

Signatures of positive selection in East African Shorthorn Zebu: A genome-wide single nucleotide polymorphism analysis

Supplementary material

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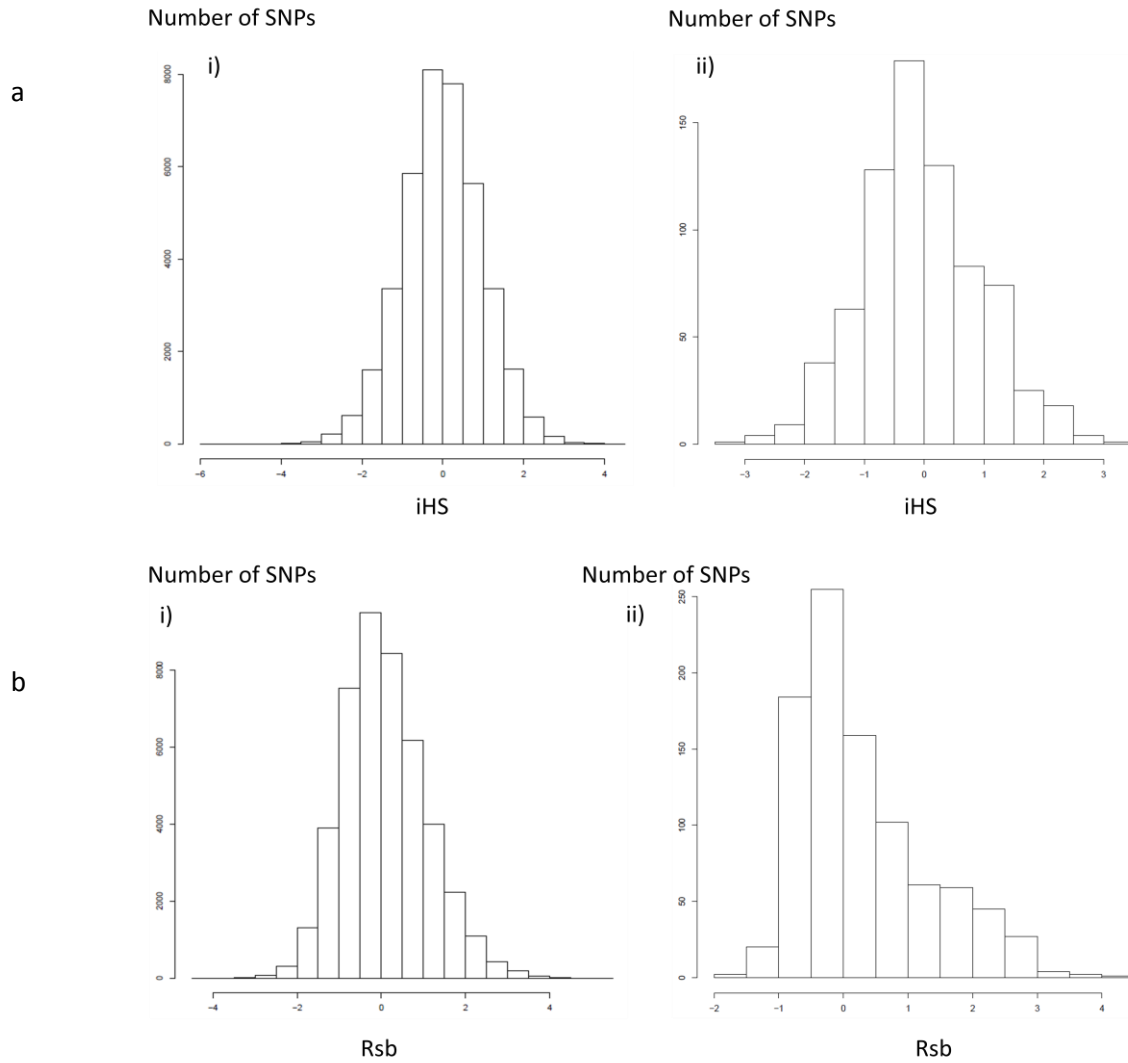
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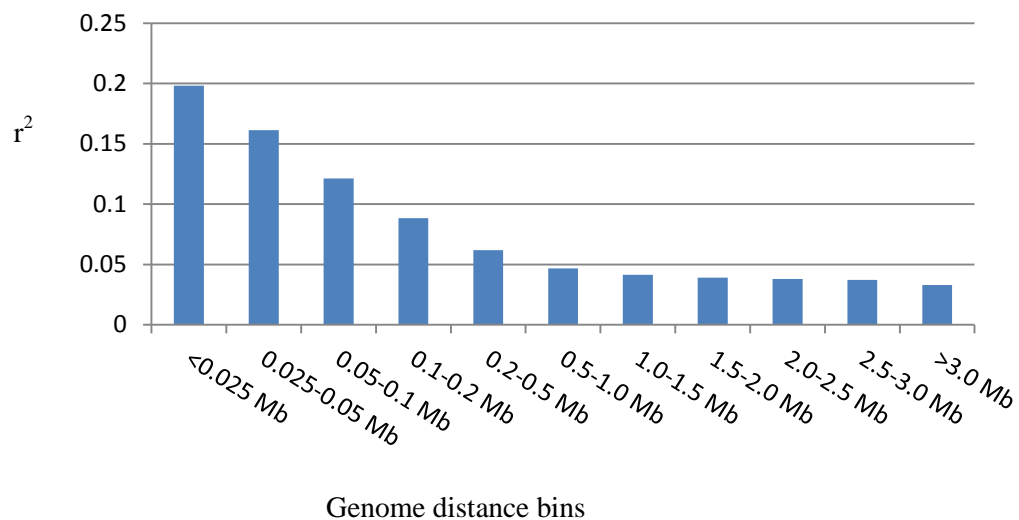
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Supplementary Figure S1: Histogram plots for the genome-wide *iHS* and *Rsb* values in autosomes (i) and BTA X (ii). (A) *iHS* values distribution in EASZ, (B) distribution of *Rsb* values between EASZ and all the reference populations combined (Holstein-Friesian, Jersey, N'Dama and Nellore).



Supplementary Figure S2: Mean r^2 values over increasing distances across EASZ autosomes. Values averaged across all the autosomes for each bin size.



Supplementary Table S1: Candidate regions identified by pairwise - combined reference *Rsb* analyses and pairwise F_{ST} analyses. *Only a single SNP above significant threshold.

| <i>Rsb</i> | EASZ vs European taurine | EASZ vs N'Dama | EASZ vs Nellore | EASZ vs combined references |
|-----------------------|----------------------------------|---------------------------|-------------------------|-----------------------------|
| BTA | Chromosomal position (bp) | | | |
| 3 | – | – | – | 101,942,771 |
| 5 | – | – | – | 57,138,952 |
| 5 | – | 60,513,092 | – | 60,556,520 |
| 5 | – | 113,737,833 | – | – |
| 11 | 62,629,106 | 62,629,106* | – | 62,629,106 |
| 12 | 27,181,474 | – | – | 27,181,474 |
| 12 | 29,217,254* | 29,217,254 | – | 29,217,254 |
| 12 | 35,740,174* | – | – | 35,740,174 |
| 18 | – | 13,238,432 | – | – |
| 19 | 42,252,751* | – | – | 42,696,851 |
| <i>F_{ST}</i> | | | | |
| BTA | Chromosomal position (bp) | | | |
| 2 | – | 125,585,810 - 126,058,677 | – | – |
| 4 | – | – | 47,195,467 - 47,539,595 | – |
| 4 | 51,927,595 - 52,308,430 | – | – | – |
| 7 | 52,224,595 - 52,720,797 | 52,224,595 - 52,720,797 | – | – |
| 13 | 46,433,697 - 46,723,493 | 46,433,697 - 46,723,493 | – | – |
| 13 | 57,848,276 - 58,207,174 | – | – | – |
| 14 | 24,482,969-25,254,540 | – | – | – |
| 19 | – | 27,369,763 - 27,763,447 | – | – |
| 22 | – | – | 2,314,019 - 2,788,566 | – |
| 24 | – | – | 4,118,163 - 4,474,760 | – |
| X | – | – | 8,582,093 - 9,248,137 | – |
| X | 40,319,976 - 43,999,854 | 39,942,044 - 42,024,368 | – | – |
| X | 84,566,018 - 85,993,719 | 84,566,018 - 85,993,719 | – | – |

Supplementary Table S3: Bovine QTL (<http://www.animalgenome.org/cgi-bin/QTLdb/BT/index>) mapped within the candidate genome region intervals.

| BTA | Candidate region intervals (bp) | start | stop | QTL_ID |
|------------|--|--------------|-------------|--|
| 2 | 125,585,810 – 126,058,677 | 51,253,890 | 127,591,834 | Non-return rate (direct) QTL (5660) |
| 2 | 125,585,810 – 126,058,677 | 73,959,847 | 135,660,955 | Non-return rate (direct) QTL (5661) |
| 2 | 125,585,810 – 126,058,677 | 73,959,847 | 135,660,955 | Non-return rate (direct) QTL (5662) |
| 2 | 125,585,810 – 126,058,677 | 73,959,847 | 135,660,955 | Palmitoleic acid content QTL (5812) |
| 2 | 125,585,810 – 126,058,677 | 2,103,896 | 137,060,424 | Milk fat yield (EBV) QTL (9943) |
| 2 | 125,585,810 – 126,058,677 | 2,103,896 | 137,060,424 | Udder depth (EBV) QTL (9944) |
| 2 | 125,585,810 – 126,058,677 | 96,411,700 | 127,591,834 | Omega-6 to omega-3 fatty acid ratio QTL (12229) |
| 2 | 125,585,810 – 126,058,677 | 82,849,969 | 134,920,734 | Body weight (birth) QTL (10670) |
| 2 | 125,585,810 – 126,058,677 | 125,343,403 | 137,060,424 | Marbling score QTL (11725) |
| 3 | 101,442,771 – 102,442,771 | 21,660,304 | 118,796,463 | Marbling score QTL (2541) |
| 3 | 101,442,771 – 102,442,771 | 37,279,800 | 115,828,702 | Milk fat yield (daughter deviation) QTL (10129) |
| 3 | 101,442,771 – 102,442,771 | 55,322,837 | 103,441,049 | Milk fat yield (daughter deviation) QTL (10132) |
| 3 | 101,442,771 – 102,442,771 | 67,306,862 | 117,267,147 | Milk fat yield (daughter deviation) QTL (10133) |
| 3 | 101,442,771 – 102,442,771 | 79,641,494 | 105,090,465 | Marbling score QTL (20402) |
| 3 | 101,442,771 – 102,442,771 | 83,411,768 | 111,164,953 | Clinical mastitis QTL (2489) |
| 3 | 101,442,771 – 102,442,771 | 84,331,413 | 108,027,796 | Calf size (maternal) QTL (15171) |
| 3 | 101,442,771 – 102,442,771 | 84,331,413 | 108,027,796 | Calving index QTL (15172) |
| 3 | 101,442,771 – 102,442,771 | 84,331,413 | 108,027,796 | Calving ease (maternal) QTL (15173) |
| 3 | 101,442,771 – 102,442,771 | 84,331,413 | 108,027,796 | Stillbirth (maternal) QTL (15174) |
| 3 | 101,442,771 – 102,442,771 | 84,686,230 | 117,703,245 | Fat thickness at the 12th rib QTL (20279) |
| 3 | 101,442,771 – 102,442,771 | 84,686,230 | 117,703,245 | Marbling score QTL (20300) |
| 3 | 101,442,771 – 102,442,771 | 84,686,230 | 117,703,245 | Marbling score QTL (20318) |
| 3 | 101,442,771 – 102,442,771 | 88,443,339 | 110,778,079 | Carcass weight QTL (10699) |
| 3 | 101,442,771 – 102,442,771 | 96,063,748 | 111,164,953 | Stillbirth (direct) QTL (4654) |
| 3 | 101,442,771 – 102,442,771 | 96,063,748 | 111,164,953 | Milk yield QTL (4711) |
| 3 | 101,442,771 – 102,442,771 | 96,063,748 | 115,768,210 | Marbling score (EBV) QTL (10700) |
| 3 | 101,442,771 – 102,442,771 | 96,063,748 | 111,164,953 | Structural soundness (legs, feet, penis, and prepuce) QTL (3581) |
| 3 | 101,442,771 – 102,442,771 | 96,255,541 | 121,430,405 | Shear force QTL (19844) |
| 4 | 47,195,467 - 47,539,595 | 25,964,437 | 54,969,795 | Residual feed intake QTL (5270) |
| 4 | 47,195,467 - 47,539,595 | 23,856,046 | 56,586,290 | Somatic cell score QTL (2730) |
| 4 | 47,195,467 - 47,539,595 | 23,856,046 | 56,586,290 | Somatic cell score QTL (2766) |
| 4 | 47,195,467 - 47,539,595 | 12,892,821 | 115,051,183 | Marbling score QTL (10013) |
| 4 | 47,195,467 - 47,539,595 | 47,084,697 | 49,500,208 | Somatic Cell Count QTL (1501) |
| 4 | 47,195,467 - 47,539,595 | 30,255,862 | 59,632,835 | Height (yearling) QTL (10709) |
| 4 | 47,195,467 - 47,539,595 | 30,255,862 | 63,721,548 | Body weight (weaning) QTL (10708) |

| | | | | |
|---|-------------------------|------------|-------------|--|
| 4 | 47,195,467 - 47,539,595 | 30,255,862 | 59,632,835 | Marbling score (EBV) QTL (10707) |
| 4 | 47,195,467 - 47,539,595 | 30,255,862 | 49,398,182 | Scrotal circumference QTL (10706) |
| 4 | 47,195,467 - 47,539,595 | 35,646,555 | 54,801,579 | Fat thickness at the 12th rib QTL (20446) |
| 4 | 47,195,467 - 47,539,595 | 30,255,862 | 59,632,835 | Height (mature) QTL (10712) |
| 4 | 47,195,467 - 47,539,595 | 35,299,668 | 92,132,307 | Social separation--Vocalization QTL (7129) |
| 4 | 47,195,467 - 47,539,595 | 35,299,668 | 92,132,307 | Social separation--Standing alert QTL (7130) |
| 4 | 51,927,595 - 52,308,430 | 12,892,821 | 115,051,183 | Marbling score QTL (10013) |
| 4 | 51,927,595 - 52,308,430 | 23,856,046 | 56,586,290 | Somatic cell score QTL (2730) |
| 4 | 51,927,595 - 52,308,430 | 23,856,046 | 56,586,290 | Somatic cell score QTL (2766) |
| 4 | 51,927,595 - 52,308,430 | 25,964,437 | 54,969,795 | Residual feed intake QTL (5270) |
| 4 | 51,927,595 - 52,308,430 | 30,255,862 | 59,632,835 | Height (yearling) QTL (10709) |
| 4 | 51,927,595 - 52,308,430 | 30,255,862 | 63,721,548 | Body weight (weaning) QTL (10708) |
| 4 | 51,927,595 - 52,308,430 | 30,255,862 | 59,632,835 | Marbling score (EBV) QTL (10707) |
| 4 | 51,927,595 - 52,308,430 | 30,255,862 | 59,632,835 | Height (mature) QTL (10712) |
| 4 | 51,927,595 - 52,308,430 | 35,299,668 | 92,132,307 | Social separation--Vocalization QTL (7129) |
| 4 | 51,927,595 - 52,308,430 | 35,299,668 | 92,132,307 | Social separation--Standing alert QTL (7130) |
| 4 | 51,927,595 - 52,308,430 | 35,646,555 | 54,801,579 | Fat thickness at the 12th rib QTL (20446) |
| 4 | 51,927,595 - 52,308,430 | 49,398,182 | 59,632,835 | Weaning weight-maternal milk QTL (10711) |
| 4 | 51,927,595 - 52,308,430 | 49,398,182 | 59,632,835 | Body weight (yearling) QTL (10710) |
| 4 | 51,927,595 - 52,308,430 | 52,116,252 | 52,320,303 | Dystocia (maternal) QTL (11381) |
| 5 | 57,477,594 - 58,477,594 | 5,927,562 | 99,524,939 | Milk fat percentage QTL (10437) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 7,317,256 | 97,020,144 | Milk yield QTL (10435) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 8,620,095 | 100,219,786 | Milk protein yield QTL (10436) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 11,664,869 | 85,115,661 | Tick resistance QTL (9915) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 12,101,640 | 108,852,142 | Milk yield (daughter deviation) QTL (9996) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 22,273,823 | 86,873,871 | Milk fat yield QTL (4976) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 25,178,267 | 75,732,931 | Milk protein percentage QTL (10438) |

| | | | | |
|---|-------------------------|------------|-------------|--|
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 26,774,010 | 118,456,816 | Milk yield (daughter deviation) QTL (9993) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 27,207,739 | 62,710,618 | Fat thickness at the 12th rib QTL (1362) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 30,997,860 | 59,644,648 | Body weight (birth) QTL (1301) |
| 5 | 57,477,594 - 58,477,594 | 30,997,860 | 59,644,648 | Body weight (yearling) QTL (1305) |
| 5 | 57,477,594 - 58,477,594 | 32,294,618 | 75,241,567 | FSH at castration QTL (1376) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 35,290,906 | 71,735,471 | Twinning QTL (7047) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 35,290,906 | 71,735,471 | Twinning QTL (7050) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 35,681,758 | 73,557,532 | Pre-weaning average daily gain QTL (1292) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 35,681,758 | 73,557,532 | Average Daily Gain QTL (1293) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 35,681,758 | 73,557,532 | Body weight (birth) QTL (1296) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 35,681,758 | 73,557,532 | Pre-weaning average daily gain QTL (1297) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 41,884,557 | 73,188,190 | Somatic cell score QTL (2659) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 42,953,682 | 86,569,875 | Milk fat yield QTL (4495) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 42,953,682 | 86,569,875 | Tenderness score QTL (1365) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 43,814,251 | 58,984,543 | Fat percentage QTL (4904) |
| 5 | 57,477,594 - 58,477,594 | 44,415,750 | 73,431,387 | Gestation length QTL (15415) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 44,415,750 | 73,431,387 | Gestation length QTL (15416) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 46,253,823 | 58,758,718 | Milk yield QTL (2429) |
| 5 | 57,477,594 - 58,477,594 | 46,493,545 | 116,834,572 | Rump length QTL (3422) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 48,200,919 | 63,510,004 | Abomasum displacement QTL (5117) |
| | 60,056,520 - 61,056,520 | | | |

| | | | | |
|---|-------------------------|------------|-------------|--|
| 5 | 57,477,594 - 58,477,594 | 49,633,681 | 85,840,285 | Yield grade QTL (1363) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 49,633,681 | 73,066,592 | Marbling score QTL (4903) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 52,239,358 | 62,710,618 | Milk fat yield (daughter deviation) QTL (9997) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 52,387,013 | 62,015,771 | Fat thickness at the 12th rib QTL (10731) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 52,387,013 | 62,015,771 | Calving ease (maternal) QTL (10732) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 53,296,546 | 62,015,771 | Twinning QTL (1761) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 53,296,546 | 59,644,648 | Average Daily Gain QTL (3406) |
| 5 | 57,477,594 - 58,477,594 | 53,296,546 | 59,644,648 | Subcutaneous fat thickness (EBV) QTL (3543) |
| 5 | 57,477,594 - 58,477,594 | 53,296,546 | 62,015,771 | Twinning QTL (1758) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 53,991,393 | 114,201,018 | Rump width QTL (3424) |
| | 60,056,520 - 61,056,520 | | | |
| | 75,786,670 - 76,786,670 | | | |
| 5 | 57,477,594 - 58,477,594 | 56,657,827 | 63,735,518 | Udder height QTL (4625) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 56,657,827 | 63,735,518 | Udder height QTL (10362) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 57,477,594 - 58,477,594 | 56,657,827 | 62,015,771 | Average Daily Gain QTL (1290) |
| | 60,056,520 - 61,056,520 | | | |
| 5 | 60,056,520 - 61,056,520 | 59,644,648 | 62,580,334 | Coat colour QTL (9929) |
| 5 | 60,056,520 - 61,056,520 | 59,644,648 | 62,580,334 | Coat colour QTL (9930) |
| 5 | 60,056,520 - 61,056,520 | 59,644,648 | 62,580,334 | Coat colour QTL (9931) |
| 5 | 60,056,520 - 61,056,520 | 59,644,648 | 62,580,334 | Coat colour QTL (9935) |
| 5 | 60,056,520 - 61,056,520 | 59,644,648 | 63,735,518 | Pre-weaning average daily gain QTL (3400) |
| 5 | 60,056,520 - 61,056,520 | 59,644,648 | 73,188,190 | Milk protein yield QTL (2608) |
| 5 | 75,786,670 - 76,786,670 | 61,772,886 | 95,093,401 | Tick resistance QTL (12220) |
| 5 | 75,786,670 - 76,786,670 | 63,144,443 | 97,714,992 | trans-Vaccenic acid content QTL (12231) |
| 5 | 75,786,670 - 76,786,670 | 63,735,518 | 97,454,424 | Stature QTL (4622) |
| 5 | 75,786,670 - 76,786,670 | 63,735,518 | 97,454,424 | Udder depth QTL (4624) |
| 5 | 75,786,670 - 76,786,670 | 63,735,518 | 97,454,424 | Body weight (birth) QTL (4627) |
| 5 | 75,786,670 - 76,786,670 | 63,735,518 | 97,454,424 | Body size QTL (4686) |
| 5 | 75,786,670 - 76,786,670 | 63,735,518 | 97,454,424 | Milk protein percentage QTL (10363) |
| 5 | 75,786,670 - 76,786,670 | 65,641,165 | 97,541,280 | Abomasum displacement QTL (5118) |
| 5 | 75,786,670 - 76,786,670 | 67,812,562 | 115,888,064 | Ovulation rate QTL (10570) |
| 5 | 75,786,670 - 76,786,670 | 71,561,759 | 86,569,875 | Twinning QTL (1759) |

| | | | | |
|----|-------------------------|------------|-------------|--|
| 5 | 75,786,670 - 76,786,670 | 71,561,759 | 97,454,424 | Height (mature) QTL (10738) |
| 5 | 75,786,670 - 76,786,670 | 73,188,190 | 114,885,247 | Milk yield QTL (2585) |
| 5 | 75,786,670 - 76,786,670 | 73,188,190 | 105,445,076 | Milk fat yield QTL (2718) |
| 5 | 75,786,670 - 76,786,670 | 73,192,533 | 86,569,875 | Milk fat percentage QTL (2658) |
| 5 | 75,786,670 - 76,786,670 | 73,557,532 | 86,569,875 | Body weight (birth) QTL (2761) |
| 5 | 75,786,670 - 76,786,670 | 75,163,397 | 86,569,875 | Longissimus muscle area QTL (10735) |
| 5 | 75,786,670 - 76,786,670 | 75,163,397 | 86,569,875 | Marbling score (EBV) QTL (10734) |
| 5 | 75,786,670 - 76,786,670 | 75,163,397 | 86,569,875 | Milk yield QTL (3602) |
| 5 | 75,786,670 - 76,786,670 | 75,163,397 | 86,569,875 | Body weight (yearling) QTL (10737) |
| 5 | 75,786,670 - 76,786,670 | 75,163,397 | 86,569,875 | Height (yearling) QTL (10736) |
| 7 | 52,224,595 - 52,720,797 | 2,714,203 | 96,212,959 | Tick resistance QTL (9916) |
| 7 | 52,224,595 - 52,720,797 | 7,241,454 | 100,015,412 | Heel depth QTL (3449) |
| 7 | 52,224,595 - 52,720,797 | 15,147,765 | 57,946,871 | Fat thickness at the 12th rib QTL (1327) |
| 7 | 52,224,595 - 52,720,797 | 18,521,635 | 57,946,871 | Sperm motility QTL (9927) |
| 7 | 52,224,595 - 52,720,797 | 18,844,180 | 73,909,970 | Social separation--Vocalization QTL (7132) |
| 7 | 52,224,595 - 52,720,797 | 34,660,867 | 102,419,615 | Milk fat percentage QTL (3434) |
| 7 | 52,224,595 - 52,720,797 | 34,768,382 | 64,188,689 | Stillbirth (direct) QTL (4656) |
| 7 | 52,224,595 - 52,720,797 | 38,033,808 | 106,050,091 | Milking speed QTL (10290) |
| 7 | 52,224,595 - 52,720,797 | 38,033,808 | 106,050,091 | Milk yield QTL (10291) |
| 7 | 52,224,595 - 52,720,797 | 38,332,974 | 59,135,155 | Stillbirth (maternal) QTL (11351) |
| 7 | 52,224,595 - 52,720,797 | 42,696,356 | 64,188,689 | Somatic cell score QTL (2667) |
| 7 | 52,224,595 - 52,720,797 | 49,887,745 | 80,525,232 | Longissimus muscle area QTL (10798) |
| 7 | 52,224,595 - 52,720,797 | 49,887,745 | 64,188,689 | Weaning weight-maternal milk QTL (10797) |
| 7 | 52,224,595 - 52,720,797 | 49,887,745 | 64,188,689 | Body weight (yearling) QTL (10796) |
| 7 | 52,224,595 - 52,720,797 | 38,332,974 | 59,135,155 | PCVF minus PCVM QTL (10516) |
| 7 | 52,224,595 - 52,720,797 | 38,332,974 | 59,135,155 | Body weight (mean) QTL (10517) |
| 7 | 52,224,595 - 52,720,797 | 38,332,974 | 59,135,155 | Percentage decrease in body weight up to day 150 after challenge QTL (10518) |
| 7 | 52,224,595 - 52,720,797 | 38,332,974 | 59,135,155 | Parasites natural logarithm of mean number QTL (10519) |
| 7 | 52,224,595 - 52,720,797 | 38,332,974 | 59,135,155 | Parasite detection rate QTL (10520) |
| 7 | 52,224,595 - 52,720,797 | 49,887,745 | 64,188,689 | Calving ease (maternal) QTL (10795) |
| 11 | 62,129,106 - 63,129,106 | 18,498,474 | 79,363,073 | Yield grade QTL (1330) |
| 11 | 62,129,106 - 63,129,106 | 18,579,771 | 99,948,793 | Rump angle QTL (3447) |
| 11 | 62,129,106 - 63,129,106 | 32,626,704 | 85,588,124 | Kidney, pelvic, and heart fat percentage QTL (15732) |
| 11 | 62,129,106 - 63,129,106 | 38,027,643 | 84,124,853 | Milk protein percentage QTL (1511) |
| 11 | 62,129,106 - 63,129,106 | 38,027,643 | 84,124,853 | Milk yield QTL (1512) |
| 11 | 62,129,106 - 63,129,106 | 42,031,547 | 63,697,544 | Body weight (weaning) QTL (10898) |

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| 11 | 62,129,106 - 63,129,106 | 44,688,479 | 76,897,486 | Social separation--Standing alert QTL (7138) |
| 11 | 62,129,106 - 63,129,106 | 44,688,479 | 84,124,853 | Retail product yield QTL (7096) |
| 11 | 62,129,106 - 63,129,106 | 46,591,394 | 73,178,408 | Dystocia (maternal) QTL (11384) |
| 11 | 62,129,106 - 63,129,106 | 46,591,394 | 63,697,544 | Body weight (birth) QTL (10900) |
| 11 | 62,129,106 - 63,129,106 | 46,591,394 | 63,697,544 | Weaning weight-maternal milk QTL (10899) |
| 11 | 62,129,106 - 63,129,106 | 46,591,394 | 85,588,124 | Body weight (weaning) QTL (15731) |
| 11 | 62,129,106 - 63,129,106 | 60,378,600 | 99,073,352 | Immunoglobulin G level QTL (5376) |
| 12 | 26,681,474 - 27,681,474 | 2,999,557 | 31,087,923 | Milk protein yield QTL (4499) |
| | 28,717,254 - 29,717,254 | | | |
| 12 | 26,681,474 - 27,681,474 | 2,999,557 | 31,087,923 | Milk fat yield QTL (4500) |
| | 28,717,254 - 29,717,254 | | | |
| 12 | 26,681,474 - 27,681,474 | 9,023,349 | 27,651,342 | Angularity QTL (4694) |
| 12 | 26,681,474 - 27,681,474 | 12,745,837 | 47,670,373 | Non-return rate (direct) QTL (5010) |
| | 28,717,254 - 29,717,254 | | | |
| | 35,240,174 - 36,240,174 | | | |
| 12 | 26,681,474 - 27,681,474 | 15,339,089 | 32,000,069 | Shear force QTL (20783) |
| | 28,717,254 - 29,717,254 | | | |
| | 35,240,174 - 36,240,174 | | | |
| 12 | 26,681,474 - 27,681,474 | 16,441,775 | 49,833,876 | Milk protein percentage QTL (2603) |
| | 28,717,254 - 29,717,254 | | | |
| | 35,240,174 - 36,240,174 | | | |
| 12 | 26,681,474 - 27,681,474 | 16,441,775 | 49,833,876 | Milk yield QTL (2587) |
| | 28,717,254 - 29,717,254 | | | |
| | 35,240,174 - 36,240,174 | | | |
| 12 | 26,681,474 - 27,681,474 | 16,441,775 | 31,087,923 | Abnormal odor intensity QTL (4831) |
| | 28,717,254 - 29,717,254 | | | |
| 12 | 26,681,474 - 27,681,474 | 16,441,775 | 49,833,876 | Milk protein yield QTL (2609) |
| | 28,717,254 - 29,717,254 | | | |
| | 35,240,174 - 36,240,174 | | | |
| 12 | 26,681,474 - 27,681,474 | 16,441,775 | 54,026,339 | Milk fat yield QTL (2599) |
| | 28,717,254 - 29,717,254 | | | |
| | 35,240,174 - 36,240,174 | | | |
| 12 | 26,681,474 - 27,681,474 | 21,229,370 | 27,651,342 | Fat thickness at the 12th rib QTL (10920) |
| 12 | 26,681,474 - 27,681,474 | 23,094,023 | 31,445,158 | Calf size (direct) QTL (15186) |
| | 28,717,254 - 29,717,254 | | | |
| 12 | 26,681,474 - 27,681,474 | 23,094,023 | 31,445,158 | Birth index QTL (15187) |
| | 28,717,254 - 29,717,254 | | | |
| 12 | 26,681,474 - 27,681,474 | 23,094,023 | 31,445,158 | Calf size (direct) QTL (15188) |
| | 28,717,254 - 29,717,254 | | | |
| 12 | 26,681,474 - 27,681,474 | 23,094,023 | 31,445,158 | Calving ease (direct) QTL (15189) |

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| | 28,717,254 - 29,717,254 | | | |
| 12 | 26,681,474 - 27,681,474 | 27,037,863 | 27,199,305 | Male Fertility QTL (15803) |
| 12 | 35,240,174 - 36,240,174 | 31,087,923 | 49,833,876 | 305 days milk yield QTL (4498) |
| 12 | 35,240,174 - 36,240,174 | 31,257,437 | 54,373,225 | Retail product yield QTL (1331) |
| 13 | 46,433,697-46,723,493 | 3,278,794 | 77,335,394 | Heat intensity QTL (3569) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 13,611,156 | 49,635,934 | Bovine spongiform encephalopathy QTL (1741) |
| 13 | 46,433,697-46,723,493 | 16,770,494 | 84,240,350 | Teat length QTL (1386) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 26,473,687 | 71,827,292 | Palmitic acid content QTL (12171) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 28,793,139 | 84,240,350 | Marbling score (EBV) QTL (10941) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 28,793,139 | 84,240,350 | Longissimus muscle area QTL (10942) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 29,549,346 | 84,240,350 | Dystocia (maternal) QTL (11385) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 30,594,768 | 84,240,350 | Rump angle QTL (3429) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 31,016,032 | 75,141,551 | Milk fat yield QTL (2555) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 35,533,824 | 84,240,350 | Weaning weight-maternal milk QTL (10944) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 35,533,824 | 84,240,350 | Fat thickness at the 12th rib QTL (10943) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 39,345,372 | 49,635,934 | Arachidonic acid content QTL (12248) |
| 13 | 46,433,697-46,723,493 | 39,501,717 | 71,509,042 | Feed conversion ratio QTL (5287) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 29,549,346 | 71,827,292 | Percentage decrease in PCV up to day 150 after challenge QTL (10524) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 29,549,346 | 71,827,292 | Percentage decrease in PCV up to day 100 after challenge QTL (10525) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 29,549,346 | 71,827,292 | Parasite detection rate QTL (10526) |
| | 57,848,276-58,207,174 | | | |
| 13 | 46,433,697-46,723,493 | 45,996,636 | 57,080,810 | Foot angle QTL (1583) |
| 13 | 57,848,276-58,207,174 | 49,602,434 | 84,240,350 | Residual feed intake QTL (5286) |
| 13 | 57,848,276-58,207,174 | 57,858,023 | 84,240,350 | Residual feed intake QTL (5285) |
| 13 | 57,848,276-58,207,174 | 57,866,398 | 84,240,350 | Interval to first estrus after calving QTL (14769) |

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| 13 | 57,848,276-58,207,174 | 58,025,523 | 58,193,023 | Milk protein yield (daughter deviation) QTL (10156) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 81,189,386 | Milk protein yield QTL (10099) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 81,189,386 | Milk protein yield QTL (10100) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 81,189,386 | Milk protein yield QTL (10101) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 25,448,723 | Milk fat yield QTL (3408) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 84,648,390 | Milk protein percentage QTL (3413) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 28,217,347 | Milk yield QTL (3512) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 28,217,347 | Milk fat yield QTL (3513) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 28,217,347 | Milk protein yield QTL (3514) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 28,217,347 | Milk fat percentage QTL (3515) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 28,217,347 | Milk protein percentage QTL (3516) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 28,217,347 | Somatic cell score QTL (3517) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 28,217,347 | Calving ease (direct) QTL (3518) |
| 14 | 24,482,969-25,254,540 | 1,641,277 | 28,217,347 | Somatic cell score QTL (3519) |
| 14 | 24,482,969-25,254,540 | 5,545,944 | 77,366,190 | Tick resistance QTL (9917) |
| 14 | 24,482,969-25,254,540 | 5,565,085 | 28,658,498 | Abnormal flavor intensity QTL (4833) |
| 14 | 24,482,969-25,254,540 | 6,311,565 | 71,762,521 | Body weight (birth) QTL (5375) |
| 14 | 24,482,969-25,254,540 | 6,311,565 | 30,372,479 | Gestation length QTL (5374) |
| 14 | 24,482,969-25,254,540 | 9,479,131 | 44,651,695 | Clinical mastitis QTL (3177) |
| 14 | 24,482,969-25,254,540 | 9,479,131 | 44,651,695 | Milk protein percentage QTL (2604) |
| 14 | 24,482,969-25,254,540 | 9,884,020 | 25,219,037 | Body weight (birth) QTL (2627) |
| 14 | 24,482,969-25,254,540 | 10,808,022 | 25,219,037 | Average Daily Gain QTL (1734) |
| 14 | 24,482,969-25,254,540 | 10,808,022 | 28,658,498 | Carcass weight QTL (10960) |
| 14 | 24,482,969-25,254,540 | 13,394,919 | 35,992,517 | Milk fat percentage QTL (2732) |
| 14 | 24,482,969-25,254,540 | 13,394,919 | 35,992,517 | Milk fat yield QTL (2733) |
| 14 | 24,482,969-25,254,540 | 13,394,919 | 35,992,517 | Somatic cell score QTL (2734) |
| 14 | 24,482,969-25,254,540 | 13,394,919 | 35,992,517 | Somatic cell score QTL (2776) |
| 14 | 24,482,969-25,254,540 | 19,181,313 | 32,900,595 | Calving ease (direct) QTL (15039) |
| 14 | 24,482,969-25,254,540 | 19,181,313 | 32,900,595 | Stillbirth (direct) QTL (15040) |
| 14 | 24,482,969-25,254,540 | 19,204,282 | 28,658,498 | Calving ease (maternal) QTL (10959) |
| 14 | 24,482,969-25,254,540 | 19,204,282 | 42,398,519 | Longissimus muscle area QTL (10964) |
| 14 | 24,482,969-25,254,540 | 19,204,282 | 42,398,519 | Height (mature) QTL (10962) |
| 14 | 24,482,969-25,254,540 | 19,204,282 | 28,658,498 | Fat thickness at the 12th rib QTL (10961) |
| 14 | 24,482,969-25,254,540 | 24,387,174 | 24,540,298 | Milk fat yield (EBV) QTL (6210) |
| 14 | 24,482,969-25,254,540 | 25,219,037 | 29,795,454 | Body weight (mean) QTL (1731) |
| 14 | 24,482,969-25,254,540 | 25,219,037 | 84,648,390 | Stature QTL (4613) |
| 14 | 24,482,969-25,254,540 | 25,219,037 | 30,870,876 | Carcass weight QTL (1375) |

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| 14 | 24,482,969-25,254,540 | 25,219,037 | 29,928,419 | Milk fat yield QTL (2676) |
| 14 | 24,482,969-25,254,540 | 25,219,037 | 29,928,419 | Rump angle QTL (1592) |
| 14 | 24,482,969-25,254,540 | 25,219,037 | 35,530,275 | Pre-weaning average daily gain QTL (2630) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Calf size (direct) QTL (4668) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Udder attachment QTL (10310) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Somatic cell score QTL (10311) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Udder height QTL (10312) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Somatic cell score QTL (10313) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Udder depth QTL (10314) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Udder height QTL (10315) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Udder attachment QTL (10316) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Udder attachment QTL (10317) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Udder height QTL (10318) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Teat placement QTL (10319) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Interval to first estrus after calving QTL (10320) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Non-return rate (direct) QTL (10321) |
| 19 | 27,369,763 - 27,763,447 | 11,888,837 | 29,996,875 | Udder depth QTL (10371) |
| 19 | 27,369,763 - 27,763,447 | 26,135,066 | 29,996,875 | Subcutaneous fat thickness (EBV) QTL (3548) |
| 19 | 27,369,763 - 27,763,447 | 23,777,982 | 50,192,247 | Gastrointestinal nematode burden QTL (12020) |
| 19 | 27,369,763 - 27,763,447 | 21,313,849 | 49,844,055 | Residual feed intake QTL (5297) |
| 19 | 27,369,763 - 27,763,447 | 10,849,616 | 39,488,788 | Milk fat yield QTL (10443) |
| 19 | 27,369,763 - 27,763,447 | 27,342,491 | 31,724,547 | Longissimus muscle area QTL (1395) |
| 19 | 27,369,763 - 27,763,447 | 6,444,969 | 60,977,344 | Somatic cell score QTL (10446) |
| 19 | 27,369,763 - 27,763,447 | 23,777,982 | 39,970,901 | Somatic cell score QTL (3624) |
| 19 | 27,369,763 - 27,763,447 | 15,216,102 | 57,001,967 | Milk trans-vaccenic acid percentage QTL (10029) |
| 19 | 27,369,763 - 27,763,447 | 15,216,102 | 62,102,274 | Milk conjugated linoleic acid percentage QTL (10031) |
| 19 | 27,369,763 - 27,763,447 | 27,072,508 | 45,248,309 | Social separation--Walking/running QTL (7143) |
| 19 | 27,369,763 - 27,763,447 | 27,072,508 | 45,248,309 | Body weight (weaning) QTL (11079) |
| 19 | 27,369,763 - 27,763,447 | 27,072,508 | 35,819,907 | Scrotal circumference QTL (11078) |
| 19 | 27,369,763 - 27,763,447 | 23,777,982 | 39,970,901 | Milk fat yield QTL (3625) |
| 19 | 27,369,763 - 27,763,447 | 5,534,311 | 58,383,029 | Milk fat percentage QTL (10444) |
| 19 | 27,369,763 - 27,763,447 | 23,777,982 | 39,970,901 | Milk fat yield QTL (3626) |
| 19 | 27,369,763 - 27,763,447 | 6,444,969 | 59,209,597 | Milk protein percentage QTL (10445) |
| 19 | 27,369,763 - 27,763,447 | 22,706,620 | 38,422,165 | Palmitoleic acid content QTL (12174) |
| 19 | 27,369,763 - 27,763,447 | 11,867,410 | 51,343,961 | Oleic acid content QTL (10021) |
| 19 | 27,369,763 - 27,763,447 | 26,906,447 | 57,001,967 | Milk oleic acid percentage QTL (10028) |

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| 19 | 27,369,763 - 27,763,447 | 9,189,005 | 57,001,967 | Milk stearic acid percentage QTL (10027) |
| 19 | 42,196,815 - 43,196,815 | 5,534,311 | 58,383,029 | Milk fat percentage QTL (10444) |
| 19 | 42,196,815 - 43,196,815 | 6,444,969 | 60,977,344 | Somatic cell score QTL (10446) |
| 19 | 42,196,815 - 43,196,815 | 6,444,969 | 59,209,597 | Milk protein percentage QTL (10445) |
| 19 | 42,196,815 - 43,196,815 | 9,189,005 | 57,001,967 | Milk stearic acid percentage QTL (10027) |
| 19 | 42,196,815 - 43,196,815 | 11,867,410 | 51,343,961 | Oleic acid content QTL (10021) |
| 19 | 42,196,815 - 43,196,815 | 15,216,102 | 57,001,967 | Milk trans-vaccenic acid percentage QTL (10029) |
| 19 | 42,196,815 - 43,196,815 | 15,216,102 | 62,102,274 | Milk conjugated linoleic acid percentage QTL (10031) |
| 19 | 42,196,815 - 43,196,815 | 21,313,849 | 49,844,055 | Residual feed intake QTL (5297) |
| 19 | 42,196,815 - 43,196,815 | 23,777,982 | 50,192,247 | Gastrointestinal nematode burden QTL (12020) |
| 19 | 42,196,815 - 43,196,815 | 26,906,447 | 57,001,967 | Milk oleic acid percentage QTL (10028) |
| 19 | 42,196,815 - 43,196,815 | 27,072,508 | 45,248,309 | Social separation--Walking/running QTL (7143) |
| 19 | 42,196,815 - 43,196,815 | 27,072,508 | 45,248,309 | Body weight (weaning) QTL (11079) |
| 19 | 42,196,815 - 43,196,815 | 31,060,180 | 54,264,618 | Ovulation rate QTL (10573) |
| 19 | 42,196,815 - 43,196,815 | 31,183,387 | 51,467,168 | Calving ease (maternal) QTL (15205) |
| 19 | 42,196,815 - 43,196,815 | 31,183,387 | 51,467,168 | Calving index QTL (15206) |
| 19 | 42,196,815 - 43,196,815 | 31,183,387 | 51,467,168 | Calf size (direct) QTL (15207) |
| 19 | 42,196,815 - 43,196,815 | 31,183,387 | 51,467,168 | Calf size (direct) QTL (15208) |
| 19 | 42,196,815 - 43,196,815 | 31,183,387 | 51,467,168 | Calving ease (direct) QTL (15209) |
| 19 | 42,196,815 - 43,196,815 | 32,260,228 | 51,343,961 | Milk myristic acid percentage QTL (10026) |
| 19 | 42,196,815 - 43,196,815 | 32,260,228 | 57,001,967 | Milk linoleic acid percentage QTL (10030) |
| 19 | 42,196,815 - 43,196,815 | 38,315,029 | 51,343,961 | Milk caproic acid percentage QTL (10022) |
| 19 | 42,196,815 - 43,196,815 | 38,422,165 | 45,248,309 | Marbling score (EBV) QTL (11080) |
| 19 | 42,196,815 - 43,196,815 | 38,422,165 | 55,709,981 | Body weight (mature) QTL (11083) |
| 19 | 42,196,815 - 43,196,815 | 38,422,165 | 45,248,309 | Calving ease (direct) QTL (11081) |
| 19 | 42,196,815 - 43,196,815 | 39,649,492 | 61,138,048 | Milk fat yield QTL (3409) |
| 23 | 27,781,915 - 28,781,915 | 1,522,506 | 39,294,063 | Dystocia (maternal) QTL (11390) |
| 23 | 27,781,915 - 28,781,915 | 5,100,918 | 32,912,086 | Percentage live sperm after thawing QTL (9918) |
| 23 | 27,781,915 - 28,781,915 | 5,413,088 | 36,225,861 | Milk fat yield QTL (10450) |
| 23 | 27,781,915 - 28,781,915 | 6,840,402 | 38,863,268 | Milk protein yield QTL (10451) |
| 23 | 27,781,915 - 28,781,915 | 8,026,650 | 38,863,268 | Milk yield QTL (10449) |
| 23 | 27,781,915 - 28,781,915 | 17,418,577 | 36,531,788 | Marbling score (EBV) QTL (11173) |
| 23 | 27,781,915 - 28,781,915 | 17,418,577 | 36,531,788 | Scrotal circumference QTL (11170) |
| 23 | 27,781,915 - 28,781,915 | 18,536,147 | 36,431,894 | Milking speed QTL (4644) |
| 23 | 27,781,915 - 28,781,915 | 18,536,147 | 39,616,944 | Milk yield QTL (3630) |
| 23 | 27,781,915 - 28,781,915 | 18,540,518 | 32,762,244 | Teat placement QTL (1635) |

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| 23 | 27,781,915 - 28,781,915 | 21,472,978 | 45,913,164 | Residual feed intake QTL (5303) |
| 23 | 27,781,915 - 28,781,915 | 22,859,015 | 36,531,788 | Fat thickness at the 12th rib QTL (11172) |
| 23 | 27,781,915 - 28,781,915 | 22,859,015 | 36,531,788 | Weaning weight-maternal milk QTL (11174) |
| 23 | 27,781,915 - 28,781,915 | 23,845,473 | 45,913,164 | Residual feed intake QTL (5304) |
| 23 | 27,781,915 - 28,781,915 | 25,051,306 | 39,294,063 | Stillbirth (maternal) QTL (11372) |
| 23 | 27,781,915 - 28,781,915 | 25,372,846 | 36,939,386 | Tick resistance QTL (12223) |
| 23 | 27,781,915 - 28,781,915 | 25,522,645 | 39,294,063 | Stillbirth (direct) QTL (11374) |
| 23 | 27,781,915 - 28,781,915 | 25,523,937 | 39,294,063 | Milk fat yield QTL (2567) |
| 23 | 27,781,915 - 28,781,915 | 27,482,198 | 36,531,788 | Veterinary treatments QTL (1415) |
| 23 | 27,781,915 - 28,781,915 | 27,946,418 | 39,294,063 | Udder depth QTL (1638) |
| 23 | 27,781,915 - 28,781,915 | 27,946,418 | 39,294,063 | Somatic cell score QTL (2688) |
| 23 | 27,781,915 - 28,781,915 | 28,164,937 | 28,289,806 | 305 days milk yield QTL (19988) |
| 23 | 27,781,915 - 28,781,915 | 28,164,937 | 28,289,806 | Milk fat percentage QTL (19989) |
| 23 | 27,781,915 - 28,781,915 | 28,164,937 | 28,289,806 | Milk protein percentage QTL (19990) |
| 23 | 27,781,915 - 28,781,915 | 28,164,937 | 28,289,806 | Somatic cell score QTL (19991) |
| 23 | 27,781,915 - 28,781,915 | 28,171,181 | 28,296,049 | Milk protein percentage QTL (19987) |
| 23 | 27,781,915 - 28,781,915 | 28,171,181 | 28,296,049 | Complement hemolytic activity QTL (19996) |
| 24 | 4,118,163 - 4,474,760 | 3,985,201 | 4,147,810 | Residual feed intake QTL (4394) |
| 24 | 4,118,163 - 4,474,760 | 3,985,201 | 4,147,810 | Residual feed intake QTL (4395) |
| 24 | 4,118,163 - 4,474,760 | 3,985,201 | 4,147,810 | Residual feed intake QTL (4470) |
| 24 | 4,118,163 - 4,474,760 | 4,431,563 | 4,594,171 | Inseminations per conception QTL (5019) |
| 24 | 4,118,163 - 4,474,760 | 4,431,563 | 4,594,171 | Milk fat percentage (EBV) QTL (11348) |
| 24 | 4,118,163 - 4,474,760 | 4,431,563 | 4,594,171 | Milk protein yield (EBV) QTL (11349) |
| 24 | 4,118,163 - 4,474,760 | 2,021,065 | 5,594,601 | Body weight (yearling) QTL (11184) |
| 24 | 4,118,163 - 4,474,760 | 2,021,065 | 5,594,601 | Marbling score (EBV) QTL (11183) |
| 24 | 4,118,163 - 4,474,760 | 2,021,065 | 12,586,644 | Longissimus muscle area QTL (11182) |
| 24 | 4,118,163 - 4,474,760 | 2,021,065 | 12,586,644 | Calving ease (maternal) QTL (11181) |
| 24 | 4,118,163 - 4,474,760 | 2,021,065 | 12,586,644 | Carcass weight QTL (11185) |
| 29 | 1,398,171 - 2,398,171 | 1,568,804 | 9,742,398 | Milk fat yield QTL (2692) |
| 29 | 1,398,171 - 2,398,171 | 1,568,804 | 25,983,377 | BWF scaled by BWI QTL (10559) |
| 29 | 1,398,171 - 2,398,171 | 1,568,804 | 25,983,377 | Parasites natural logarithm of mean number QTL (10560) |
| X | 39,942,044 - 42,024,368 | 35,316,579 | 52,665,694 | Milking speed (EBV) QTL (10456) |
| X | 8,582,093 - 9,248,137 | 7,735,326 | 12,629,028 | Dystocia (maternal) QTL (2713) |
| X | 8,582,093 - 9,248,137 | 7,735,326 | 12,629,028 | Stillbirth (maternal) QTL (2714) |
| X | 8,582,093 - 9,248,137 | 7,735,326 | 12,629,028 | Non-return rate (maternal) QTL (2715) |
| X | 8,582,093 - 9,248,137 | 7,735,326 | 12,629,028 | Milk fat yield (EBV) QTL (10455) |

| | | | | |
|---|-----------------------|-----------|------------|-------------------------------|
| X | 8,582,093 - 9,248,137 | 7,735,326 | 12,629,028 | Milk protein yield QTL (1539) |
| X | 8,582,093 - 9,248,137 | 7,735,326 | 12,629,028 | Milk yield QTL (1540) |
| X | 8,582,093 - 9,248,137 | 7,735,326 | 12,629,028 | Milk energy yield QTL (1541) |

Supplementary Table S4: Bovine genes mapped within the candidate genome region intervals.

| BTA | Candidate region intervals (bp) | Gene Start (bp) | Gene End (bp) | Ensembl Gene ID | Associated Gene Name | Identifying analysis |
|-----|---------------------------------|-----------------|---------------|---------------------|----------------------|----------------------|
| 2 | 125,585,810 – 126,058,677 | 125,600,540 | 125,600,953 | ENSBTAG00000003676 | | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,629,834 | 125,630,345 | ENSBTAG000000040210 | | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,646,957 | 125,647,070 | ENSBTAG000000045032 | <i>SNORA40</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,653,307 | 125,658,882 | ENSBTAG00000002678 | <i>MED18</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,698,160 | 125,714,128 | ENSBTAG00000002363 | <i>SESN2</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,727,885 | 125,730,128 | ENSBTAG00000006342 | <i>ATPIF1</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,733,245 | 125,757,519 | ENSBTAG000000018385 | <i>DNAJC8</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,784,497 | 125,811,602 | ENSBTAG000000027051 | <i>PTAFR</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,829,745 | 125,830,707 | ENSBTAG000000009937 | | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,899,852 | 125,969,668 | ENSBTAG000000043989 | <i>EYA3</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,975,898 | 125,982,957 | ENSBTAG000000008800 | <i>XKR8</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 125,983,558 | 126,015,376 | ENSBTAG000000012997 | <i>SMPDL3B</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 126,030,987 | 126,055,499 | ENSBTAG000000006225 | <i>RPA2</i> | Fst |
| 2 | 125,585,810 – 126,058,677 | 126,058,353 | 126,070,741 | ENSBTAG000000006223 | <i>THEMIS2</i> | Fst |
| 3 | 101,442,771 – 102,442,771 | 101,566,202 | 101,614,105 | ENSBTAG000000012648 | <i>ZSWIM5</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,616,935 | 101,620,220 | ENSBTAG000000012644 | <i>UROD</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,623,083 | 101,631,050 | ENSBTAG000000019013 | <i>HECTD3</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,644,781 | 101,756,554 | ENSBTAG000000019010 | <i>EIF2B3</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,762,662 | 101,778,582 | ENSBTAG000000024137 | <i>PTCH2</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,781,321 | 101,781,437 | ENSBTAG000000042956 | <i>U5</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,784,090 | 101,789,519 | ENSBTAG000000039529 | <i>BTBD19</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,791,333 | 101,791,992 | ENSBTAG000000006128 | <i>TCTEX1D4</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,792,010 | 101,796,880 | ENSBTAG000000006125 | <i>PLK3</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,809,788 | 101,813,887 | ENSBTAG000000015288 | <i>BEST4</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,816,844 | 101,818,956 | ENSBTAG000000015285 | <i>RPS8</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,817,129 | 101,817,197 | ENSBTAG000000042545 | <i>snosnR61</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,817,654 | 101,817,726 | ENSBTAG000000042292 | <i>SNORD38</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,818,498 | 101,818,601 | ENSBTAG000000042645 | <i>SNORD46</i> | Rsb |

| | | | | | | |
|---|---------------------------|-------------|-------------|--------------------|----------------------|-----|
| 3 | 101,442,771 – 102,442,771 | 101,819,039 | 101,819,118 | ENSBTAG00000045792 | <i>SNORD39</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,831,089 | 101,831,187 | ENSBTAG00000044657 | <i>U6</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,832,373 | 101,851,108 | ENSBTAG00000015280 | <i>KIF2C</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,870,236 | 101,870,351 | ENSBTAG00000042506 | <i>U5</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,876,647 | 101,939,033 | ENSBTAG00000011822 | <i>C1orf228</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,939,347 | 101,955,118 | ENSBTAG00000012372 | <i>TMEM53</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 101,957,666 | 102,232,064 | ENSBTAG00000012355 | <i>RNF220</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 102,290,329 | 102,421,170 | ENSBTAG00000015559 | <i>ERI3</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 102,310,324 | 102,310,397 | ENSBTAG00000045144 | <i>bta-mir-2414</i> | Rsb |
| 3 | 101,442,771 – 102,442,771 | 102,421,544 | 102,430,739 | ENSBTAG00000005912 | <i>DMAPI</i> | Rsb |
| 4 | 47,195,467 - 47,539,595 | 46,974,646 | 47,228,658 | ENSBTAG00000002037 | <i>ATXN7LI</i> | Fst |
| 4 | 47,195,467 - 47,539,595 | 47,306,857 | 47,307,501 | ENSBTAG00000000100 | | Fst |
| 4 | 47,195,467 - 47,539,595 | 47,319,496 | 47,372,208 | ENSBTAG00000021365 | <i>CDHR3</i> | Fst |
| 4 | 47,195,467 - 47,539,595 | 47,367,036 | 47,367,106 | ENSBTAG00000044548 | <i>bta-mir-2284b</i> | Fst |
| 4 | 47,195,467 - 47,539,595 | 47,423,619 | 47,453,580 | ENSBTAG00000019794 | <i>SYPL1</i> | Fst |
| 4 | 47,195,467 - 47,539,595 | 47,483,218 | 47,483,324 | ENSBTAG00000042539 | <i>U6</i> | Fst |
| 4 | 47,195,467 - 47,539,595 | 47,508,242 | 47,508,671 | ENSBTAG00000019824 | | Fst |
| 4 | 51,927,595 - 52,308,430 | 51,912,652 | 52,042,198 | ENSBTAG00000006161 | <i>C-MET</i> | Fst |
| 4 | 51,927,595 - 52,308,430 | 52,173,110 | 52,208,687 | ENSBTAG00000017869 | <i>CAVI</i> | Fst |
| 4 | 51,927,595 - 52,308,430 | 52,230,674 | 52,235,915 | ENSBTAG00000045584 | <i>CAV2</i> | Fst |
| 5 | 57,477,594 - 58,477,594 | 57,467,337 | 57,484,118 | ENSBTAG00000014697 | <i>SMARCC2</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,486,017 | 57,489,133 | ENSBTAG00000010799 | <i>MYL6</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,489,469 | 57,492,173 | ENSBTAG00000031217 | <i>MYL6B</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,504,094 | 57,518,152 | ENSBTAG00000009543 | <i>FAM62A</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,522,062 | 57,527,396 | ENSBTAG00000009542 | <i>ZC3H10</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,532,245 | 57,538,950 | ENSBTAG00000010451 | <i>PA2G4</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,539,933 | 57,560,884 | ENSBTAG00000010444 | <i>ERBB3</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,603,811 | 57,606,599 | ENSBTAG00000038896 | <i>RPS26</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,616,541 | 57,626,816 | ENSBTAG00000012636 | <i>IKZF4</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,639,566 | 57,643,834 | ENSBTAG00000006160 | <i>SUOX</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,648,526 | 57,651,738 | ENSBTAG00000014129 | <i>RAB5B</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,664,374 | 57,669,057 | ENSBTAG00000004021 | <i>CDK2</i> | Rsb |

| | | | | | | |
|---|-------------------------|------------|------------|---------------------|----------------|-----|
| 5 | 57,477,594 - 58,477,594 | 57,669,835 | 57,677,941 | ENSBTAG00000004019 | <i>PMEL17</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,678,063 | 57,699,615 | ENSBTAG00000004018 | <i>DGKA</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,703,547 | 57,724,145 | ENSBTAG000000031146 | <i>WIBG</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,751,506 | 57,757,615 | ENSBTAG00000009051 | <i>MMP19</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,758,050 | 57,762,409 | ENSBTAG00000009049 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,763,740 | 57,770,666 | ENSBTAG000000020664 | <i>DNAJC14</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,770,769 | 57,774,153 | ENSBTAG000000020663 | <i>ORMDL2</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,774,486 | 57,823,736 | ENSBTAG000000020662 | <i>CIP29</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,830,915 | 57,837,708 | ENSBTAG00000007417 | <i>GDF11</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,854,278 | 57,857,485 | ENSBTAG000000011931 | <i>CD63</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,858,977 | 57,862,779 | ENSBTAG000000011927 | <i>RDH5</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,863,517 | 57,866,922 | ENSBTAG000000011918 | <i>BLOC1S1</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,874,054 | 57,898,519 | ENSBTAG000000012897 | <i>ITGA7</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,899,029 | 57,901,211 | ENSBTAG000000012896 | <i>METTL7B</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,934,910 | 57,935,872 | ENSBTAG00000006605 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,937,675 | 57,937,828 | ENSBTAG000000044490 | <i>SNORA81</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,952,735 | 57,953,673 | ENSBTAG000000031031 | <i>OR10P1</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,967,852 | 57,968,814 | ENSBTAG000000021621 | <i>OR6C4</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 57,999,926 | 58,000,852 | ENSBTAG000000047920 | <i>OR2AP1</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,013,470 | 58,014,035 | ENSBTAG000000018506 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,050,316 | 58,051,245 | ENSBTAG000000047733 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,067,221 | 58,068,156 | ENSBTAG000000021122 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,114,643 | 58,115,581 | ENSBTAG000000037758 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,161,352 | 58,162,290 | ENSBTAG000000047931 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,207,648 | 58,208,574 | ENSBTAG000000047980 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,260,957 | 58,261,892 | ENSBTAG000000037842 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,353,382 | 58,353,485 | ENSBTAG000000042326 | <i>U6</i> | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,419,457 | 58,420,410 | ENSBTAG000000047825 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,450,945 | 58,451,880 | ENSBTAG000000024798 | | Rsb |
| 5 | 57,477,594 - 58,477,594 | 58,463,855 | 58,464,790 | ENSBTAG000000021460 | | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,077,564 | 60,078,505 | ENSBTAG000000045807 | | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,098,740 | 60,099,837 | ENSBTAG000000046761 | | Rsb |

| | | | | | | |
|---|-------------------------|------------|------------|--------------------|---------------------|-----|
| 5 | 60,056,520 - 61,056,520 | 60,120,924 | 60,121,865 | ENSBTAG00000045982 | | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,157,085 | 60,158,008 | ENSBTAG00000047631 | | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,225,838 | 60,226,830 | ENSBTAG00000005626 | <i>NEUROD4</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,265,820 | 60,300,780 | ENSBTAG00000005120 | <i>TESPA1</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,372,425 | 60,502,966 | ENSBTAG00000003183 | <i>NTN4</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,411,589 | 60,411,695 | ENSBTAG00000043340 | <i>U6</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,556,051 | 60,564,297 | ENSBTAG00000016271 | <i>SNRPF</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,564,497 | 60,591,379 | ENSBTAG00000016274 | <i>CCDC38</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,598,348 | 60,613,063 | ENSBTAG00000016275 | <i>AMDHD1</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,618,663 | 60,641,990 | ENSBTAG00000016276 | <i>HAL</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,647,973 | 60,678,518 | ENSBTAG00000016415 | <i>LTA4H</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,823,240 | 60,891,359 | ENSBTAG00000001509 | <i>ELK3</i> | Rsb |
| 5 | 60,056,520 - 61,056,520 | 60,897,636 | 61,006,980 | ENSBTAG00000001510 | <i>CDK17</i> | Rsb |
| 5 | 75,786,670 - 76,786,670 | 75,790,890 | 75,808,769 | ENSBTAG00000030652 | <i>MGC133880</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 75,810,521 | 75,817,101 | ENSBTAG00000030650 | <i>TST</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 75,818,030 | 75,827,375 | ENSBTAG00000030648 | <i>MPST</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 75,855,285 | 75,866,757 | ENSBTAG00000030646 | <i>KCTD17</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 75,870,208 | 75,903,553 | ENSBTAG00000032152 | <i>TMPRSS6</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 75,927,872 | 75,939,915 | ENSBTAG00000016345 | <i>IL2RB</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 75,992,622 | 75,999,893 | ENSBTAG00000008074 | <i>C1QTNF6</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,012,701 | 76,013,957 | ENSBTAG00000008910 | <i>SSTR3</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,033,363 | 76,050,218 | ENSBTAG00000011043 | <i>RAC2</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,049,715 | 76,049,777 | ENSBTAG00000045421 | <i>bta-mir-1835</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,080,309 | 76,111,131 | ENSBTAG00000014237 | <i>CYTH4</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,173,495 | 76,175,969 | ENSBTAG00000007259 | <i>ELFN2</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,266,277 | 76,282,792 | ENSBTAG00000015043 | <i>MFNG</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,287,158 | 76,312,955 | ENSBTAG00000015044 | <i>CARD10</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,325,755 | 76,325,863 | ENSBTAG00000042271 | <i>U6</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,346,985 | 76,347,091 | ENSBTAG00000043029 | <i>U6</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,375,512 | 76,405,820 | ENSBTAG00000016661 | <i>USP18</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,497,229 | 76,503,464 | ENSBTAG00000030632 | <i>ALG10</i> | iHs |
| 5 | 75,786,670 - 76,786,670 | 76,692,598 | 76,808,969 | ENSBTAG0000000606 | <i>SYT10</i> | iHs |

| | | | | | | |
|----|-------------------------|------------|------------|--------------------|---------------------|-----|
| 7 | 52,224,595 - 52,720,797 | 52,218,128 | 52,244,915 | ENSBTAG00000006756 | | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,252,774 | 52,270,426 | ENSBTAG00000008224 | <i>PAIP2</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,272,186 | 52,284,986 | ENSBTAG00000010798 | <i>SLC23A1</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,285,863 | 52,287,943 | ENSBTAG00000038337 | <i>MZB1</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,290,536 | 52,293,580 | ENSBTAG00000030520 | <i>PROB1</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,295,318 | 52,300,482 | ENSBTAG00000017957 | <i>SPATA24</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,305,244 | 52,337,268 | ENSBTAG00000002286 | <i>DNAJC18</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,346,079 | 52,354,152 | ENSBTAG00000030518 | <i>ECSCR</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,355,941 | 52,357,730 | ENSBTAG00000030517 | | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,361,793 | 52,368,150 | ENSBTAG00000002296 | <i>TMEM173</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,414,547 | 52,457,128 | ENSBTAG00000004161 | <i>UBE2D2</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,505,097 | 52,513,059 | ENSBTAG00000003986 | <i>CXXC5</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,669,811 | 52,707,149 | ENSBTAG00000000238 | <i>PSD2</i> | Fst |
| 7 | 52,224,595 - 52,720,797 | 52,714,639 | 52,774,754 | ENSBTAG00000010689 | <i>NRG2</i> | Fst |
| 11 | 62,129,106 - 63,129,106 | 62,244,354 | 62,299,938 | ENSBTAG00000000111 | <i>UGP2</i> | Rsb |
| 11 | 62,129,106 - 63,129,106 | 62,301,309 | 62,377,281 | ENSBTAG00000000115 | <i>VPS54</i> | Rsb |
| 11 | 62,129,106 - 63,129,106 | 62,471,609 | 62,528,075 | ENSBTAG00000020865 | <i>PEL11</i> | Rsb |
| 11 | 62,129,106 - 63,129,106 | 62,812,719 | 62,817,829 | ENSBTAG00000000156 | <i>LGALSL</i> | Rsb |
| 11 | 62,129,106 - 63,129,106 | 62,911,414 | 62,951,512 | ENSBTAG00000009299 | <i>AFTPH</i> | Rsb |
| 11 | 62,129,106 - 63,129,106 | 62,992,908 | 62,993,855 | ENSBTAG00000007793 | <i>SERTAD2</i> | Rsb |
| 12 | 26,681,474 - 27,681,474 | 27,400,069 | 27,417,180 | ENSBTAG00000010787 | <i>RFC3</i> | Rsb |
| 12 | 28,717,254 - 29,717,254 | 28,769,267 | 28,967,537 | ENSBTAG00000006771 | <i>FRY</i> | Rsb |
| 12 | 28,717,254 - 29,717,254 | 29,234,959 | 29,280,832 | ENSBTAG00000015132 | <i>RXFP2</i> | Rsb |
| 12 | 28,717,254 - 29,717,254 | 29,660,160 | 29,660,238 | ENSBTAG00000044236 | <i>bta-mir-2299</i> | Rsb |
| 12 | 28,717,254 - 29,717,254 | 29,661,280 | 29,726,355 | ENSBTAG00000033412 | <i>B3GALTL</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 35,630,411 | 35,647,612 | ENSBTAG00000048237 | <i>FGF9</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 35,710,543 | 35,769,962 | ENSBTAG00000015943 | <i>EFHA1</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 35,781,299 | 35,837,108 | ENSBTAG00000006177 | <i>ZDHHC20</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 35,840,400 | 35,841,483 | ENSBTAG00000003315 | <i>MRPL57</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 35,841,563 | 35,854,986 | ENSBTAG00000003314 | <i>SKA3</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 35,860,636 | 35,868,470 | ENSBTAG00000018631 | <i>SAP18</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 35,919,546 | 35,942,309 | ENSBTAG00000014406 | <i>LATS2</i> | Rsb |

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|----|-------------------------|------------|------------|--------------------|--------------------|-----|
| 12 | 35,240,174 - 36,240,174 | 35,958,357 | 36,046,871 | ENSBTAG00000003710 | <i>XPO4</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 36,055,182 | 36,075,245 | ENSBTAG00000008296 | <i>N6AMT2</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 36,076,412 | 36,105,865 | ENSBTAG00000025402 | <i>IL17D</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 36,110,810 | 36,166,860 | ENSBTAG00000014286 | <i>IFT88</i> | Rsb |
| 12 | 35,240,174 - 36,240,174 | 36,187,100 | 36,243,551 | ENSBTAG00000011726 | <i>CRYL1</i> | Rsb |
| 13 | 46,433,697-46,723,493 | 46,383,731 | 46,630,127 | ENSBTAG00000014194 | <i>ADARB2</i> | Fst |
| 13 | 46,433,697-46,723,493 | 46,492,045 | 46,502,978 | ENSBTAG00000039356 | | Fst |
| 13 | 46,433,697-46,723,493 | 46,545,942 | 46,546,045 | ENSBTAG00000037833 | | Fst |
| 13 | 46,433,697-46,723,493 | 46,647,460 | 46,679,926 | ENSBTAG00000000683 | <i>WDR37</i> | Fst |
| 13 | 46,433,697-46,723,493 | 46,682,710 | 46,685,834 | ENSBTAG00000004075 | <i>ID11</i> | Fst |
| 13 | 46,433,697-46,723,493 | 46,689,063 | 46,703,756 | ENSBTAG00000014917 | <i>GTPBP4</i> | Fst |
| 13 | 57,848,276-58,207,174 | 57,855,967 | 57,864,630 | ENSBTAG00000004402 | <i>SLMO2</i> | Fst |
| 13 | 57,848,276-58,207,174 | 57,866,138 | 57,869,829 | ENSBTAG00000039208 | <i>ATP5E</i> | Fst |
| 13 | 57,848,276-58,207,174 | 57,874,077 | 57,879,042 | ENSBTAG00000018785 | <i>TUBB1</i> | Fst |
| 13 | 57,848,276-58,207,174 | 57,889,707 | 57,899,205 | ENSBTAG00000018784 | <i>CTSZ</i> | Fst |
| 13 | 57,848,276-58,207,174 | 57,899,212 | 57,909,996 | ENSBTAG00000018783 | <i>NELFCD</i> | Fst |
| 13 | 57,848,276-58,207,174 | 58,010,287 | 58,049,012 | ENSBTAG00000017475 | <i>GNAS</i> | Fst |
| 13 | 57,848,276-58,207,174 | 58,019,524 | 58,049,012 | ENSBTAG00000047223 | <i>GNAS</i> | Fst |
| 13 | 57,848,276-58,207,174 | 58,091,936 | 58,092,013 | ENSBTAG00000037319 | <i>bta-mir-296</i> | Fst |
| 14 | 24,482,969-25,254,540 | 24,295,567 | 24,610,955 | ENSBTAG00000044050 | <i>XKR4</i> | Fst |
| 14 | 24,482,969-25,254,540 | 24,711,327 | 24,747,118 | ENSBTAG00000005893 | <i>TMEM68</i> | Fst |
| 14 | 24,482,969-25,254,540 | 24,747,219 | 24,772,713 | ENSBTAG00000005898 | <i>TGS1</i> | Fst |
| 14 | 24,482,969-25,254,540 | 24,847,257 | 24,920,713 | ENSBTAG00000020034 | <i>LYN</i> | Fst |
| 14 | 24,482,969-25,254,540 | 24,955,079 | 24,956,324 | ENSBTAG00000019147 | <i>RPS20</i> | Fst |
| 14 | 24,482,969-25,254,540 | 24,955,769 | 24,955,835 | ENSBTAG00000045097 | <i>snoU54</i> | Fst |
| 14 | 24,482,969-25,254,540 | 24,970,516 | 24,970,679 | ENSBTAG00000028889 | <i>U1</i> | Fst |
| 14 | 24,482,969-25,254,540 | 24,975,950 | 24,976,948 | ENSBTAG00000019145 | <i>C-MOS</i> | Fst |
| 14 | 24,482,969-25,254,540 | 25,007,291 | 25,009,296 | ENSBTAG00000004022 | <i>PLAG1</i> | Fst |
| 14 | 24,482,969-25,254,540 | 25,052,885 | 25,058,779 | ENSBTAG00000033284 | <i>CHCHD7</i> | Fst |
| 14 | 24,482,969-25,254,540 | 25,067,486 | 25,067,823 | ENSBTAG00000039031 | | Fst |
| 14 | 24,482,969-25,254,540 | 25,105,062 | 25,117,554 | ENSBTAG00000018570 | <i>SDR16C5</i> | Fst |
| 14 | 24,482,969-25,254,540 | 25,153,583 | 25,179,651 | ENSBTAG00000040321 | <i>SDR16C6</i> | Fst |

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|----|-------------------------|------------|------------|--------------------|--------------------|-----|
| 14 | 24,482,969-25,254,540 | 25,218,586 | 25,222,991 | ENSBTAG0000004924 | <i>PENK</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,361,427 | 27,370,256 | ENSBTAG00000031933 | <i>ALOX12E</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,388,083 | 27,388,880 | ENSBTAG00000047925 | | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,421,125 | 27,434,258 | ENSBTAG00000021933 | <i>ALOX12</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,436,503 | 27,438,226 | ENSBTAG00000021932 | <i>RNASEK</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,438,490 | 27,441,264 | ENSBTAG00000021931 | <i>BAP18</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,441,343 | 27,441,429 | ENSBTAG00000030113 | <i>bta-mir-195</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,441,652 | 27,441,763 | ENSBTAG00000029868 | <i>bta-mir-497</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,447,122 | 27,451,108 | ENSBTAG00000020854 | <i>BCL6B</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,455,597 | 27,459,088 | ENSBTAG00000020853 | <i>SLC16A13</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,459,410 | 27,461,845 | ENSBTAG00000020852 | <i>SLC16A11</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,466,190 | 27,471,041 | ENSBTAG00000017895 | <i>CLEC10A</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,490,118 | 27,500,094 | ENSBTAG00000025101 | <i>ASGR2</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,529,097 | 27,532,634 | ENSBTAG00000012071 | <i>ASGR1</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,539,053 | 27,539,197 | ENSBTAG00000042630 | <i>SNORA1</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,543,283 | 27,565,410 | ENSBTAG00000002564 | <i>DLG4</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,568,181 | 27,573,378 | ENSBTAG00000003072 | <i>ACADVL</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,571,341 | 27,571,429 | ENSBTAG00000029812 | <i>bta-mir-324</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,574,027 | 27,581,405 | ENSBTAG00000003075 | <i>DVL2</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,582,170 | 27,585,794 | ENSBTAG00000014881 | <i>PHF23</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,586,886 | 27,588,815 | ENSBTAG00000014883 | <i>GABARAP</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,589,896 | 27,596,032 | ENSBTAG00000019443 | <i>CTDNEP1</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,596,778 | 27,602,464 | ENSBTAG00000019446 | <i>ELP5</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,602,595 | 27,604,817 | ENSBTAG00000019448 | <i>CLDN7</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,616,793 | 27,621,455 | ENSBTAG00000009190 | <i>SLC2A4</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,622,773 | 27,628,780 | ENSBTAG00000009126 | <i>YBX2</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,648,382 | 27,653,256 | ENSBTAG00000002018 | <i>EIF5A</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,653,444 | 27,656,067 | ENSBTAG00000010513 | <i>GPS2</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,656,328 | 27,668,154 | ENSBTAG00000010519 | | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,669,262 | 27,672,230 | ENSBTAG00000045892 | | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,673,004 | 27,684,649 | ENSBTAG00000010527 | <i>ACAP1</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,685,379 | 27,688,137 | ENSBTAG00000010532 | <i>KCTD11</i> | Fst |

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| 19 | 27,369,763 - 27,763,447 | 27,700,503 | 27,706,189 | ENSBTAG00000017739 | <i>TNK1</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,706,379 | 27,710,913 | ENSBTAG00000017747 | <i>PLSCR3</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,714,471 | 27,715,619 | ENSBTAG00000031752 | <i>TMEM256</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,727,925 | 27,733,393 | ENSBTAG00000020252 | <i>NLGN2</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,733,908 | 27,735,191 | ENSBTAG00000020253 | <i>SPEM1</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,747,547 | 27,749,621 | ENSBTAG00000031737 | <i>TMEM102</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,751,729 | 27,755,716 | ENSBTAG00000019241 | <i>FGF11</i> | Fst |
| 19 | 27,369,763 - 27,763,447 | 27,757,183 | 27,766,382 | ENSBTAG00000019242 | <i>CHRNBI</i> | Fst |
| 19 | 42,196,815 - 43,196,815 | 42,208,153 | 42,214,637 | ENSBTAG00000030519 | | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,226,385 | 42,230,810 | ENSBTAG00000037560 | <i>HKA1</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,248,647 | 42,252,437 | ENSBTAG00000013685 | <i>KRT31</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,260,882 | 42,285,621 | ENSBTAG00000000573 | | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,301,511 | 42,309,720 | ENSBTAG00000016384 | <i>KRT32</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,313,515 | 42,317,810 | ENSBTAG00000006807 | <i>KRT35</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,325,914 | 42,329,903 | ENSBTAG00000046124 | <i>KRT36</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,356,580 | 42,361,365 | ENSBTAG00000004903 | <i>KRT15</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,366,660 | 42,370,493 | ENSBTAG00000004905 | <i>KRT19</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,413,413 | 42,418,215 | ENSBTAG00000047165 | <i>KRT9</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,430,195 | 42,434,559 | ENSBTAG00000007583 | <i>KRT14</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,463,453 | 42,465,605 | ENSBTAG00000033766 | <i>KRT16</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,472,440 | 42,483,976 | ENSBTAG00000006806 | <i>KRT17</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,479,982 | 42,484,047 | ENSBTAG00000047262 | | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,497,766 | 42,497,869 | ENSBTAG00000042827 | <i>U6</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,516,886 | 42,517,005 | ENSBTAG00000042897 | <i>SNORA26</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,545,777 | 42,548,334 | ENSBTAG00000002282 | <i>EIF1</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,565,344 | 42,567,655 | ENSBTAG00000017663 | <i>GAST</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,602,486 | 42,626,600 | ENSBTAG00000017685 | <i>JUP</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,639,451 | 42,645,799 | ENSBTAG00000025752 | <i>LEPREL4</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,650,885 | 42,655,321 | ENSBTAG00000011454 | <i>FKBP10</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,657,994 | 42,665,703 | ENSBTAG00000011456 | <i>NT5C3L</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,666,504 | 42,679,044 | ENSBTAG00000011459 | <i>KLHL10</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,684,412 | 42,689,873 | ENSBTAG00000011460 | <i>KLHL11</i> | Rsb |

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| 19 | 42,196,815 - 43,196,815 | 42,691,369 | 42,735,634 | ENSBTAG00000016740 | <i>ACLY</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,749,145 | 42,771,008 | ENSBTAG00000013698 | <i>TTC25</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,774,249 | 42,780,091 | ENSBTAG00000025762 | <i>CNP</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,781,320 | 42,809,906 | ENSBTAG00000002654 | <i>DNAJC7</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,812,569 | 42,816,762 | ENSBTAG00000002657 | <i>NKIRAS2</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,818,405 | 42,850,694 | ENSBTAG000000046162 | <i>ZNF385C</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,877,797 | 42,888,179 | ENSBTAG000000046580 | <i>LGP2</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,888,854 | 42,895,399 | ENSBTAG000000044019 | <i>KAT2A</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,896,709 | 42,897,222 | ENSBTAG000000024979 | <i>HSPB9</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,898,002 | 42,903,081 | ENSBTAG00000006982 | <i>RAB5C</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,922,699 | 42,938,502 | ENSBTAG000000001195 | <i>KCNH4</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,941,042 | 42,942,287 | ENSBTAG000000000665 | <i>BORX</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,946,040 | 42,949,784 | ENSBTAG000000000666 | <i>GHDC</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 42,960,226 | 42,996,671 | ENSBTAG000000010125 | <i>STAT5B</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 43,033,597 | 43,054,075 | ENSBTAG000000009496 | <i>STAT5A</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 43,056,660 | 43,132,624 | ENSBTAG000000021523 | <i>STAT3</i> | Rsb |
| 19 | 42,196,815 - 43,196,815 | 43,148,013 | 43,162,165 | ENSBTAG000000039684 | <i>PTRF</i> | Rsb |
| 22 | 2,314,019 - 2,788,566 | 2,565,863 | 2,565,970 | ENSBTAG000000028620 | <i>5S_rRNA</i> | Fst |
| 22 | 2,314,019 - 2,788,566 | 2,685,120 | 2,763,664 | ENSBTAG000000035286 | <i>CMC1</i> | Fst |
| 22 | 2,314,019 - 2,788,566 | 2,766,407 | 2,807,380 | ENSBTAG000000004117 | <i>AZI2</i> | Fst |
| 23 | 27,781,915 - 28,781,915 | 27,779,849 | 27,791,241 | ENSBTAG000000014434 | <i>CCHCR1</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,793,273 | 27,794,712 | ENSBTAG000000025531 | <i>PSORS1C2</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,808,496 | 27,812,710 | ENSBTAG000000021721 | <i>CDSN</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,816,299 | 27,818,479 | ENSBTAG000000004539 | <i>C6orf15</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,837,208 | 27,837,314 | ENSBTAG000000043004 | <i>U6</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,842,253 | 27,845,729 | ENSBTAG000000007075 | | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,863,067 | 27,867,532 | ENSBTAG000000022590 | <i>BOLA</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,945,517 | 27,946,340 | ENSBTAG000000038810 | <i>SFTA2</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,947,120 | 27,947,226 | ENSBTAG000000043267 | <i>U6</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,949,626 | 27,961,526 | ENSBTAG000000010698 | <i>VAR52</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,962,144 | 27,968,734 | ENSBTAG000000046757 | <i>GTF2H4</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 27,975,619 | 27,989,666 | ENSBTAG000000010682 | <i>DDR1</i> | iHs |

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| 23 | 27,781,915 - 28,781,915 | 28,088,456 | 28,089,722 | ENSBTAG00000011358 | <i>IER3</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,090,029 | 28,100,113 | ENSBTAG00000009960 | <i>FLOT1</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,101,727 | 28,105,320 | ENSBTAG00000006969 | <i>TUBB5</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,111,675 | 28,114,705 | ENSBTAG00000006966 | <i>NRM</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,117,757 | 28,127,002 | ENSBTAG00000025526 | <i>MDC1</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,128,194 | 28,137,021 | ENSBTAG00000039695 | <i>KIAA1949</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,140,250 | 28,152,483 | ENSBTAG00000006960 | <i>DHX16</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,152,665 | 28,156,380 | ENSBTAG00000006958 | <i>C6orf136</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,156,649 | 28,169,424 | ENSBTAG00000006941 | <i>ATAT1</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,169,926 | 28,176,489 | ENSBTAG00000006936 | <i>MRPS18B</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,177,338 | 28,192,982 | ENSBTAG00000006933 | <i>PPP1R10</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,178,036 | 28,178,111 | ENSBTAG00000043729 | | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,199,129 | 28,211,340 | ENSBTAG00000006927 | <i>ABCF1</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,202,778 | 28,202,855 | ENSBTAG00000044647 | <i>bta-mir-2378</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,203,151 | 28,203,252 | ENSBTAG00000037337 | <i>bta-mir-877</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,218,620 | 28,224,731 | ENSBTAG00000006914 | <i>PRR3</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,224,609 | 28,231,251 | ENSBTAG00000025516 | <i>GNL1</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,257,737 | 28,271,232 | ENSBTAG00000007643 | <i>TRIM39-RPP21</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,298,189 | 28,298,628 | ENSBTAG00000001477 | | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,299,437 | 28,311,309 | ENSBTAG00000038619 | <i>LOC512672</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,330,539 | 28,334,072 | ENSBTAG00000005146 | | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,355,361 | 28,358,332 | ENSBTAG00000019386 | <i>BOLA-NC</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,469,735 | 28,473,401 | ENSBTAG00000020116 | <i>JSP.1</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,502,524 | 28,506,312 | ENSBTAG00000002069 | <i>BOLA</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,530,978 | 28,540,122 | ENSBTAG00000037421 | | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,563,086 | 28,579,480 | ENSBTAG00000035744 | <i>TRIM26</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,600,596 | 28,610,740 | ENSBTAG00000007532 | <i>TRIM15</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,601,333 | 28,601,408 | ENSBTAG00000044550 | | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,613,833 | 28,622,421 | ENSBTAG00000007530 | <i>TRIM10</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,626,339 | 28,638,869 | ENSBTAG00000037381 | <i>TRIM40</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,665,990 | 28,676,508 | ENSBTAG00000004490 | <i>TRIM31</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,707,264 | 28,710,379 | ENSBTAG00000032247 | <i>PPP1R11</i> | iHs |

| | | | | | | |
|----|-------------------------|------------|------------|--------------------|---------------------|-----|
| 23 | 27,781,915 - 28,781,915 | 28,714,470 | 28,717,896 | ENSBTAG00000031792 | <i>ZNRD1</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,735,960 | 28,739,682 | ENSBTAG00000017836 | <i>ZFP57</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,739,331 | 28,750,908 | ENSBTAG00000017818 | <i>MOG</i> | iHs |
| 23 | 27,781,915 - 28,781,915 | 28,775,534 | 28,803,895 | ENSBTAG00000017239 | <i>GABBR1</i> | iHs |
| 24 | 4,118,163 - 4,474,760 | 3,841,029 | 4,197,665 | ENSBTAG00000022887 | <i>ZNF407</i> | Fst |
| 24 | 4,118,163 - 4,474,760 | 4,231,234 | 4,259,140 | ENSBTAG00000021428 | <i>CNDP1</i> | Fst |
| 24 | 4,118,163 - 4,474,760 | 4,267,545 | 4,278,276 | ENSBTAG00000009841 | <i>CNDP2</i> | Fst |
| 24 | 4,118,163 - 4,474,760 | 4,308,177 | 4,325,743 | ENSBTAG00000000106 | <i>FAM69C</i> | Fst |
| 24 | 4,118,163 - 4,474,760 | 4,369,229 | 4,393,273 | ENSBTAG00000022466 | <i>C18orf63</i> | Fst |
| 24 | 4,118,163 - 4,474,760 | 4,413,368 | 4,445,873 | ENSBTAG00000012012 | <i>CYB5A</i> | Fst |
| 29 | 1,398,171 - 2,398,171 | 1,379,817 | 1,497,748 | ENSBTAG00000035110 | <i>CCDC67</i> | iHs |
| 29 | 1,398,171 - 2,398,171 | 1,681,372 | 1,719,249 | ENSBTAG00000008530 | <i>SLC36A4</i> | iHs |
| 29 | 1,398,171 - 2,398,171 | 1,881,124 | 1,882,754 | ENSBTAG00000047614 | | iHs |
| 29 | 1,398,171 - 2,398,171 | 1,934,150 | 1,936,897 | ENSBTAG00000013398 | | iHs |
| 29 | 1,398,171 - 2,398,171 | 1,965,869 | 2,605,125 | ENSBTAG00000004081 | <i>FAT3</i> | iHs |
| X | 8,582,093 - 9,248,137 | 8,278,045 | 8,926,654 | ENSBTAG00000018819 | <i>TENM1</i> | Fst |
| X | 8,582,093 - 9,248,137 | 9,100,433 | 9,101,239 | ENSBTAG00000046818 | | Fst |
| X | 8,582,093 - 9,248,137 | 9,189,806 | 9,189,885 | ENSBTAG00000044803 | <i>bta-mir-2483</i> | Fst |
| X | 39,942,044 - 43,999,854 | 39,983,832 | 39,984,337 | ENSBTAG00000038379 | | Fst |
| X | 39,942,044 - 43,999,854 | 39,990,127 | 40,004,312 | ENSBTAG00000013462 | <i>LICAM</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,036,423 | 40,038,823 | ENSBTAG00000047138 | <i>AVPR2</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,038,943 | 40,054,667 | ENSBTAG00000047531 | <i>ARHGAP4</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,058,809 | 40,063,513 | ENSBTAG00000047702 | <i>NAA10</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,060,594 | 40,061,079 | ENSBTAG00000045947 | | Fst |
| X | 39,942,044 - 43,999,854 | 40,063,730 | 40,071,014 | ENSBTAG00000047827 | <i>RENBP</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,075,766 | 40,095,591 | ENSBTAG00000011904 | <i>HCFC1</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,089,605 | 40,089,666 | ENSBTAG00000045033 | <i>bta-mir-2485</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,097,615 | 40,102,129 | ENSBTAG00000008278 | <i>TMEM187</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,126,143 | 40,133,455 | ENSBTAG00000016085 | <i>IRAK1</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,144,448 | 40,196,621 | ENSBTAG00000047855 | <i>MECP2</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,234,826 | 40,247,095 | ENSBTAG00000020299 | <i>OPNILW</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,247,366 | 40,254,767 | ENSBTAG00000020300 | <i>TEX28</i> | Fst |

| | | | | | | |
|---|-------------------------|------------|------------|---------------------|--------------------|-----|
| X | 39,942,044 - 43,999,854 | 40,263,164 | 40,291,627 | ENSBTAG00000020127 | <i>TKTL1</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,310,757 | 40,332,714 | ENSBTAG00000011190 | <i>FLNA</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,341,311 | 40,343,613 | ENSBTAG00000022314 | <i>EMD</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,364,802 | 40,367,164 | ENSBTAG00000007454 | <i>RPL10</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,366,530 | 40,366,664 | ENSBTAG000000042493 | <i>SNORA70</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,368,988 | 40,371,659 | ENSBTAG00000007455 | <i>DNASE1L1</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,379,111 | 40,387,392 | ENSBTAG00000007456 | <i>TAZ</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,402,701 | 40,410,481 | ENSBTAG00000012117 | <i>ATP6API</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,411,179 | 40,416,941 | ENSBTAG00000012125 | <i>GDII</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,417,745 | 40,423,500 | ENSBTAG00000033032 | <i>FAM50A</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,441,196 | 40,449,872 | ENSBTAG00000008552 | <i>PLXNA3</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,458,245 | 40,460,872 | ENSBTAG00000014331 | <i>UBL4A</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,461,474 | 40,464,916 | ENSBTAG00000014333 | <i>SLC10A3</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,469,573 | 40,477,912 | ENSBTAG00000012747 | <i>FAM3A</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,484,795 | 40,500,923 | ENSBTAG00000019512 | <i>G6PD</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,501,902 | 40,519,262 | ENSBTAG00000006268 | <i>IKBKKG</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,582,925 | 40,585,508 | ENSBTAG00000001900 | | Fst |
| X | 39,942,044 - 43,999,854 | 40,711,311 | 40,711,396 | ENSBTAG000000043130 | <i>SNORD62</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,752,944 | 40,753,240 | ENSBTAG000000047737 | <i>Metazoa_SRP</i> | Fst |
| X | 39,942,044 - 43,999,854 | 40,831,323 | 40,832,788 | ENSBTAG000000034444 | | Fst |
| X | 39,942,044 - 43,999,854 | 40,837,707 | 40,838,457 | ENSBTAG000000046642 | | Fst |
| X | 39,942,044 - 43,999,854 | 40,924,913 | 40,945,291 | ENSBTAG00000012084 | | Fst |
| X | 39,942,044 - 43,999,854 | 41,124,895 | 41,126,541 | ENSBTAG000000047120 | | Fst |
| X | 39,942,044 - 43,999,854 | 41,130,959 | 41,132,723 | ENSBTAG000000045853 | | Fst |
| X | 39,942,044 - 43,999,854 | 42,008,984 | 42,011,006 | ENSBTAG00000019942 | <i>PABPC5</i> | Fst |
| X | 39,942,044 - 43,999,854 | 42,130,045 | 42,131,016 | ENSBTAG000000033749 | | Fst |
| X | 39,942,044 - 43,999,854 | 42,583,762 | 42,621,146 | ENSBTAG00000001911 | | Fst |
| X | 84,566,018 - 85,993,719 | 84,500,825 | 84,570,816 | ENSBTAG00000006878 | | Fst |
| X | 84,566,018 - 85,993,719 | 84,590,185 | 84,590,760 | ENSBTAG00000004110 | | Fst |
| X | 84,566,018 - 85,993,719 | 84,623,894 | 84,624,016 | ENSBTAG000000043870 | <i>U6</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,657,971 | 84,661,552 | ENSBTAG00000012163 | <i>ITGB1BP2</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,662,118 | 84,675,255 | ENSBTAG00000012152 | <i>NONO</i> | Fst |

| | | | | | | |
|---|-------------------------|------------|------------|--------------------|-----------------|-----|
| X | 84,566,018 - 85,993,719 | 84,689,654 | 84,704,026 | ENSBTAG00000008492 | <i>ZMYM3</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,715,936 | 84,723,342 | ENSBTAG00000020512 | <i>GJB1</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,738,870 | 84,745,441 | ENSBTAG00000020513 | | Fst |
| X | 84,566,018 - 85,993,719 | 84,765,209 | 84,787,720 | ENSBTAG00000007708 | <i>NLGN3</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,789,500 | 84,811,761 | ENSBTAG00000021351 | <i>MED12</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,816,193 | 84,819,838 | ENSBTAG00000007626 | <i>IL2RG</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,820,230 | 84,822,311 | ENSBTAG00000032209 | <i>CXorf65</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,822,740 | 84,831,551 | ENSBTAG00000004879 | <i>FOXO4</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,852,014 | 84,860,773 | ENSBTAG00000007871 | <i>SNX12</i> | Fst |
| X | 84,566,018 - 85,993,719 | 84,901,862 | 84,902,344 | ENSBTAG00000023277 | | Fst |
| X | 84,566,018 - 85,993,719 | 85,010,185 | 85,015,644 | ENSBTAG00000007403 | <i>SLC7A3</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,042,821 | 85,229,518 | ENSBTAG00000016272 | <i>TEX11</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,171,802 | 85,171,931 | ENSBTAG00000043203 | <i>SNORA11</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,197,994 | 85,198,063 | ENSBTAG00000042884 | <i>snoU2-30</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,198,206 | 85,198,285 | ENSBTAG00000042915 | <i>snoU2_19</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,245,062 | 85,298,606 | ENSBTAG00000011291 | <i>DLG3</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,309,754 | 85,319,162 | ENSBTAG00000012863 | <i>GDPD2</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,321,685 | 85,449,499 | ENSBTAG00000012861 | | Fst |
| X | 84,566,018 - 85,993,719 | 85,450,103 | 85,453,009 | ENSBTAG00000012860 | <i>PDZD11</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,458,940 | 85,470,775 | ENSBTAG00000012856 | <i>ARR3</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,481,339 | 85,482,436 | ENSBTAG00000040541 | <i>P2RY4</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,499,886 | 85,508,546 | ENSBTAG00000018839 | <i>AWAT1</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,556,424 | 85,577,736 | ENSBTAG00000007798 | <i>DGAT2L6</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,588,917 | 85,635,721 | ENSBTAG00000007797 | <i>IGBP1</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,677,239 | 85,678,114 | ENSBTAG00000007839 | <i>OTUD6A</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,693,325 | 85,693,403 | ENSBTAG00000044635 | | Fst |
| X | 84,566,018 - 85,993,719 | 85,700,206 | 85,702,893 | ENSBTAG00000012281 | <i>AWAT2</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,708,003 | 86,099,973 | ENSBTAG00000012543 | <i>EDA</i> | Fst |
| X | 84,566,018 - 85,993,719 | 85,898,898 | 85,899,424 | ENSBTAG00000022278 | <i>RPL23A</i> | Fst |

Supplementary Table S5: Candidate genes considered within the candidate genome regions.

| BTA | Gene Start (bp) | Gene End (bp) | Ensembl ID | gene ID | gene name | biological role |
|-----|-----------------|---------------|--------------------|-----------------|--|---|
| 2 | 125,600,540 | 125,600,953 | ENSBTAG00000003676 | Uncharacterized | Uncharacterized | unknown |
| 3 | 101,876,647 | 101,939,033 | ENSBTAG00000011822 | <i>C1orf228</i> | chromosome 1 open reading frame 228 | unknown |
| 3 | 101,939,347 | 101,955,118 | ENSBTAG00000012372 | <i>TMEM53</i> | transmembrane protein 53 | unknown |
| 3 | 101,957,666 | 102,232,064 | ENSBTAG00000012355 | <i>RNF220</i> | ring finger protein 220 | metal ion binding |
| 4 | 46,974,646 | 47,228,658 | ENSBTAG00000002037 | <i>ATXN7L1</i> | ataxin 7-like 1 | ATXV7 involved in microtubule cytoskeleton stabilization |
| 5 | 57,967,852 | 57,968,814 | ENSBTAG00000021621 | <i>OR6C4</i> | olfactory receptor | sensory perception of smell and response to stimulus |
| 5 | 57,999,926 | 58,000,852 | ENSBTAG00000047920 | <i>OR2AP1</i> | olfactory receptor, family 2, subfamily AP, member 1 | sensory perception of smell and response to stimulus |
| 5 | 60,556,051 | 60,564,297 | ENSBTAG00000016271 | <i>SNRPF</i> | small nuclear ribonucleoprotein polypeptide F | mRNA splicing |
| 5 | 60,564,497 | 60,591,379 | ENSBTAG00000016274 | <i>CCDC38</i> | coiled-coil domain containing 38 | unknown |
| 5 | 76,266,277 | 76,282,792 | ENSBTAG00000015043 | <i>MFNG</i> | MFNG O-fucosylpeptide 3-beta-N-acetylglucosaminyltransferase | regulation of protein binding and metabolic process |
| 5 | 76,287,158 | 76,312,955 | ENSBTAG00000015044 | <i>CARD10</i> | caspase recruitment domain family, member 10 | regulation of apoptosis |
| 7 | 52,414,547 | 52,457,128 | ENSBTAG00000004161 | <i>UBE2D2</i> | ubiquitin-conjugating enzyme E2D 2 | Addition of multiple ubiquitin groups to a protein, forming a ubiquitin chain |
| 12 | 29,234,959 | 29,280,832 | ENSBTAG00000015132 | <i>RXFP2</i> | relaxin/insulin-like family peptide receptor 2 | regulation of male gonad development |
| 12 | 35,710,543 | 35,769,962 | ENSBTAG00000015943 | <i>EFHA1</i> | EF-hand domain family, member A1 | regulation of mitochondrial calcium ion concentration |
| 13 | 46,383,731 | 46,630,127 | ENSBTAG00000014194 | <i>ADARB2</i> | adenosine deaminase, RNA-specific, B2 | RNA processing (poly(A) RNA binding) |

| | | | | | | |
|----|------------|------------|--------------------|---------------------|---|--|
| 13 | 46,492,045 | 46,502,978 | ENSBTAG00000039356 | Uncharacterized | Uncharacterized | oxidation-reduction process |
| 13 | 58,091,936 | 58,092,013 | ENSBTAG00000037319 | <i>bta-mir-296</i> | microRNA-296 | unknown |
| 14 | 24,295,567 | 24,610,955 | ENSBTAG00000044050 | <i>XKR4</i> | Kell blood group complex subunit-related family, member 4 | Double layer of lipid molecules that encloses all cells |
| 19 | 27,421,125 | 27434258 | ENSBTAG00000021933 | <i>ALOX12</i> | arachidonate 12-lipoxygenase | arachidonate 12-lipoxygenase activity and iron ion binding |
| 19 | 27,436,503 | 27,438,226 | ENSBTAG00000021932 | <i>RNASEK</i> | ribonuclease, RNase K | Catalysis of the hydrolysis of ester linkages within nucleic acids |
| 19 | 27,438,490 | 27,441,264 | ENSBTAG00000021931 | <i>BAP18</i> | Chromatic complexes subunit BAP18 | The alteration of DNA, protein, or sometimes RNA, in chromatin, which may result in changing the chromatin structure |
| 19 | 27,447,122 | 27,451,108 | ENSBTAG00000020854 | <i>BCL6B</i> | B-cell CLL/lymphoma 6, member B | A transcription repressor may be related to early B-cell development |
| 19 | 27,455,597 | 27,459,088 | ENSBTAG00000020853 | <i>SLC16A13</i> | solute carrier family 16, member 13 | The process in which a solute is transported from one side of a membrane to the other. |
| 19 | 27,459,410 | 27,461,845 | ENSBTAG00000020852 | <i>SLC16A11</i> | solute carrier family 16, member 11 | The process in which a solute is transported from one side of a membrane to the other. |
| 19 | 27,466,190 | 27,471,041 | ENSBTAG00000017895 | <i>CLEC10A</i> | C-type lectin domain family 10, member A | Interacting selectively and non-covalently with any carbohydrate |
| 19 | 42,666,504 | 42,679,044 | ENSBTAG00000011459 | <i>KLHL10</i> | kelch-like family member 10 | spermatogenesis and fertility |
| 19 | 42,684,412 | 42,689,873 | ENSBTAG00000011460 | <i>KLHL11</i> | kelch-like 11 | Protein binding |
| 19 | 42,691,369 | 42,735,634 | ENSBTAG00000016740 | <i>ACLY</i> | ATP citrate lyase | lipid metabolism and energy production |
| 23 | 28,257,737 | 28,271,232 | ENSBTAG00000007643 | <i>TRIM39-RPP21</i> | TRIM39-RPP21 readthrough | cell-cell junctions and focal adhesion |
| 23 | 28,298,189 | 28,298,628 | ENSBTAG00000001477 | uncharacterized | Uncharacterized | unknown |
| 23 | 28,299,437 | 28,311,309 | ENSBTAG00000038619 | <i>LOC512672</i> | major histocompatibility complex, class I | antigen processing and presentation |
| 24 | 4413368 | 4445873 | ENSBTAG00000012012 | <i>CYB5A</i> | cytochrome b5 type A | reduce ferric haemoglobin (methemoglobin) to ferrous haemoglobin |

| | | | | | | |
|----|------------|------------|--------------------|---------------------|---|-------------------------------------|
| 29 | 1,881,124 | 1,882,754 | ENSBTAG00000047614 | Uncharacterized | Uncharacterized | unknown |
| X | 9,189,806 | 9,189,885 | ENSBTAG00000044803 | <i>bta-mir-2483</i> | microRNA-2483 | unknown |
| X | 40,752,944 | 40,753,240 | ENSBTAG00000047737 | <i>Metazoa_SRP</i> | Metazoan signal recognition particle RNA | unknown |
| X | 85,556,424 | 85,577,736 | ENSBTAG00000007798 | <i>DGAT2L6</i> | diacylglycerol O-acyltransferase 2-like 6 | transferase activity |
| X | 85,588,917 | 85,635,721 | ENSBTAG00000007797 | <i>IGBP1</i> | immunoglobulin (CD79A) binding protein 1 | regulation of B cells proliferation |

