 | NA21613 | 25.89% | 39 | 110.301 |
| NA21528 | NA21682 | 25.87% | 41 | 86.0756 |
| NA21478 | NA21631 | 25.82% | 36 | 73.9753 |
| NA21494 | NA21528 | 25.64% | 36 | 61.272  |
| NA21519 | NA21597 | 25.52% | 39 | 87.8061 |
| NA21365 | NA21509 | 25.39% | 38 | 95.8596 |
| NA21450 | NA21455 | 25.36% | 44 | 84.3651 |
| NA21494 | NA21587 | 25.30% | 33 | 78.0138 |
| NA21313 | NA21438 | 25.28% | 40 | 66.7687 |
| NA21453 | NA21494 | 25.28% | 33 | 127.922 |
| NA21485 | NA21490 | 25.20% | 41 | 81.0813 |
| NA21302 | NA21366 | 25.16% | 40 | 101.667 |
| NA21367 | NA21378 | 25.10% | 43 | 66.809  |
| NA21365 | NA21357 | 24.99% | 43 | 60.188  |
| NA21303 | NA21352 | 24.91% | 39 | 78.0138 |
| NA21597 | NA21678 | 24.81% | 45 | 86.4846 |
| NA21619 | NA21636 | 24.66% | 38 | 63.2672 |
| NA21438 | NA21485 | 24.54% | 40 | 55.103  |
| NA21312 | NA21613 | 24.46% | 34 | 69.0533 |
| NA21303 | NA21414 | 24.36% | 38 | 71.1289 |
| NA21408 | NA21423 | 24.27% | 35 | 118.837 |
| NA21435 | NA21648 | 24.26% | 45 | 48.6664 |
| NA21314 | NA21622 | 24.24% | 40 | 65.5344 |
| NA21521 | NA21601 | 23.57% | 24 | 93.0101 |
| NA21362 | NA21439 | 23.41% | 41 | 56.5943 |
| NA21455 | NA21493 | 23.39% | 38 | 86.4195 |
| NA21367 | NA21493 | 23.31% | 41 | 84.1909 |
| NA21420 | NA21519 | 23.31% | 34 | 74.691  |
| NA21636 | NA21647 | 23.30% | 41 | 51.2968 |
| NA21473 | NA21614 | 23.27% | 49 | 57.432  |
| NA21597 | NA21635 | 23.24% | 40 | 70.5349 |
| NA21370 | NA21613 | 23.21% | 43 | 64.8878 |
| NA21351 | NA21520 | 23.19% | 50 | 56.2913 |
| NA21352 | NA21527 | 23.15% | 31 | 92.9571 |
| NA21475 | NA21485 | 23.14% | 44 | 77.6399 |
| NA21320 | NA21423 | 22.96% | 37 | 63.4589 |
| NA21300 | NA21312 | 22.90% | 33 | 64.6863 |
| NA21320 | NA21366 | 22.83% | 40 | 81.467  |
| NA21423 | NA21450 | 22.80% | 38 | 71.602  |
| NA21300 | NA21717 | 22.77% | 40 | 64.71   |
| NA21341 | NA21434 | 22.66% | 29 | 84.2483 |
|---------|---------|--------|----|---------|
| NA21634 | NA21648 | 22.63% | 44 | 63.5455 |
| NA21363 | NA21520 | 22.60% | 41 | 69.1596 |
| NA21400 | NA21509 | 22.44% | 34 | 87.7055 |
| NA21357 | NA21523 | 22.42% | 45 | 62.191  |
| NA21356 | NA21521 | 22.37% | 43 | 65.1948 |
| NA21357 | NA21400 | 22.21% | 34 | 70.8028 |
| NA21351 | NA21303 | 22.17% | 40 | 85.644  |
| NA21685 | NA21480 | 21.64% | 29 | 83.6648 |
| NA21418 | NA21723 | 21.61% | 45 | 42.9345 |
| NA21312 | NA21423 | 21.53% | 37 | 62.5575 |
| NA21741 | NA21718 | 21.34% | 35 | 64.579  |
| NA21318 | NA21420 | 21.32% | 41 | 72.6194 |
| NA21448 | NA21494 | 21.30% | 35 | 97.9582 |
| NA21311 | NA21367 | 21.29% | 32 | 67.9864 |
| NA21304 | NA21417 | 21.26% | 31 | 78.6919 |
| NA21351 | NA21513 | 21.16% | 40 | 79.6944 |
| NA21351 | NA21686 | 21.14% | 34 | 98.5499 |
| NA21421 | NA21487 | 20.96% | 38 | 64.4577 |
| NA21300 | NA21693 | 20.93% | 44 | 53.9549 |
| NA21385 | NA21650 | 20.77% | 39 | 65.9886 |
| NA21383 | NA21387 | 20.74% | 34 | 58.7445 |
| NA21363 | NA21513 | 20.71% | 39 | 85.3989 |
| NA21351 | NA21613 | 20.49% | 37 | 67.9859 |
| NA21473 | NA21513 | 20.35% | 38 | 59.6131 |
| NA21401 | NA21404 | 20.30% | 33 | 92.1027 |
| NA21333 | NA21634 | 20.25% | 37 | 54.0026 |
| NA21303 | NA21587 | 20.18% | 29 | 103.567 |
| NA21363 | NA21686 | 20.07% | 35 | 103.931 |
| NA21733 | NA21523 | 20.06% | 29 | 53.7532 |
| NA21320 | NA21525 | 19.97% | 31 | 74.6411 |
| NA21333 | NA21435 | 19.94% | 32 | 72.321  |
| NA21339 | NA21647 | 19.67% | 37 | 53.7532 |
| NA21514 | NA21614 | 19.60% | 39 | 78.05  |
| NA21408 | NA21447 | 19.47% | 36 | 57.705  |
| NA21365 | NA21435 | 19.35% | 31 | 78.3952 |
| NA21356 | NA21359 | 19.34% | 29 | 67.3629 |
| NA21527 | NA21650 | 19.12% | 34 | 64.3543 |
| NA21300 | NA21370 | 19.06% | 31 | 52.6773 |
| NA21514 | NA21686 | 18.87% | 34 | 78.9469 |
| NA21740 | NA21480 | 18.79% | 39 | 60.6933 |
| NA21298 | NA21387 | 18.69% | 28 | 78.0801 |
| NA21515 | NA21611 | 18.68% | 33 | 54.2198 |
| NA21339 | NA21634 | 18.48% | 35 | 47.964  |
| NA21519 | NA21636 | 18.44% | 31 | 67.444  |
| NA21378 | NA21614 | 18.40% | 29 | 61.7372 |
| NA21303 | NA21614 | 18.35% | 36 | 63.212  |
| NA21391 | NA21487 | 18.29% | 26 | 93.432  |
| NA21447 | NA21450 | 18.24% | 42 | 49.9445 |
| NA21448 | NA21614 | 17.90% | 23 | 100.501 |
| NA21825 | NA21493 | 17.85% | 34 | 49.3836 |
| NA21480 | NA21488 | 17.76% | 35 | 45.0117 |
| NA21333 | NA21647 | 17.69% | 32 | 53.037  |
| NA21733 | NA21509 | 17.68% | 30 | 84.2422 |
| NA21512 | NA21717 | 17.62% | 37 | 62.5669 |
| ID      | ID      | Percentage | Value | Value |
|---------|---------|------------|-------|-------|
| NA21360 | NA21716 | 17.56%     | 42    | 41.003 |
| NA21303 | NA21650 | 17.56%     | 23    | 99.2688 |
| NA21317 | NA21678 | 17.55%     | 32    | 73.693 |
| NA21362 | NA21454 | 17.53%     | 34    | 48.275 |
| NA21513 | NA21648 | 17.49%     | 30    | 71.036 |
| NA21423 | NA21622 | 17.47%     | 29    | 83.8987 |
| NA21509 | NA21723 | 17.24%     | 29    | 56.692 |
| NA21417 | NA21424 | 17.23%     | 31    | 73.1572 |
| NA21740 | NA21405 | 17.18%     | 32    | 64.449 |
| NA21686 | NA21683 | 17.09%     | 30    | 75.415 |
| NA21303 | NA21513 | 17.04%     | 28    | 66.723 |
| NA21525 | NA21509 | 17.02%     | 31    | 87.3776 |
| NA21473 | NA21648 | 16.94%     | 32    | 60.192 |
| NA21317 | NA21635 | 16.92%     | 29    | 91.2525 |
| NA21391 | NA21417 | 16.92%     | 35    | 45.4574 |
| NA21479 | NA21693 | 16.74%     | 30    | 69.7359 |
| NA21400 | NA21523 | 16.69%     | 24    | 120.543 |
| NA21477 | NA21478 | 16.67%     | 33    | 45.7379 |
| NA21615 | NA21717 | 16.66%     | 35    | 51.48 |
| NA21520 | NA21514 | 16.57%     | 36    | 78.392 |
| NA21587 | NA21650 | 16.55%     | 28    | 56.0592 |
| NA21438 | NA21475 | 16.53%     | 33    | 51.3661 |
| NA21417 | NA21421 | 16.52%     | 32    | 74.453 |
| NA21385 | NA21527 | 16.50%     | 33    | 57.0677 |
| NA21339 | NA21596 | 16.43%     | 27    | 61.5641 |
| NA21313 | NA21528 | 16.42%     | 28    | 52.355 |
| NA21513 | NA21608 | 16.37%     | 26    | 148.991 |
| NA21304 | NA21512 | 16.26%     | 33    | 65.3165 |
| NA21514 | NA21613 | 16.24%     | 37    | 66.495 |
| NA21344 | NA21378 | 16.14%     | 25    | 72.1634 |
| NA21457 | NA21613 | 16.11%     | 35    | 42.1614 |
| NA21737 | NA21378 | 16.08%     | 26    | 72.1209 |
| NA21365 | NA21617 | 16.06%     | 27    | 73.2654 |
| NA21741 | NA21360 | 15.97%     | 31    | 58.3973 |
| NA21523 | NA21617 | 15.97%     | 26    | 76.188 |
| NA21320 | NA21367 | 15.96%     | 23    | 79.9491 |
| NA21425 | NA21439 | 15.92%     | 33    | 63.1944 |
| NA21596 | NA21634 | 15.91%     | 33    | 43.765 |
| NA21613 | NA21614 | 15.83%     | 44    | 36.5723 |
| NA21314 | NA21425 | 15.82%     | 29    | 61.651 |
| NA21478 | NA21485 | 15.78%     | 26    | 79.747 |
| NA21352 | NA21682 | 15.72%     | 23    | 77.1757 |
| NA21614 | NA21648 | 15.68%     | 34    | 60.0398 |
| NA21344 | NA21614 | 15.67%     | 25    | 59.4558 |
| NA21301 | NA21448 | 15.67%     | 23    | 69.3805 |
| NA21302 | NA21614 | 15.67%     | 31    | 55.8944 |
| NA21357 | NA21525 | 15.66%     | 31    | 41.2043 |
| NA21478 | NA21597 | 15.65%     | 28    | 41.8024 |
| NA21473 | NA21608 | 15.62%     | 32    | 61.466 |
| NA21523 | NA21597 | 15.58%     | 26    | 76.4337 |
| NA21523 | NA21723 | 15.58%     | 29    | 52.099 |
| NA21737 | NA21614 | 15.57%     | 25    | 59.4558 |
| NA21420 | NA21678 | 15.57%     | 31    | 78.6578 |
| NA21424 | NA21634 | 15.56%     | 36    | 48.015 |
| NA21613 | NA21683 | 15.46%     | 35    | 75.3556 |
| NA21386 | NA21526 | 15.42%     | 32    | 34.9981 |
| NA21487 | NA21490 | 15.42%     | 29    | 77.3237 |
| NA21365 | NA21576 | 15.41% | 24 | 52.83 |
| NA21425 | NA21450 | 15.40% | 26 | 95.509 |
| NA21339 | NA21424 | 15.38% | 30 | 51.754 |
| NA21357 | NA21723 | 15.31% | 26 | 56.692 |
| NA21477 | NA21485 | 15.30% | 31 | 68.4907 |
| NA21608 | NA21686 | 15.19% | 29 | 108.388 |
| NA21339 | NA21424 | 15.38% | 30 | 51.754 |
| NA21366 | NA21525 | 15.00% | 31 | 56.388 |
| NA21320 | NA21597 | 14.98% | 17 | 77.5454 |
| NA21740 | NA21399 | 14.98% | 32 | 44.801 |
| NA21405 | NA21457 | 14.98% | 22 | 67.2715 |
| NA21359 | NA21424 | 14.89% | 35 | 50.626 |
| NA21317 | NA21597 | 14.88% | 27 | 40.0175 |
| NA21457 | NA21520 | 14.85% | 31 | 43.5421 |
| NA21313 | NA21520 | 14.82% | 23 | 72.5633 |
| NA21515 | NA21722 | 14.82% | 22 | 80.7151 |
| NA21320 | NA21509 | 14.81% | 23 | 94.0054 |
| NA21383 | NA21389 | 14.81% | 34 | 50.2544 |
| NA21312 | NA21367 | 14.80% | 20 | 103.244 |
| NA21391 | NA21490 | 14.76% | 30 | 73.9732 |
| NA21509 | NA21597 | 14.75% | 23 | 83.2608 |
| NA21303 | NA21686 | 14.74% | 23 | 81.0339 |
| NA21489 | NA21529 | 14.70% | 23 | 53.43 |
| NA21391 | NA21475 | 14.60% | 36 | 44.6979 |
| NA21457 | NA21686 | 14.58% | 28 | 45.5729 |
| NA21351 | NA21683 | 14.55% | 28 | 45.282 |
| NA21351 | NA21682 | 14.53% | 23 | 60.17 |
| NA21408 | NA21425 | 14.51% | 30 | 63.9779 |
| NA21520 | NA21608 | 14.47% | 32 | 96.577 |
| NA21317 | NA21420 | 14.34% | 24 | 74.244 |
| NA21391 | NA21717 | 14.33% | 26 | 52.501 |
| NA21475 | NA21487 | 14.31% | 26 | 77.2327 |
| NA21614 | NA21683 | 14.30% | 36 | 38.6016 |
| NA21435 | NA21617 | 14.27% | 21 | 76.9825 |
| NA21420 | NA21525 | 14.27% | 23 | 110.133 |
| NA21578 | NA21717 | 14.23% | 29 | 55.836 |
| NA21301 | NA21378 | 14.18% | 24 | 91.5183 |
| NA21364 | NA21368 | 14.15% | 18 | 114.965 |
| NA21316 | NA21636 | 14.14% | 29 | 67.537 |
| NA21733 | NA21357 | 14.10% | 27 | 43.1081 |
| NA21382 | NA21390 | 14.09% | 31 | 56.8353 |
| NA21733 | NA21400 | 14.08% | 27 | 89.1512 |
| NA21336 | NA21576 | 14.07% | 26 | 85.6296 |
| NA21513 | NA21683 | 13.98% | 28 | 47.1226 |
| NA21386 | NA21650 | 13.89% | 26 | 66.2636 |
| NA21367 | NA21596 | 13.88% | 25 | 85.8091 |
| NA21435 | NA21596 | 13.86% | 27 | 52.718 |
| NA21302 | NA21414 | 13.86% | 28 | 50.84 |
| NA21825 | NA21453 | 13.81% | 30 | 34.3879 |
| NA21399 | NA21457 | 13.81% | 21 | 63.6535 |
| NA21336 | NA21453 | 13.80% | 28 | 70.6274 |
| NA21351 | NA21302 | 13.79% | 26 | 85.644 |
| NA21438 | NA21490 | 13.78% | 30 | 41.5604 |
| NA21417 | NA21717 | 13.78% | 38 | 30.136 |
| NA21454 | NA21488 | 13.71% | 23  | 49.472 |
| NA21391 | NA21451 | 13.70% | 21  | 66.1496 |
| NA21301 | NA21614 | 13.67% | 22  | 72.449 |
| NA21435 | NA21523 | 13.66% | 26  | 44.663 |
| NA21302 | NA21352 | 13.64% | 29  | 102.199 |
| NA21486 | NA21524 | 13.61% | 30  | 62.2761 |
| NA21301 | NA21453 | 13.57% | 19  | 93.6256 |
| NA21300 | NA21313 | 13.52% | 19  | 63.7084 |
| NA21435 | NA21523 | 13.66% | 26  | 44.663 |
| NA21301 | NA21453 | 13.71% | 23  | 49.472 |
| NA21391 | NA21451 | 13.70% | 21  | 66.1496 |
| NA21301 | NA21453 | 13.57% | 19  | 93.6256 |
| NA21300 | NA21313 | 13.52% | 19  | 63.7084 |
| NA21420 | NA21442 | 13.46% | 27  | 76.0641 |
| NA21366 | NA21357 | 13.45% | 28  | 59.009 |
| NA21303 | NA21520 | 13.40% | 25  | 48.253 |
| NA21301 | NA21455 | 13.33% | 17  | 93.9535 |
| NA21390 | NA21529 | 13.32% | 19  | 85.2421 |
| NA21351 | NA21457 | 13.32% | 25  | 83.0572 |
| NA21313 | NA21587 | 13.31% | 21  | 70.5413 |
| NA21421 | NA21451 | 13.28% | 21  | 117.958 |
| NA21399 | NA21683 | 13.27% | 23  | 58.567 |
| NA21435 | NA21493 | 13.20% | 25  | 71.2917 |
| NA21356 | NA21601 | 13.16% | 29  | 69.0704 |
| NA21522 | NA21622 | 13.14% | 20  | 70.0927 |
| NA21528 | NA21622 | 13.10% | 23  | 67.9232 |
| NA21740 | NA21402 | 13.00% | 23  | 61.1308 |
| NA21311 | NA21423 | 12.99% | 26  | 60.6933 |
| NA21379 | NA21421 | 12.96% | 23  | 47.702 |
| NA21359 | NA21596 | 12.94% | 32  | 53.334 |
| NA21420 | NA21635 | 12.92% | 28  | 78.6578 |
| NA21438 | NA21487 | 12.92% | 31  | 46.3693 |
| NA21382 | NA21529 | 12.92% | 26  | 44.984 |
| NA21578 | NA21615 | 12.85% | 26  | 64.6024 |
| NA21733 | NA21525 | 12.67% | 18  | 100.292 |
| NA21435 | NA21453 | 12.63% | 22  | 45.191 |
| NA21477 | NA21487 | 12.63% | 26  | 68.2412 |
| NA21400 | NA21723 | 12.58% | 29  | 47.119 |
| NA21480 | NA21631 | 12.56% | 19  | 66.467 |
| NA21825 | NA21617 | 12.48% | 19  | 50.8028 |
| NA21523 | NA21576 | 12.44% | 31  | 53.605 |
| NA21333 | NA21434 | 12.39% | 24  | 52.1621 |
| NA21364 | NA21632 | 12.37% | 28  | 36.7674 |
| NA21596 | NA21647 | 12.31% | 27  | 62.4289 |
| NA21383 | NA21384 | 12.28% | 29  | 49.453 |
| NA21424 | NA21647 | 12.26% | 31  | 34.4665 |
| NA21382 | NA21386 | 12.26% | 27  | 37.6583 |
| NA21478 | NA21678 | 12.24% | 27  | 35.543 |
| NA21391 | NA21439 | 12.22% | 28  | 46.16 |
| NA21825 | NA21365 | 12.20% | 24  | 63.78 |
| NA21514 | NA21648 | 12.19% | 23  | 78.5561 |
| NA21405 | NA21578 | 12.19% | 25  | 49.5945 |
| NA21402 | NA21683 | 12.17% | 20  | 59.14 |
| NA21365 | NA21597 | 12.17% | 17  | 87.4963 |
| NA21303 | NA21528 | 12.16% | 25  | 38.678 |
| NA21400 | NA21525 | 12.14% | 20  | 120.728 |
| NA21298 | NA21382 | 12.10% | 20  | 63.5664 |
| NA21391 | NA21478 | 12.10% | 21  | 41.269 |
| NA21313 | NA21439 | 12.08% | 25  | 53.0581 |
| NA21402 | NA21583 | 12.03% | 23 | 52.109 |
| NA21312 | NA21622 | 11.97% | 19 | 65.4991 |
| NA21448 | NA21448 | 11.96% | 18 | 54.5009 |
| NA21420 | NA21597 | 11.94% | 24 | 51.5921 |
| NA21473 | NA21473 | 11.90% | 22 | 61.48 |
| NA21333 | NA21596 | 11.90% | 22 | 59.049 |
| NA21608 | NA21608 | 11.90% | 25 | 44.7186 |
| NA21448 | NA21448 | 11.90% | 18 | 54.523 |
| NA21312 | NA21622 | 11.87% | 25 | 63.4599 |
| NA21683 | NA21683 | 11.85% | 23 | 61.7103 |
| NA21737 | NA21448 | 11.84% | 18 | 54.523 |
| NA21424 | NA21424 | 11.84% | 28 | 77.0675 |
| NA21344 | NA21448 | 11.80% | 22 | 63.126 |
| NA21608 | NA21608 | 11.78% | 26 | 39.538 |
| NA21486 | NA21486 | 11.76% | 26 | 55.2573 |
| NA21351 | NA21608 | 11.70% | 29 | 33.212 |
| NA21514 | NA21514 | 11.70% | 23 | 66.8941 |
| NA21477 | NA21635 | 11.69% | 24 | 50.7571 |
| NA21635 | NA21635 | 11.67% | 24 | 36.9916 |
| NA21347 | NA21347 | 11.64% | 23 | 51.7859 |
| NA21353 | NA21353 | 11.64% | 25 | 35.7869 |
| NA21368 | NA21368 | 11.64% | 28 | 48.998 |
| NA21478 | NA21478 | 11.60% | 23 | 58.1141 |
| NA21439 | NA21439 | 11.57% | 24 | 53.435 |
| NA21448 | NA21448 | 11.56% | 21 | 56.7893 |
| NA21648 | NA21648 | 11.51% | 25 | 39.617 |
| NA21479 | NA21479 | 11.44% | 25 | 44.618 |
| NA21385 | NA21385 | 11.42% | 18 | 65.8667 |
| NA21457 | NA21457 | 11.38% | 27 | 36.34 |
| NA21578 | NA21578 | 11.37% | 24 | 49.341 |
| NA21423 | NA21423 | 11.32% | 23 | 49.408 |
| NA21401 | NA21401 | 11.32% | 24 | 70.503 |
| NA21357 | NA21357 | 11.21% | 27 | 32.095 |
| NA21423 | NA21423 | 11.17% | 21 | 62.439 |
| NA21722 | NA21722 | 11.16% | 29 | 32.781 |
| NA21608 | NA21608 | 11.10% | 26 | 52.255 |
| NA21424 | NA21424 | 11.03% | 26 | 47.344 |
| NA21381 | NA21381 | 11.02% | 21 | 54.9513 |
| NA21614 | NA21614 | 10.97% | 26 | 48.8776 |
| NA21622 | NA21622 | 10.96% | 18 | 53.825 |
| NA21524 | NA21524 | 10.94% | 25 | 45.1017 |
| NA21381 | NA21381 | 10.86% | 20 | 68.6464 |
| NA21622 | NA21622 | 10.82% | 16 | 52.6843 |
| NA21514 | NA21514 | 10.82% | 25 | 49.7818 |
| NA21457 | NA21457 | 10.81% | 16 | 50.5271 |
| NA21450 | NA21450 | 10.77% | 20 | 51.1041 |
| NA21613 | NA21613 | 10.76% | 17 | 63.4272 |
| NA21693 | NA21693 | 10.73% | 19 | 68.68 |
| NA21367 | NA21367 | 10.72% | 16 | 80.0085 |
| NA21435 | NA21435 | 10.68% | 16 | 51.6512 |
| NA21494 | NA21494 | 10.66% | 16 | 80.1553 |
| NA21717 | NA21717 | 10.66% | 24 | 33.002 |
| NA21614 | NA21614 | 10.63% | 28 | 42.2867 |
| NA21510 | NA21510 | 10.63% | 26 | 39.9796 |
| NA21487 | NA21487 | 10.62% | 18 | 93.843 |
| NA21682 | NA21682 | 10.61% | 17 | 58.103 |
| NA21512 | NA21512 | 10.61% | 20 | 51.998 |
| NA21301 | NA21417 | 10.58% | 23 | 43.9453 |
| NA21493 | NA21614 | 10.58% | 19 | 71.709  |
| NA21351 | NA21514 | 10.58% | 25 | 36.6554 |
| NA21344 | NA21719 | 10.56% | 24 | 51.0009 |
| NA21737 | NA21719 | 10.49% | 23 | 55.6686 |
| NA21339 | NA21636 | 10.48% | 21 | 64.889  |
| NA21355 | NA21583 | 10.46% | 24 | 37.9281 |
| NA21357 | NA21597 | 10.44% | 20 | 55.3    |
| NA21383 | NA21390 | 10.43% | 17 | 45.5084 |
| NA21344 | NA21719 | 10.43% | 24 | 45.8818 |
| NA21351 | NA21636 | 10.42% | 21 | 55.6686 |
| NA21301 | NA21381 | 10.41% | 17 | 45.5084 |
| NA21521 | NA21523 | 10.37% | 22 | 54.049  |
| NA21336 | NA21390 | 10.35% | 21 | 50.9209 |
| NA21401 | NA21509 | 10.34% | 20 | 56.7286 |
| NA21303 | NA21608 | 10.33% | 21 | 63.212  |
| NA21344 | NA21648 | 10.29% | 27 | 28.165  |
| NA21356 | NA21355 | 10.20% | 17 | 45.5084 |
| NA21300 | NA21448 | 10.26% | 19 | 60.594  |
| NA21597 | NA21636 | 10.23% | 25 | 59.9471 |
| NA21352 | NA21355 | 10.20% | 21 | 48.1547 |
| NA21381 | NA21683 | 10.16% | 18 | 59.583  |
| NA21379 | NA21485 | 10.11% | 27 | 29.9092 |
| NA21399 | NA21583 | 10.10% | 20 | 46.8221 |
| NA21825 | NA21494 | 10.09% | 21 | 48.9739 |
| NA21381 | NA21457 | 10.09% | 20 | 41.956  |
| NA21298 | NA21389 | 10.07% | 15 | 78.1967 |
| NA21363 | NA21683 | 10.07% | 27 | 33.713  |
| NA21513 | NA21716 | 10.07% | 23 | 31.655  |
| NA21333 | NA21424 | 10.04% | 15 | 59.309  |
| NA21303 | NA21440 | 10.03% | 25 | 33.679  |
| NA21311 | NA21425 | 10.00% | 24 | 53.66   |
| NA21366 | NA21378 | 9.97%  | 17 | 72.2421 |
| NA21302 | NA21448 | 9.96%  | 17 | 55.149  |
| NA21512 | NA21578 | 9.95%  | 21 | 36.146  |
| NA21300 | NA21718 | 9.92%  | 19 | 46.1048 |
| NA21366 | NA21723 | 9.90%  | 20 | 41.949  |
| NA21448 | NA21608 | 9.89%  | 16 | 53.188  |
| NA21356 | NA21361 | 9.89%  | 15 | 66.8359 |
| NA21385 | NA21587 | 9.89%  | 16 | 69.7459 |
| NA21365 | NA21400 | 9.88%  | 17 | 48.2795 |
| NA21512 | NA21718 | 9.86%  | 20 | 41.567  |
| NA21425 | NA21634 | 9.84%  | 24 | 45.523  |
| NA21359 | NA21647 | 9.84%  | 24 | 37.4921 |
| NA21312 | NA21425 | 9.83%  | 20 | 61.7    |
| NA21784 | NA21488 | 9.79%  | 20 | 42.7337 |
| NA21320 | NA21425 | 9.78%  | 21 | 40.659  |
| NA21439 | NA21485 | 9.73%  | 22 | 45.0652 |
| NA21367 | NA21494 | 9.73%  | 23 | 34.843  |
| NA21825 | NA21523 | 9.72%  | 17 | 44.28   |
| NA21379 | NA21487 | 9.70%  | 24 | 31.474  |
| NA21318 | NA21344 | 9.69%  | 16 | 50.959  |
| NA21365 | NA21476 | 9.67%  | 19 | 80.5    |
| NA21737 | NA21455 | 9.66%  | 17 | 72.5422 |
| NA21344 | NA21453 | 9.64%  | 17 | 72.2215 |
| NA21402 | NA21578 | 9.63%  | 18 | 49.6296 |
| NA21421 | NA21512 | 9.63%  | 16 | 54.8331 |
| NA21615 | NA21722 | 9.62%  | 22 | 94.3816 |
| NA21304 | NA21596 | 9.60% | 21 | 66.266 |
| NA21344 | NA21455 | 9.58% | 17 | 72.7158 |
| NA21303 | NA21683 | 9.58% | 16 | 67.2758 |
| NA21525 | NA21597 | 9.56% | 18 | 70.0277 |
| NA21370 | NA21523 | 9.55% | 15 | 52.2665 |
| NA21339 | NA21648 | 9.53% | 18 | 50.1678 |
| NA21514 | NA21717 | 9.53% | 23 | 62.5467 |
| NA21737 | NA21453 | 9.50% | 16 | 72.1919 |
| NA21405 | NA21583 | 9.50% | 19 | 52.109 |
| NA21339 | NA21405 | 9.50% | 23 | 50.2327 |
| NA21303 | NA21362 | 9.50% | 14 | 41.7454 |
| NA21390 | NA21583 | 9.45% | 16 | 77.0511 |
| NA21307 | NA21722 | 9.44% | 21 | 71.1147 |
| NA21362 | NA21488 | 9.43% | 21 | 38.9687 |
| NA21526 | NA21587 | 9.42% | 22 | 60.6119 |
| NA21318 | NA21336 | 9.39% | 18 | 42.955 |
| NA21693 | NA21717 | 9.35% | 22 | 29.6957 |
| NA21740 | NA21510 | 9.34% | 24 | 36.323 |
| NA21741 | NA21513 | 9.28% | 15 | 47.6594 |
| NA21360 | NA21400 | 9.24% | 22 | 44.6643 |
| NA21386 | NA21527 | 9.24% | 21 | 34.426 |
| NA21339 | NA21425 | 9.18% | 19 | 49.2707 |
| NA21421 | NA21717 | 9.18% | 21 | 44.6643 |
| NA21339 | NA21367 | 9.16% | 19 | 39.363 |
| NA21361 | NA21716 | 9.13% | 24 | 40.761 |
| NA21379 | NA21576 | 9.12% | 17 | 43.3642 |
| NA21365 | NA21521 | 9.10% | 20 | 40.8147 |
| NA21425 | NA21440 | 9.09% | 21 | 49.4668 |
| NA21316 | NA21336 | 9.08% | 18 | 42.955 |
| NA21596 | NA21636 | 9.07% | 20 | 48.82 |
| NA21312 | NA21435 | 9.04% | 21 | 46.4104 |
| NA21583 | NA21722 | 9.01% | 20 | 43.0755 |
| NA21648 | NA21683 | 9.01% | 21 | 67.0613 |
| NA21401 | NA21457 | 9.00% | 14 | 63.08 |
| NA21382 | NA21486 | 8.99% | 16 | 68.493 |
| NA21615 | NA21718 | 8.97% | 18 | 51.48 |
| NA21370 | NA21435 | 8.95% | 19 | 46.4901 |
| NA21367 | NA21435 | 8.91% | 14 | 56.5115 |
| NA21363 | NA21608 | 8.90% | 24 | 56.2644 |
| NA21473 | NA21683 | 8.89% | 23 | 35.46 |
| NA21370 | NA21614 | 8.89% | 23 | 34.1293 |
| NA21365 | NA21370 | 8.85% | 16 | 72.3439 |
| NA21448 | NA21647 | 8.84% | 20 | 41.8457 |
| NA21365 | NA21473 | 8.79% | 17 | 55.061 |
| NA21578 | NA21718 | 8.78% | 17 | 56.566 |
| NA21312 | NA21365 | 8.77% | 16 | 73.1083 |
| NA21303 | NA21457 | 8.74% | 19 | 68.9096 |
| NA21379 | NA21486 | 8.70% | 22 | 31.7026 |
| NA21400 | NA21576 | 8.69% | 20 | 56.2396 |
| NA21457 | NA21473 | 8.61% | 24 | 40.7608 |
| NA21344 | NA21493 | 8.57% | 18 | 55.3734 |
| NA21339 | NA21399 | 8.56% | 22 | 40.9181 |
| NA21417 | NA21440 | 8.56% | 19 | 43.873 |
| NA21351 | NA21365 | 8.54% | 24 | 36.5086 |
| NA21303 | NA21613 | 8.54% | 22 | 36.4539 |
|   |   |   |   |   |
|---|---|---|---|---|
| NA21608 | NA21648 | 8.53% | 23 | 34.8325 |
| NA21611 | NA21722 | 8.51% | 12 | 56.4463 |
| NA21425 | NA21647 | 8.51% | 25 | 34.2205 |
| NA21737 | NA21493 | 8.50% | 19 | 55.3734 |
| NA21298 | NA21717 | 8.47% | 17 | 27.657  |
| NA21303 | NA21363 | 8.47% | 16 | 68.635  |
| NA21576 | NA21723 | 8.46% | 19 | 40.5487 |
| NA21312 | NA21614 | 8.46% | 19 | 34.0711 |
| NA21486 | NA21525 | 8.45% | 21 | 57.703  |
| NA21302 | NA21587 | 8.43% | 16 | 84.9715 |
| NA21455 | NA21614 | 8.41% | 18 | 57.703  |
| NA21473 | NA21619 | 8.39% | 20 | 41.506  |
| NA21368 | NA21723 | 8.38% | 17 | 35.3    |
| NA21357 | NA21486 | 8.38% | 15 | 46.13   |
| NA21339 | NA21631 | 8.37% | 23 | 42.778  |
| NA21317 | NA21636 | 8.36% | 21 | 40.249  |
| NA21390 | NA21453 | 8.33% | 14 | 29.549  |
| NA21320 | NA21617 | 8.32% | 14 | 43.5936 |
| NA21363 | NA21648 | 8.32% | 21 | 66.2107 |
| NA21733 | NA21366 | 8.28% | 14 | 44.8271 |
| NA21300 | NA21480 | 8.27% | 20 | 44.5796 |
| NA21480 | NA21490 | 8.27% | 17 | 44.8271 |
| NA21439 | NA21475 | 8.24% | 24 | 36.6755 |
| NA21476 | NA21523 | 8.22% | 16 | 80.5    |
| NA21316 | NA21515 | 8.22% | 20 | 41.069  |
| NA21362 | NA21386 | 8.22% | 16 | 56.4595 |
| NA21784 | NA21522 | 8.21% | 19 | 37.8644 |
| NA21424 | NA21510 | 8.21% | 17 | 45.0258 |
| NA21424 | NA21636 | 8.20% | 21 | 32.573  |
| NA21302 | NA21473 | 8.18% | 18 | 43.2147 |
| NA21344 | NA21620 | 8.17% | 23 | 65.0332 |
| NA21303 | NA21423 | 8.16% | 31 | 22.558  |
| NA21362 | NA21385 | 8.13% | 11 | 86.5453 |
| NA21359 | NA21634 | 8.10% | 23 | 26.3881 |
| NA21457 | NA21514 | 8.10% | 14 | 61.1308 |
| NA21457 | NA21648 | 8.09% | 17 | 67.0613 |
| NA21341 | NA21575 | 8.08% | 18 | 62.6894 |
| NA21351 | NA21435 | 8.07% | 19 | 46.602  |
| NA21344 | NA21417 | 8.07% | 16 | 51.5173 |
| NA21526 | NA21528 | 8.07% | 17 | 60.5833 |
| NA21320 | NA21435 | 8.06% | 19 | 29.8663 |
| NA21311 | NA21622 | 8.05% | 20 | 37.011  |
| NA21737 | NA21417 | 8.03% | 16 | 51.4646 |
| NA21382 | NA21388 | 8.02% | 17 | 61.1507 |
| NA21333 | NA21648 | 8.02% | 13 | 45.735  |
| NA21737 | NA21620 | 8.00% | 22 | 64.8119 |
| NA21417 | NA21425 | 7.99% | 22 | 43.4456 |
| NA21388 | NA21488 | 7.99% | 17 | 44.9794 |
| NA21514 | NA21683 | 7.98% | 18 | 47.2581 |
| NA21825 | NA21366 | 7.96% | 18 | 36.4    |
| NA21366 | NA21381 | 7.96% | 15 | 54.7208 |
| NA21475 | NA21529 | 7.95% | 17 | 32.8514 |
| NA21367 | NA21647 | 7.95% | 23 | 26.8705 |
| NA21578 | NA21608 | 7.94% | 20 | 36.278  |
| NA21303 | NA21450 | 7.92% | 23 | 34.7873 |
| NA21303 | NA21526 | 7.90% | 18 | 45.537  |
| NA21301 | NA21318 | 7.89% | 14 | 49.9472 |
| NA21417 | NA21512 | 7.89% | 20 | 29.676 |
| NA21423 | NA21440 | 7.87% | 15 | 52.963 |
| NA21344 | NA21608 | 7.86% | 18 | 59.259 |
| NA21447 | NA21440 | 7.86% | 16 | 45.846 |
| NA21737 | NA21608 | 7.85% | 18 | 59.259 |
| NA21475 | NA21480 | 7.85% | 21 | 35.084 |
| NA21580 | NA21488 | 7.82% | 14 | 61.058 |
| NA21442 | NA21524 | 7.80% | 19 | 43.592 |
| NA21344 | NA21608 | 7.86% | 18 | 59.259 |
| NA21447 | NA21440 | 7.86% | 16 | 45.846 |
| NA21737 | NA21608 | 7.85% | 18 | 59.259 |
| NA21475 | NA21480 | 7.85% | 21 | 35.084 |
| NA21580 | NA21488 | 7.82% | 14 | 61.058 |
| NA21442 | NA21524 | 7.80% | 19 | 43.592 |
| NA21344 | NA21608 | 7.86% | 18 | 59.259 |
| NA21447 | NA21440 | 7.86% | 16 | 45.846 |
| NA21737 | NA21608 | 7.85% | 18 | 59.259 |
| NA21475 | NA21480 | 7.85% | 21 | 35.084 |
| NA21580 | NA21488 | 7.82% | 14 | 61.058 |
| NA21442 | NA21524 | 7.80% | 19 | 43.592 |
| NA21344 | NA21608 | 7.86% | 18 | 59.259 |
| NA21447 | NA21440 | 7.86% | 16 | 45.846 |
| NA21302  | NA21513 | 7.31% | 16 | 48.7465 |
|-----------|---------|-------|----|---------|
| NA21360   | NA21718 | 7.30% | 18 | 30.6954 |
| NA21382   | NA21487 | 7.29% | 13 | 40.7797 |
| NA21308   | NA21441 | 7.28% | 13 | 70.9428 |
| NA21519   | NA21512 | 7.26% | 14 | 64.017  |
| NA21740   | NA21493 | 7.26% | 16 | 36.553  |
| NA21608   | NA21617 | 7.23% | 20 | 38.3124 |
| NA21479   | NA21493 | 7.22% | 18 | 50.928  |
| NA21525   | NA21723 | 7.22% | 13 | 45.0244 |
| NA21339   | NA21401 | 7.22% | 21 | 31.103  |
| NA21424   | NA21515 | 7.21% | 18 | 68.1639 |
| NA21401   | NA21523 | 7.21% | 20 | 31.8327 |
| NA21363   | NA21435 | 7.20% | 17 | 33.509  |
| NA21473   | NA21576 | 7.19% | 17 | 52.2243 |
| NA21312   | NA21523 | 7.18% | 15 | 31.1989 |
| NA21424   | NA21648 | 7.16% | 21 | 31.103  |
| NA21308   | NA21486 | 7.15% | 17 | 45.282  |
| NA21379   | NA21451 | 7.02% | 11 | 62.7267 |
| NA21784   | NA21597 | 7.00% | 14 | 37.504  |
| NA21479   | NA21510 | 7.00% | 17 | 51.0225 |
| NA21440   | NA21587 | 6.99% | 15 | 37.701  |
| NA21303   | NA21386 | 6.98% | 16 | 53.583  |
| NA21784   | NA21631 | 6.97% | 24 | 20.748  |
| NA21391   | NA21480 | 6.96% | 13 | 53.8298 |
| NA21311   | NA21486 | 6.94% | 19 | 37.864  |
| NA21386   | NA21587 | 6.94% | 14 | 55.1719 |
| NA21583   | NA21596 | 6.92% | 14 | 53.8199 |
| NA21361   | NA21647 | 6.90% | 19 | 37.2925 |
| NA21367   | NA21634 | 6.89% | 18 | 41.3618 |
| NA21382   | NA21488 | 6.89% | 13 | 51.56   |
| NA21318   | NA21515 | 6.88% | 14 | 50.0923 |
| NA21576   | NA21617 | 6.88% | 19 | 32.6838 |
| NA21450   | NA21583 | 6.87% | 13 | 60.333  |
| NA21480   | NA21635 | 6.84% | 14 | 34.7784 |
| NA21301   | NA21722 | 6.84% | 17 | 45.653  |
| NA21408   | NA21440 | 6.83% | 17 | 38.32   |
| NA21489   | NA21515 | 6.82% | 15 | 34.131  |
| NA21454   | NA21475 | 6.81% | 11 | 54.788  |
| NA21318   | NA21615 | 6.81% | 15 | 36.498  |
| NA21366   | NA21521 | 6.80% | 15 | 30.6566 |
| NA21308   | NA21619 | 6.78% | 18 | 36.12   |
| NA21385   | NA21528 | 6.77% | 11 | 55.2417 |
| NA21388   | NA21529 | 6.77% | 10 | 57.14   |
| NA21825   | NA21370 | 6.76% | 12 | 52.0239 |
| NA21401   | NA21723 | 6.75% | 21 | 40.707  |
| NA21733   | NA21576 | 6.75% | 19 | 35.4833 |
Table Legends

Table S1. Application of Parente2 on recovering previously reported cryptic relationships on the HapMap III MKK population. In Pemberton et al. (2010), 68 parent-offspring, 16 sibling, and 80 other relationships were identified in the HapMap Phase III MKK population. Using Parente2 we uncovered all these relationships. The table reports statistics on mean and minimum IBD detected across the genomes of every pair of individuals of each relationship type.

Table S2. Detection of additional putative relationships on the HapMap III MKK population. We list all pairs of individuals not previously reported as related, for which IBD was detected at a whole genome level higher than 10%.