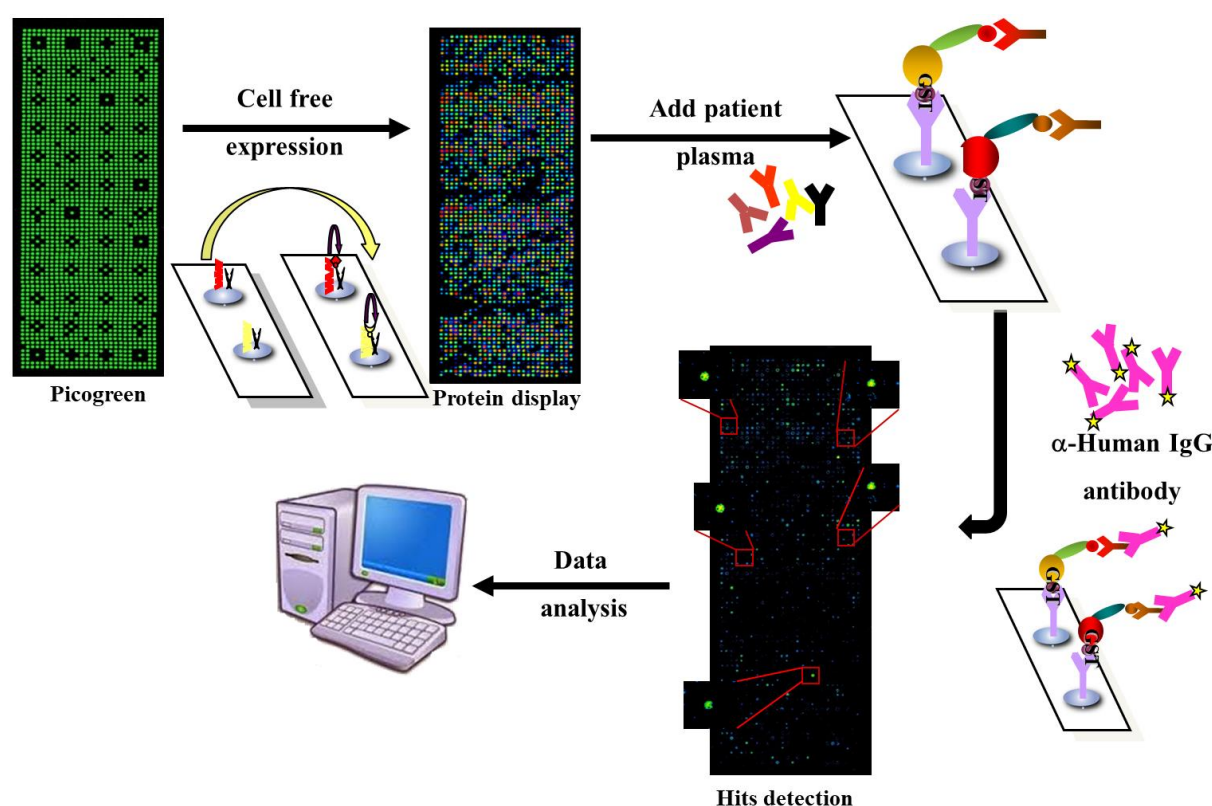


# Supplementary Material: Tracking the Antibody Immune in Sporadic Colorectal Cancer by Using Antigen Self-Assembled Protein Arrays

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**Figure S1.** Schematic description of experimental workflow of serum screening.

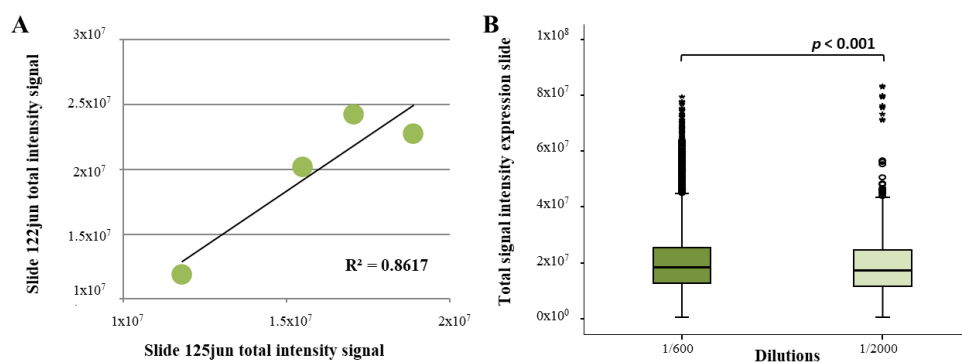


Figure S2. Reproducibility NAPPArray performance.

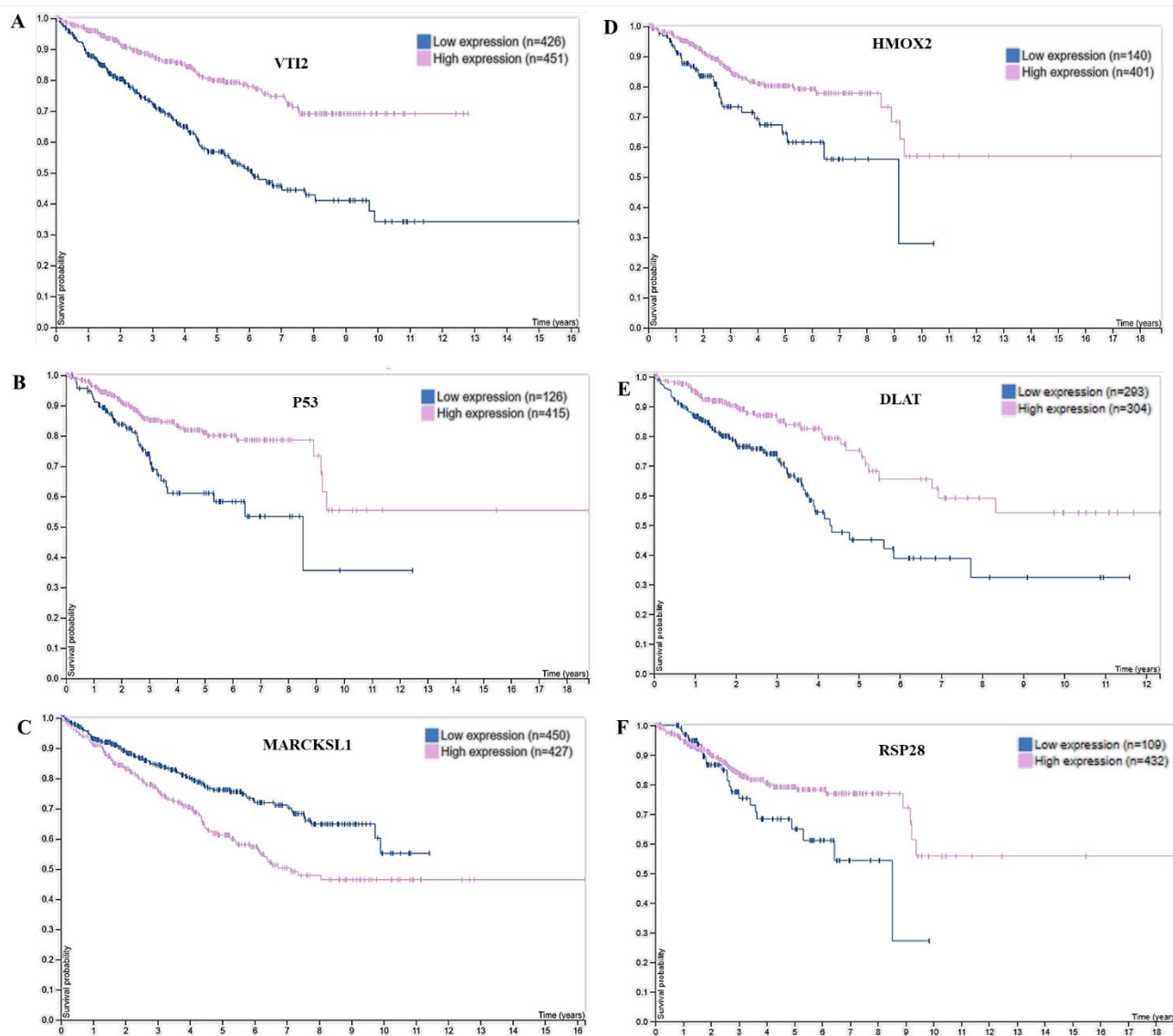


Figure S3. The Human Protein Atlas [28] showed that VTI2 (A), p53 (B), MARCKSL1 (C), HMOX2 (D), DLAT (E), RSP28 (F) have been described as a CRC prognosis biomarkers.

Table S1. List of tumoral antigen human proteins included in NAPPA

| Clone name | Start Position | Stop Position | Chromosomal Localization | Description   |
|------------|----------------|---------------|--------------------------|---|
| 76P        | 43661419       | 43699293      | 15q15.3                  | Gamma-tubulin complex component 4                             |
| A4GALT     | 43088127       | 43117304      | 22q13.2                  | Lactosylceramide 4-alpha-galactosyltransferase                |
| AARS       | 70286198       | 70323446      | 16q22.1                  | Alanine--tRNA ligase, cytoplasmic                             |
| AATF       | 35306175       | 35414171      | 17q12                    | Protein AATF  |
| ABAT       | 8768422        | 8878432       | 16p13.2                  | 4-aminobutyrate aminotransferase, mitochondrial               |
| ABCD4      | 74752126       | 74769759      | 14q24.3                  | ATP-binding cassette sub-family D member 4                    |
| ABCF1      | 30539153       | 30564956      | 6p21.33                  | ATP-binding cassette sub-family F member 1                    |
| ABCF2      | 150904923      | 150924316     | 7q36.1                   | ATP-binding cassette sub-family F member 2                    |
| ABCG2      | 89011416       | 89152474      | 4q22.1                   | ATP-binding cassette sub-family G member 2                    |
| ABHD11     | 73150424       | 73153197      | 7q11.23                  | Alpha/beta hydrolase domain-containing protein 11             |
| ABHD5      | 43731605       | 43775863      | 3p21.33                  | 1-acylglycerol-3-phosphate O-acyltransferase<br>ABHD5         |
| ACAA2      | 47309869       | 47340330      | 18q21.1                  | 3-ketoacyl-CoA thiolase, mitochondrial                        |
| ACAD8      | 134123389      | 134135749     | 11q25                    | Isobutyryl-CoA dehydrogenase, mitochondrial                   |
| ACAD9      | 128598439      | 128634910     | 3q21.3                   | Acyl-CoA dehydrogenase family member 9, mitochondrial         |
| ACADM      | 76190036       | 76253260      | 1p31.1                   | Medium-chain specific acyl-CoA dehydrogenase, mitochondrial   |
| ACO2       | 41865129       | 41924993      | 22q13.2                  | Aconitate hydratase, mitochondrial                            |
| ACPP       | 132036211      | 132087142     | 3q22.1                   | Prostatic acid phosphatase                                    |
| ACSL5      | 114133776      | 114188138     | 10q25.2                  | Long-chain-fatty-acid--CoA ligase 5                           |
| ACTA1      | 229566992      | 229569845     | 1q42.13                  | Actin, alpha skeletal muscle                                  |
| ACTG2      | 74119441       | 74146992      | 2p13.1                   | Actin, gamma-enteric smooth muscle                            |
| ACTN1      | 69340860       | 69446157      | 14q24.1                  | Alpha-actinin-1   |
| ACTN4      | 39138289       | 39222223      | 19q13.2                  | Alpha-actinin-4   |
| ACTR1A     | 104238986      | 104262482     | 10q24.32                 | Alpha-centractin  |
| ACTR1B     | 98272431       | 98280570      | 2q11.2                   | Beta-centractin   |
| ACTRT2     | 2938046        | 2939465       | 1p36.32                  | Actin-related protein T2                                      |
| ACY1       | 52009066       | 52023199      | 3p21.2                   | Aminoacylase-1  |
| ADA        | 43248163       | 43280874      | 20q13.12                 | Adenosine deaminase   |
| ADAM2      | 39601254       | 39695808      | 8p11.22                  | Disintegrin and metalloproteinase domain-containing protein 2 |
| ADAT1      | 75630879       | 75657198      | 16q23.1                  | tRNA-specific adenosine deaminase 1                           |
| ADCK4      | 41197434       | 41224112      | 19q13.2                  | AarF domain-containing protein kinase 4                       |
| ADFP       | 19108373       | 19149288      | 9p22.1                   | Perilipin-2   |
| ADH5       | 99992132       | 100009952     | 4q23                     | Alcohol dehydrogenase class-3                                 |
| ADORA3     | 112025970      | 112106584     | 1p13.2                   | Adenosine receptor A3   |
| ADRBK1     | 67033881       | 67054027      | 11q13.2                  | Beta-adrenergic receptor kinase 1                             |
| AGA        | 178351924      | 178363657     | 4q34.3                   | N(4)-(beta-N-acetylglucosaminy)-L-asparaginase                |
| AGER       | 32148745       | 32152101      | 6p21.32                  | Advanced glycosylation end product-specific receptor          |
| AGMAT      | 15898848       | 15911605      | 1p36.21                  | Agmatinase, mitochondrial                                     |
| AGPAT5     | 6565878        | 6617184       | 8p23.1                   | 1-acyl-sn-glycerol-3-phosphate acyltransferase epsilon        |
| AGTR2      | 115301975      | 115306225     | Xq23                     | Type-2 angiotensin II receptor                                |
| AGTRAP     | 11796141       | 11814859      | 1p36.22                  | Type-1 angiotensin II receptor-associated protein             |
| AIPL1      | 6297013        | 6338519       | 17p13.2                  | Aryl-hydrocarbon-interacting protein-like 1                   |
| AK1        | 130628759      | 130640022     | 9q34.11                  | Adenylate kinase isoenzyme 1                                  |
| AK3L1      | 4711155        | 4742043       | 9p24.1                   | GTP:AMP phosphotransferase AK3, mitochondrial                 |
| AKAP10     | 19807615       | 19881656      | 17p11.2                  | A-kinase anchor protein 10, mitochondrial                     |
| AKR1B1     | 134127102      | 134144036     | 7q33                     | Aldose reductase  |

|         |           |           |          |  |
|---------|-----------|-----------|----------|--|
| AKR1B10 | 134212344 | 134226160 | 7q33     | Aldo-keto reductase family 1 member B10                        |
| AKR1C4  | 5237425   | 5260912   | 10p15.1  | Aldo-keto reductase family 1 member C4                         |
| AKT1    | 105235686 | 105262088 | 14q32.33 | RAC-alpha serine/threonine-protein kinase                      |
| AKT3    | 243651535 | 244014381 | 1q43     | RAC-gamma serine/threonine-protein kinase                      |
| ALB     | 74262831  | 74287129  | 4q13.3   | Serum albumin  |
| ALDH1A2 | 58245622  | 58790065  | 15q21.3  | Retinal dehydrogenase 2  |
| ALDH3A2 | 19551449  | 19580911  | 17p11.2  | Fatty aldehyde dehydrogenase                                   |
| ALDH3B1 | 67776048  | 67796744  | 11q13.2  | Aldehyde dehydrogenase family 3 member B1                      |
| ALDH4A1 | 19197926  | 19229275  | 1p36.13  | Delta-1-pyrroline-5-carboxylate dehydrogenase, mitochondrial   |
| ALDOA   | 30064411  | 30081778  | 16p11.2  | Fructose-bisphosphate aldolase A                               |
| ALF     | 38462442  | 38471278  | 1p34.3   | Four and a half LIM domains protein 3                          |
| ALG2    | 101978708 | 101984238 | 9q22.33  | Alpha-1,3/1,6-mannosyltransferase ALG2                         |
| ALG3    | 183960089 | 183967336 | 3q27.1   | Dol-P-Man:Man(5)GlcNAc(2)-PP-Dol alpha-1,3-mannosyltransferase |
| ALG9    | 111652919 | 111742305 | 11q23.1  | Alpha-1,2-mannosyltransferase ALG9                             |
| AMY2A   | 104159999 | 104168402 | 1p21.1   | Pancreatic alpha-amylase                                       |
| ANGPTL7 | 11249398  | 11256038  | 1p36.22  | Angiopoietin-related protein 7                                 |
| ANKH    | 14704910  | 14871887  | 5p15.2   | Progressive ankylosis protein homolog                          |
| ANKRA2  | 72848160  | 72861511  | 5q13.2   | Ankyrin repeat family A protein 2                              |
| ANKRD1  | 92671853  | 92681033  | 10q23.31 | Ankyrin repeat domain-containing protein 1                     |
| ANP32A  | 69070874  | 69113236  | 15q23    | Acidic leucine-rich nuclear phosphoprotein 32 family member A  |
| ANXA1   | 75766673  | 75785309  | 9q21.13  | Annexin A1   |
| ANXA11  | 81910645  | 81965328  | 10q22.3  | Annexin A11  |
| ANXA13  | 124693034 | 124749647 | 8q24.13  | Annexin A13  |
| ANXA5   | 122589110 | 122618268 | 4q27     | Annexin A5   |
| ANXA8   | 48255253  | 48279200  | 10q11.22 | Annexin A8   |
| ANXA9   | 150954493 | 150968110 | 1q21.3   | Annexin A9   |
| AP2A2   | 924894    | 1012239   | 11p15.5  | AP-2 complex subunit alpha-2                                   |
| AP2B1   | 33905065  | 34053436  | 17q12    | AP-2 complex subunit beta                                      |
| AP3S1   | 115177178 | 115249778 | 5q22.3   | AP-3 complex subunit sigma-1                                   |
| AP3S2   | 90373831  | 90437574  | 15q26.1  | AP-3 complex subunit sigma-2                                   |
| APBB2   | 40812044  | 41218731  | 4p13     | Amyloid beta A4 precursor protein-binding family B member 2    |
| APEH    | 49711435  | 49721396  | 3p21.31  | Acylamino-acid-releasing enzyme                                |
| APEX1   | 20923350  | 20925927  | 14q11.2  | DNA-(apurinic or apyrimidinic site) lyase                      |
| APEX2   | 55026790  | 55035490  | Xp11.21  | DNA-(apurinic or apyrimidinic site) lyase 2                    |
| APOA1   | 116706467 | 116708666 | 11q23.3  | Apolipoprotein A-I   |
| APOA2   | 161192082 | 161193421 | 1q23.3   | Apolipoprotein A-II  |
| APOD    | 195295573 | 195311076 | 3q29     | Apolipoprotein D   |
| APOE    | 45409011  | 45412650  | 19q13.32 | Apolipoprotein E   |
| APOH    | 64208151  | 64252643  | 17q24.2  | Beta-2-glycoprotein 1  |
| APOL2   | 36622256  | 36636000  | 22q12.3  | Apolipoprotein L2  |
| APPBP1  | 66836778  | 66907159  | 16q22.1  | NEDD8-activating enzyme E1 regulatory subunit                  |
| AQP2    | 50344524  | 50352664  | 12q13.12 | Aquaporin-2  |
| AQP3    | 33441152  | 33447609  | 9p13.3   | Aquaporin-3  |
| AQP5    | 50355653  | 50359464  | 12q13.12 | Aquaporin-5  |
| AQP5    | 50355653  | 50359464  | 12q13.12 | Aquaporin-5  |
| AQP9    | 58430368  | 58478110  | 15q21.3  | Aquaporin-9  |
| ARAF    | 47420516  | 47431307  | Xp11.23  | Serine/threonine-protein kinase A-Raf                          |
| ARAF1   | 47420516  | 47431307  | Xp11.23  | Serine/threonine-protein kinase A-Raf                          |
| ARC     | 143692405 | 143696833 | 8q24.3   | Activity-regulated cytoskeleton-associated protein             |
| ARFGAP3 | 43192508  | 43254112  | 22q13.2  | ADP-ribosylation factor GTPase-activating protein 3            |
| ARFIP2  | 6496910   | 6502666   | 11p15.4  | Arfaptin-2   |

|          |           |           |          |  |
|----------|-----------|-----------|----------|--|
| ARG1     | 131894284 | 131905472 | 6q23.2   | Arginase-1   |
| ARHA     | 49396578  | 49450431  | 3p21.31  | Transforming protein RhoA                                    |
| ARHB     | 20646835  | 20649200  | 2p24.1   | Rho-related GTP-binding protein RhoB                         |
| ARHC     | 113243728 | 113250056 | 1p13.2   | Rho-related GTP-binding protein RhoC                         |
| ARHG     | 3848208   | 3862213   | 11p15.4  | Rho-related GTP-binding protein RhoG                         |
| ARHGDI1B | 15094951  | 15114662  | 12p12.3  | Rho GDP-dissociation inhibitor 2                             |
| ARHGEF1  | 42387228  | 42434302  | 19q13.2  | Rho guanine nucleotide exchange factor 1                     |
| ARHGEF5  | 144052381 | 144077725 | 7q35     | Rho guanine nucleotide exchange factor 5                     |
| ARHI     | 68511645  | 68517314  | 1p31.3   | GTP-binding protein Di-Ras3                                  |
| ARL1     | 101786898 | 101801598 | 12q23.2  | ADP-ribosylation factor-like protein 1                       |
| ARL3     | 104433488 | 104474164 | 10q24.32 | ADP-ribosylation factor-like protein 3                       |
| ARL5A    | 152645498 | 152685006 | 2q23.3   | ADP-ribosylation factor-like protein 5A                      |
| ARL5B    | 18948334  | 18970568  | 10p12.31 | ADP-ribosylation factor-like protein 5B                      |
| ARMCX2   | 100910267 | 100914876 | Xq22.1   | Armadillo repeat-containing X-linked protein 2               |
| ARMCX3   | 100877787 | 100882833 | Xq22.1   | Armadillo repeat-containing X-linked protein 3               |
| ARPM1    | 169484709 | 169487683 | 3q26.2   | Actin-related protein T3                                     |
| ARRB2    | 4613784   | 4624794   | 17p13.2  | Beta-arrestin-2  |
| ART3     | 76932337  | 77033955  | 4q21.1   | Ecto-ADP-ribosyltransferase 3                                |
| ASB3     | 53759810  | 54087170  | 2p16.2   | Ankyrin repeat and SOCS box protein 3                        |
| ASCL1    | 103351464 | 103354294 | 12q23.2  | Achaete-scute homolog 1                                      |
| ASGR1    | 7076750   | 7082883   | 17p13.1  | Asialoglycoprotein receptor 1                                |
| ASGR2    | 7004641   | 7019019   | 17p13.1  | Asialoglycoprotein receptor 2                                |
| ASNS     | 97481430  | 97501854  | 7q21.3   | Asparagine synthetase [glutamine-hydrolyzing]                |
| ASPA     | 3375668   | 3406713   | 17p13.2  | Aspartoacylase   |
| ASPSR1   | 79934683  | 79975282  | 17q25.3  | Tether containing UBX domain for GLUT4                       |
| ATF3     | 212738676 | 212794119 | 1q32.3   | Cyclic AMP-dependent transcription factor ATF-3              |
| ATF4     | 39915700  | 39918691  | 22q13.1  | Cyclic AMP-dependent transcription factor ATF-4              |
| ATG10    | 81267844  | 81572676  | 5q14.1   | Ubiquitin-like-conjugating enzyme ATG10                      |
| ATG3     | 112251356 | 112280893 | 3q13.2   | Ubiquitin-like-conjugating enzyme ATG3                       |
| ATG4C    | 63249806  | 63331184  | 1p31.3   | Cysteine protease ATG4C                                      |
| ATIC     | 216176540 | 216214487 | 2q35     | Bifunctional purine biosynthesis protein PURH                |
| ATOH7    | 69990386  | 69991871  | 10q21.3  | Protein atonal homolog 7                                     |
| ATP5B    | 57031959  | 57039798  | 12q13.3  | ATP synthase subunit beta, mitochondrial                     |
| ATP5G2   | 54026510  | 54071192  | 12q13.13 | ATP synthase F(0) complex subunit C2, mitochondrial          |
| ATP6V0D1 | 67471917  | 67515140  | 16q22.1  | V-type proton ATPase subunit d 1                             |
| ATXN10   | 46067678  | 46241187  | 22q13.31 | Ataxin-10  |
| AUH      | 93976097  | 94124195  | 9q22.31  | Methylglutaconyl-CoA hydratase, mitochondrial                |
| AURKA    | 54944445  | 54967393  | 20q13.2  | Aurora kinase A  |
| AVPI1    | 99437181  | 99447080  | 10q24.2  | Arginine vasopressin-induced protein 1                       |
| AYP1     | 38059189  | 38069245  | 14q21.1  | Hepatocyte nuclear factor 3-alpha                            |
| B3GNT1   | 66112843  | 66115163  | 11q13.2  | Beta-1,4-glucuronyltransferase 1                             |
| B4-2     | 89790470  | 89794879  | 6q15     | Proline-rich nuclear receptor coactivator 1                  |
| B4GALT3  | 161141100 | 161147287 | 1q23.3   | Beta-1,4-galactosyltransferase 3                             |
| B4GALT7  | 177027101 | 177037348 | 5q35.3   | Beta-1,4-galactosyltransferase 7                             |
| BAAT     | 104122699 | 104145801 | 9q31.1   | Bile acid-CoA:amino acid N-acyltransferase                   |
| BACE1    | 117156402 | 117186975 | 11q23.3  | Beta-secretase 1   |
| BAD      | 64037302  | 64052176  | 11q13.1  | Bcl2-associated agonist of cell death                        |
| BAG1     | 33247818  | 33264761  | 9p13.3   | BAG family molecular chaperone regulator 1                   |
| BAG3     | 121410882 | 121437331 | 10q26.11 | BAG family molecular chaperone regulator 3                   |
| BAIAP2   | 79008948  | 79091232  | 17q25.3  | Brain-specific angiogenesis inhibitor 1-associated protein 2 |
| BAK1     | 33540329  | 33548019  | 6p21.31  | Bcl-2 homologous antagonist/killer                           |
| BANP     | 87982850  | 88110924  | 16q24.2  | Protein BANP   |
| BAP1     | 52435029  | 52444366  | 3p21.1   | Ubiquitin carboxyl-terminal hydrolase BAP1                   |

|          |            |            |          |  |
|----------|------------|------------|----------|--|
| BASP1    | 17065707   | 17276943   | 5p15.1   | Brain acid soluble protein 1   |
| BAT4     | 31629006   | 31634060   | 6p21.33  | G patch domain and ankyrin repeat-containing protein 1                   |
| BATF     | 75988768   | 76013358   | 14q24.3  | Basic leucine zipper transcriptional factor ATF-like                     |
| BAX      | 49458072   | 49465055   | 19q13.33 | Apoptosis regulator BAX  |
| BBOX1    | 27062272   | 27149356   | 11p14.2  | Gamma-butyrobetaine dioxygenase  |
| BBS2     | 56500748   | 56554195   | 16q12.2  | Bardet-Biedl syndrome 2 protein  |
| BBS4     | 72978527   | 73030817   | 15q24.1  | Bardet-Biedl syndrome 4 protein  |
| BC-2     | 59062933   | 59066491   | 19q13.43 | Charged multivesicular body protein 2a                                   |
| BCAS2    | 115110178  | 115124260  | 1p13.2   | Pre-mRNA-splicing factor SPF27   |
| BCAT2    | 49298319   | 49314286   | 19q13.33 | Branched-chain-amino-acid aminotransferase, mitochondrial                |
| BCL10    | 85731931   | 85742773   | 1p22.3   | B-cell lymphoma/leukemia 10  |
| BCL2     | 60790579   | 60987361   | 18q21.33 | Apoptosis regulator Bcl-2  |
| BCL2A1   | 80253231   | 80263788   | 15q25.1  | Bcl-2-related protein A1   |
| BCL2L1   | 30252255   | 30311792   | 20q11.21 | Bcl-2-like protein 1   |
| BCL2L13  | 18111621   | 18213388   | 22q11.21 | Bcl-2-like protein 13  |
| BECN1    | 40962152   | 40985367   | 17q21.31 | Beclin-1   |
| BET1     | 93592074   | 93633694   | 7q21.3   | BET1 homolog   |
| BGN      | 152760397  | 152775012  | Xq28     | Biglycan   |
| BHMT2    | 78365540   | 78385289   | 5q14.1   | S-methylmethionine--homocysteine S-methyltransferase BHMT2               |
| BIK      | 43506754   | 43525718   | 22q13.2  | Bcl-2-interacting killer   |
| BIRC5    | 76210267   | 76221717   | 17q25.3  | Baculoviral IAP repeat-containing protein 5                              |
| BIRC7    | 61867235   | 61871859   | 20q13.33 | Baculoviral IAP repeat-containing protein 7                              |
| BLZF1    | 169337208  | 169365778  | 1q24.2   | Golgin-45  |
| BMP10    | 69092613   | 69098649   | 2p13.3   | Bone morphogenetic protein 10  |
| BMP5     | 55618443   | 55740362   | 6p12.1   | Bone morphogenetic protein 5   |
| BMP7     | 55743804   | 55841685   | 20q13.31 | Bone morphogenetic protein 7   |
| BMPRI1A  | 88516407   | 88692595   | 10q23.2  | Bone morphogenetic protein receptor type-1A                              |
| BNIP2    | 59951345   | 59981733   | 15q22.2  | BCL2/adenovirus E1B 19 kDa protein-interacting protein 2                 |
| BOK      | 242498136  | 242513546  | 2q37.3   | Bcl-2-related ovarian killer protein                                     |
| BPIL1    | 31595406   | 31611515   | 20q11.21 | BPI fold-containing family B member 2                                    |
| BRE      | 28112808   | 28561768   | 2p23.2   | BRCA1-A complex subunit BRE  |
| BTBD1    | 83685174   | 83736106   | 15q25.2  | BTB/POZ domain-containing protein 1                                      |
| BTBD14A  | 138898383  | 138987131  | 9q34.3   | Nucleus accumbens-associated protein 2                                   |
| BTF3     | 72794233   | 72801460   | 5q13.2   | Transcription factor BTF3  |
| BTG1     | 92536286   | 92539673   | 12q21.33 | Protein BTG1   |
| BUD13    | 116618886  | 116643704  | 11q23.3  | BUD13 homolog  |
| BZW1     | 201675317  | 201688569  | 2q33.1   | Basic leucine zipper and W2 domain-containing protein 1                  |
| BZW2     | 16685756   | 16746148   | 7p21.1   | Basic leucine zipper and W2 domain-containing protein 2                  |
| C10orf33 | 100143322  | 100174941  | 10q24.2  | Pyridine nucleotide-disulfide oxidoreductase domain-containing protein 2 |
| C11orf64 | 60383209   | 60454622   | 11q12.2  | Putative uncharacterized protein encoded by LINC00301                    |
| C11orf73 | 86013253   | 86056969   | 11q14.2  | Protein Hikeshi  |
| C12orf24 | 110906169  | 110928190  | 12q24.11 | Protein FAM216A  |
| C15orf48 | 45,430,529 | 45,448,761 | 15q21.1  | Chromosome 15 Open Reading Frame 48                                      |
| C19orf28 | 3538259    | 3574288    | 19p13.3  | Major facilitator superfamily domain-containing protein 12               |
| C19orf43 | 12841454   | 12845589   | 19p13.2  | Uncharacterized protein C19orf43   |
| C19orf6  | 1009647    | 1021117    | 19p13.3  | Membralin  |

|          |             |             |          |  |
|----------|-------------|-------------|----------|--|
| C1orf128 | 24104895    | 24114722    | 1p36.11  | PITH domain-containing protein 1                                     |
| C1orf162 | 112016414   | 112021134   | 1p13.2   | Transmembrane protein C1orf162                                       |
| C1orf182 | 156307105   | 156316786   | 1q22     | TSSK6-activating co-chaperone protein                                |
| C1orf48  | 212899495   | 212965124   | 1q32.3   | Kinetochore-associated protein NSL1 homolog                          |
| C1orf62  | 109358520   | 109506106   | 1p13.3   | Protein AKNAD1   |
| C1QB     | 22979255    | 22988031    | 1p36.12  | Complement C1q subcomponent subunit B                                |
| C1QTNF1  | 77018896    | 77045870    | 17q25.3  | Complement C1q tumor necrosis factor-related protein 1               |
| C1QTNF2  | 159774758   | 159797648   | 5q33.3   | Complement C1q tumor necrosis factor-related protein 2               |
| C1QTNF6  | 37576207    | 37595425    | 22q12.3  | Complement C1q tumor necrosis factor-related protein 6               |
| C21orf66 | 34106210    | 34144169    | 21q22.11 | PAX3- and PAX7-binding protein 1                                     |
| C2orf15  | 99757948    | 99939204    | 2q11.2   | Uncharacterized protein C2orf15                                      |
| C2orf30  | 54014181    | 54045956    | 2p16.2   | Endoplasmic reticulum lectin 1                                       |
| C2orf4   | 32090129    | 32236299    | 2p22.3   | Protein MEMO1  |
| C3AR1    | 8210898     | 8219067     | 12p13.31 | C3a anaphylatoxin chemotactic receptor                               |
| C3orf37  | 128997671   | 129025029   | 3q21.3   | Embryonic stem cell-specific 5-hydroxymethylcytosine-binding protein |
| C4BPA    | 207277607   | 207318317   | 1q32.2   | C4b-binding protein alpha chain                                      |
| C5AR1    | 47793280    | 47825323    | 19q13.32 | C5a anaphylatoxin chemotactic receptor 1                             |
| C5orf15  | 133,955,502 | 133,968,787 | 5q31.1   | Chromosome 5 Open Reading Frame 15                                   |
| C6       | 41142336    | 41261540    | 5p13.1   | Complement component C6  |
| C6orf55  | 142468367   | 142545826   | 6q24.1   | Vacuolar protein sorting-associated protein VTA1 homolog             |
| C9orf116 | 138387027   | 138393580   | 9q34.3   | UPF0691 protein C9orf116   |
| C9orf156 | 100666771   | 100684852   | 9q22.33  | Nef-associated protein 1   |
| C9orf45  | 123,109,494 | 123,115,477 | 9q33.3   | Chromosome 9 Open Reading Frame 45                                   |
| C9orf80  | 115446206   | 115480516   | 9q32     | SOSS complex subunit C   |
| CA12     | 63613577    | 63674360    | 15q22.2  | Carbonic anhydrase 12  |
| CA2      | 86376081    | 86393722    | 8q21.2   | Carbonic anhydrase 2   |
| CABP1    | 121078355   | 121105127   | 12q24.31 | Calcium-binding protein 1  |
| CACNG4   | 64961026    | 65029514    | 17q24.2  | Voltage-dependent calcium channel gamma-4 subunit                    |
| CACNG6   | 54495542    | 54515923    | 19q13.42 | Voltage-dependent calcium channel gamma-6 subunit                    |
| CAGE1    | 7326889     | 7389976     | 6p24.3   | Cancer-associated gene 1 protein                                     |
| CALM2    | 47387221    | 47403740    | 2p21     | Calmodulin   |
| CALML3   | 5566924     | 5568225     | 10p15.1  | Calmodulin-like protein 3  |
| CALU     | 128379346   | 128411861   | 7q32.1   | Calumenin  |
| CAMK1D   | 12391481    | 12877545    | 10p13    | Calcium/calmodulin-dependent protein kinase type 1D                  |
| CAMKK1   | 3763609     | 3798185     | 17p13.2  | Calcium/calmodulin-dependent protein kinase kinase 1                 |
| CAMKK2   | 121675497   | 121736111   | 12q24.31 | Calcium/calmodulin-dependent protein kinase kinase 2                 |
| CAMKV    | 49895421    | 49907655    | 3p21.31  | CaM kinase-like vesicle-associated protein                           |
| CAPN1    | 64948037    | 64979477    | 11q13.1  | Calpain-1 catalytic subunit  |
| CAPN10   | 241526133   | 241557122   | 2q37.3   | Calpain-10   |
| CART     | 71014990    | 71016875    | 5q13.2   | Cocaine- and amphetamine-regulated transcript protein                |
| CASP2    | 142985308   | 143004789   | 7q34     | Caspase-2  |
| CASP3    | 185548850   | 185570663   | 4q35.1   | Caspase-3  |
| CASP4    | 104813593   | 104840163   | 11q22.3  | Caspase-4  |
| CASP6    | 110609785   | 110624739   | 4q25     | Caspase-6  |

|          |            |            |          |   |
|----------|------------|------------|----------|---|
| CASQ1    | 160160285  | 160171676  | 1q23.2   | Calsequestrin-1                                     |
| CASQ2    | 116242628  | 116311402  | 1p13.1   | Calsequestrin-2                                     |
| CAST     | 95860971   | 96115299   | 5q15     | Calpastatin   |
| CBLB     | 105374305  | 105588396  | 3q13.11  | E3 ubiquitin-protein ligase CBL-B                   |
| CBR1     | 37442239   | 37445464   | 21q22.12 | Carbonyl reductase [NADPH] 1                        |
| CBR1     | 37442239   | 37445464   | 21q22.12 | Carbonyl reductase [NADPH] 1                        |
| CBR1     | 37442239   | 37445464   | 21q22.12 | Carbonyl reductase [NADPH] 1                        |
| CBR3     | 37507210   | 37518864   | 21q22.12 | Carbonyl reductase [NADPH] 3                        |
| CBX6     | 39257455   | 39268319   | 22q13.1  | Chromobox protein homolog 6                         |
| CCDC102A | 57546090   | 57570511   | 16q21    | Coiled-coil domain-containing protein 102A          |
| CCDC104  | 55,519,595 | 55,545,879 | 2p16.1   | Cilia And Flagella Associated Protein 36            |
| CCDC107  | 35658301   | 35661508   | 9p13.3   | Coiled-coil domain-containing protein 107           |
| CCDC16   | 33288549   | 33290205   | 17q12    | Zinc finger protein 830                             |
| CCDC47   | 61822610   | 61853711   | 17q23.3  | Coiled-coil domain-containing protein 47            |
| CCDC72   | 48481667   | 48485616   | 3p21.31  | Translation machinery-associated protein 7          |
| CCDC86   | 60609544   | 60618554   | 11q12.2  | Coiled-coil domain-containing protein 86            |
| CCL11    | 32612687   | 32615353   | 17q12    | Eotaxin   |
| CCL13    | 32683471   | 32685629   | 17q12    | C-C motif chemokine 13                              |
| CCL20    | 228678558  | 228682272  | 2q36.3   | C-C motif chemokine 20                              |
| CCL27    | 34661877   | 34664045   | 9p13.3   | C-C motif chemokine 27                              |
| CCL5     | 34198495   | 34207797   | 17q12    | C-C motif chemokine 5                               |
| CCND1    | 69455855   | 69469242   | 11q13.3  | G1/S-specific cyclin-D1                             |
| CCND2    | 4382938    | 4414516    | 12p13.32 | G1/S-specific cyclin-D2                             |
| CCND3    | 41902671   | 42018095   | 6p21.1   | G1/S-specific cyclin-D3                             |
| CCNE1    | 30302805   | 30315215   | 19q12    | G1/S-specific cyclin-E1                             |
| CCNH     | 86687311   | 86708836   | 5q14.3   | Cyclin-H  |
| CCNI     | 77968311   | 77997158   | 4q21.1   | Cyclin-I  |
| CCR6     | 167525295  | 167553184  | 6q27     | C-C chemokine receptor type 6                       |
| CCS      | 66360292   | 66373490   | 11q13.2  | Copper chaperone for superoxide dismutase           |
| CCT3     | 156278759  | 156337664  | 1q22     | T-complex protein 1 subunit gamma                   |
| CCT5     | 10250033   | 10266524   | 5p15.2   | T-complex protein 1 subunit epsilon                 |
| CCT7     | 73460548   | 73480149   | 2p13.2   | T-complex protein 1 subunit eta                     |
| CD151    | 832843     | 839831     | 11p15.5  | CD151 antigen                                       |
| CD160    | 145695798  | 145715614  | 1q21.1   | CD160 antigen                                       |
| CD19     | 28943260   | 28950667   | 16p11.2  | B-lymphocyte antigen CD19                           |
| CD207    | 71057347   | 71062952   | 2p13.3   | C-type lectin domain family 4 member K              |
| CD2BP2   | 30362087   | 30366682   | 16p11.2  | CD2 antigen cytoplasmic tail-binding protein 2      |
| CD34     | 208057594  | 208084747  | 1q32.2   | Hematopoietic progenitor cell antigen CD34          |
| CD36     | 79998891   | 80308593   | 7q21.11  | Platelet glycoprotein 4                             |
| CD37     | 49838428   | 49846592   | 19q13.33 | Leukocyte antigen CD37                              |
| CD40     | 44746911   | 44758502   | 20q13.12 | Tumor necrosis factor receptor superfamily member 5 |
| CD44     | 35160417   | 35253949   | 11p13    | CD44 antigen  |
| CD48     | 160648536  | 160681641  | 1q23.3   | CD48 antigen  |
| CD59     | 33719807   | 33757991   | 11p13    | CD59 glycoprotein                                   |
| CD63     | 56119107   | 56123491   | 12q13.2  | CD63 antigen  |
| CD69     | 9905082    | 9913497    | 12p13.31 | Early activation antigen CD69                       |
| CD7      | 80272744   | 80275478   | 17q25.3  | T-cell antigen CD7                                  |
| CD74     | 149781200  | 149792492  | 5q32     | HLA class II histocompatibility antigen gamma chain |
| CD82     | 44585977   | 44641913   | 11p11.2  | CD82 antigen  |
| CDC2     | 50796310   | 50883179   | 14q21.3  | Cyclin-dependent kinase-like 1                      |
| CDC20    | 43824626   | 43828874   | 1p34.2   | Cell division cycle protein 20 homolog              |
| CDC27    | 45195069   | 45266788   | 17q21.32 | Cell division cycle protein 27 homolog              |
| CDC34    | 531714     | 542097     | 19p13.3  | Ubiquitin-conjugating enzyme E2 R1                  |

|          |           |           |          |   |
|----------|-----------|-----------|----------|---|
| CDC42    | 22379120  | 22419437  | 1p36.12  | Cell division control protein 42 homolog                  |
| CDC42EP1 | 37956454  | 37965412  | 22q13.1  | Cdc42 effector protein 1                                  |
| CDC42EP2 | 65082289  | 65089900  | 11q13.1  | Cdc42 effector protein 2                                  |
| CDC45L   | 19466982  | 19508135  | 22q11.21 | Cell division control protein 45 homolog                  |
| CDC5L    | 44355262  | 44418163  | 6p21.1   | Cell division cycle 5-like protein                        |
| CDCA1    | 163236366 | 163325554 | 1q23.3   | Kinetochore protein Nuf2                                  |
| CDCA4    | 105475910 | 105487485 | 14q32.33 | Cell division cycle-associated protein 4                  |
| CDCA5    | 64833772  | 64851636  | 11q13.1  | Sororin   |
| CDH15    | 89238175  | 89261900  | 16q24.3  | Cadherin-15   |
| CDIPT    | 29869678  | 29875057  | 16p11.2  | CDP-diacylglycerol--inositol 3-phosphatidyltransferase    |
| CDK2     | 56360553  | 56366568  | 12q13.2  | Cyclin-dependent kinase 2                                 |
| CDK4     | 58141510  | 58149796  | 12q14.1  | Cyclin-dependent kinase 4                                 |
| CDK5     | 150750899 | 150755617 | 7q36.1   | Cyclin-dependent-like kinase 5                            |
| CDK6     | 92234235  | 92465908  | 7q21.2   | Cyclin-dependent kinase 6                                 |
| CDKN1A   | 36644305  | 36655116  | 6p21.2   | Cyclin-dependent kinase inhibitor 1                       |
| CDKN1B   | 12867992  | 12875305  | 12p13.1  | Cyclin-dependent kinase inhibitor 1B                      |
| CDKN2A   | 21967751  | 21995300  | 9p21.3   | Cyclin-dependent kinase inhibitor 2A                      |
| CDKN2B   | 22002902  | 22009362  | 9p21.3   | Cyclin-dependent kinase 4 inhibitor B                     |
| CDKN2C   | 51426417  | 51440305  | 1p32.3   | Cyclin-dependent kinase 4 inhibitor C                     |
| CDSN     | 31127873  | 31133179  | 6p22.1   | Corneodesmosin  |
| CEACAM8  | 43084393  | 43099207  | 19q13.2  | Carcinoembryonic antigen-related cell adhesion molecule 8 |
| CEBPG    | 33864236  | 33873592  | 19q13.11 | CCAAT/enhancer-binding protein gamma                      |
| CENPH    | 68485375  | 68506184  | 5q13.2   | Centromere protein H                                      |
| CENPK    | 64813593  | 64858998  | 5q12.3   | Centromere protein K                                      |
| CES1     | 55836763  | 55867249  | 16q12.2  | Liver carboxylesterase 1                                  |
| CES2     | 66968347  | 66978999  | 16q22.1  | Cocaine esterase  |
| CFB      | 31895475  | 31919861  | 6p21.33  | Complement factor B                                       |
| CFHR1    | 196788887 | 196801319 | 1q31.3   | Complement factor H-related protein 1                     |
| CFHR2    | 196788898 | 196928356 | 1q31.3   | Complement factor H-related protein 2                     |
| CFP      | 47483612  | 47489704  | Xp11.23  | Properdin   |
| CH25H    | 90965694  | 90967071  | 10q23.31 | Cholesterol 25-hydroxylase                                |
| CHEK1    | 125495036 | 125546150 | 11q24.2  | Serine/threonine-protein kinase Chk1                      |
| CHEK2    | 29083731  | 29138410  | 22q12.1  | Serine/threonine-protein kinase Chk2                      |
| CHMP2A   | 59062933  | 59066491  | 19q13.43 | Charged multivesicular body protein 2a                    |
| CHMP5    | 33264940  | 33281977  | 9p13.3   | Charged multivesicular body protein 5                     |
| CHODL    | 19273580  | 19639690  | 21q21.1  | Chondrolectin   |
| CHRA1    | 141521397 | 141527236 | 8q24.3   | Chromatin accessibility complex protein 1                 |
| CHRM1    | 62676151  | 62689279  | 11q12.3  | Muscarinic acetylcholine receptor M1                      |
| CHRNA1   | 7348380   | 7361026   | 17p13.1  | Acetylcholine receptor subunit beta                       |
| CHST12   | 2443223   | 2474242   | 7p22.3   | Carbohydrate sulfotransferase 12                          |
| CHST8    | 34112861  | 34264414  | 19q13.11 | Carbohydrate sulfotransferase 8                           |
| CIB1     | 90773207  | 90777279  | 15q26.1  | Calcium and integrin-binding protein 1                    |
| CILP     | 65488337  | 65503826  | 15q22.31 | Cartilage intermediate layer protein 1                    |
| CITED1   | 71521488  | 71527037  | Xq13.1   | Cbp/p300-interacting transactivator 1                     |
| CITED2   | 139693393 | 139695757 | 6q24.1   | Cbp/p300-interacting transactivator 2                     |
| CKAP1    | 36605191  | 36616849  | 19q13.12 | Tubulin-folding cofactor B                                |
| CKLF     | 66586466  | 66600154  | 16q21    | Chemokine-like factor                                     |
| CKMT1B   | 43885252  | 43897099  | 15q15.3  | Creatine kinase U-type, mitochondrial                     |
| CKN1     | 60169658  | 60240900  | 5q12.1   | DNA excision repair protein ERCC-8                        |
| CKS1B    | 154947129 | 154951725 | 1q21.3   | Cyclin-dependent kinases regulatory subunit 1             |
| CLCC1    | 109472130 | 109506111 | 1p13.3   | Chloride channel CLIC-like protein 1                      |
| CLCF1    | 67131639  | 67141648  | 11q13.2  | Cardiotrophin-like cytokine factor 1                      |
| CLDN1    | 190023490 | 190040264 | 3q28     | Claudin-1   |

|         |           |           |          |  |
|---------|-----------|-----------|----------|--|
| CLEC1A  | 10222153  | 10264226  | 12p13.2  | C-type lectin domain family 1 member A                         |
| CLEC2B  | 10005583  | 10022735  | 12p13.31 | C-type lectin domain family 2 member B                         |
| CLIC1   | 31698358  | 31707540  | 6p21.33  | Chloride intracellular channel protein 1                       |
| CLIC2   | 154505500 | 154563966 | Xq28     | Chloride intracellular channel protein 2                       |
| CLIC5   | 45868045  | 46048132  | 6p21.1   | Chloride intracellular channel protein 5                       |
| CLNS1A  | 77225981  | 77348850  | 11q14.1  | Methylosome subunit pICln                                      |
| CLPP    | 6361463   | 6368919   | 19p13.3  | ATP-dependent Clp protease proteolytic subunit, mitochondrial  |
| CLSTN1  | 9789084   | 9884584   | 1p36.22  | Calsyntenin-1  |
| CLU     | 27454434  | 27472548  | 8p21.1   | Clusterin  |
| CMKOR1  | 237476430 | 237491001 | 2q37.3   | Atypical chemokine receptor 3                                  |
| CNIH4   | 224544552 | 224567161 | 1q42.11  | Protein cornichon homolog 4                                    |
| CNN2    | 1026298   | 1039068   | 19p13.3  | Calponin-2   |
| CNN3    | 95362507  | 95392834  | 1p21.3   | Calponin-3   |
| CNOT10  | 32726637  | 32815367  | 3p22.3   | CCR4-NOT transcription complex subunit 10                      |
| CNP     | 40118759  | 40129749  | 17q21.2  | 2',3'-cyclic-nucleotide 3'-phosphodiesterase                   |
| CNTROB  | 7835419   | 7853236   | 17p13.1  | Centrobilin  |
| COG1    | 71189129  | 71204646  | 17q25.1  | Conserved oligomeric Golgi complex subunit 1                   |
| COMT    | 19929130  | 19957498  | 22q11.21 | Catechol O-methyltransferase                                   |
| COPB1   | 14464986  | 14521573  | 11p15.2  | Coatamer subunit beta  |
| COPE    | 19010323  | 19030206  |          | Coatamer subunit epsilon                                       |
| COPS5   | 67955314  | 67996018  | 8q13.1   | COP9 signalosome complex subunit 5                             |
| COPS6   | 99686577  | 99689823  | 7q22.1   | COP9 signalosome complex subunit 6                             |
| COPZ2   | 46103533  | 46115392  | 17q21.32 | Coatamer subunit zeta-2  |
| COQ2    | 84182689  | 84206067  | 4q21.23  | 4-hydroxybenzoate polyprenyltransferase, mitochondrial         |
| COQ6    | 74416629  | 74430373  | 14q24.3  | Ubiquinone biosynthesis monooxygenase COQ6, mitochondrial      |
| CORO1B  | 67205519  | 67211292  | 11q13.2  | Coronin-1B   |
| COX11   | 53029263  | 53046146  | 17q22    | Cytochrome c oxidase assembly protein COX11, mitochondrial     |
| COX4I1  | 85832239  | 85840650  | 16q24.1  | Cytochrome c oxidase subunit 4 isoform 1, mitochondrial        |
| COX5B   | 98262503  | 98264846  | 2q11.2   | Cytochrome c oxidase subunit 5B, mitochondrial                 |
| COX6A1  | 120875893 | 120878545 | 12q24.31 | Cytochrome c oxidase subunit 6A1, mitochondrial                |
| COX6A1  | 120875893 | 120878545 | 12q24.31 | Cytochrome c oxidase subunit 6A1, mitochondrial                |
| COX6A2  | 31439052  | 31439967  | 16p11.2  | Cytochrome c oxidase subunit 6A2, mitochondrial                |
| COX6B1  | 36139125  | 36149763  | 19q13.12 | Cytochrome c oxidase subunit 6B1                               |
| COX7C   | 85913721  | 85916779  | 5q14.3   | Cytochrome c oxidase subunit 7C, mitochondrial                 |
| CP110   | 19535133  | 19564730  | 16p12.3  | Centriolar coiled-coil protein of 110 kDa                      |
| CPSF1   | 145618444 | 145634753 | 8q24.3   | Cleavage and polyadenylation specificity factor subunit 1      |
| CPT1C   | 50194155  | 50216988  | 19q13.33 | Carnitine O-palmitoyltransferase 1, brain isoform              |
| CRABP2  | 156669398 | 156675608 | 1q23.1   | Cellular retinoic acid-binding protein 2                       |
| CRADD   | 94071151  | 94288616  | 12q22    | Death domain-containing protein CRADD                          |
| CREB1   | 208394461 | 208468155 | 2q33.3   | Cyclic AMP-responsive element-binding protein 1                |
| CREB3L1 | 46299212  | 46342972  | 11p11.2  | Cyclic AMP-responsive element-binding protein 3-like protein 1 |
| CREG1   | 167498914 | 167523004 | 1q24.2   | Protein CREG1  |
| CRIP1   | 105952654 | 105955284 | 14q32.33 | Cysteine-rich protein 1  |
| CRIP2   | 105939299 | 105946499 | 14q32.33 | Cysteine-rich protein 2  |
| CRK     | 1323983   | 1366456   | 17p13.3  | Adapter molecule crk   |
| CRMP1   | 5749811   | 5894785   | 4p16.2   | Dihydropyrimidinase-related protein 1                          |
| CRTAP   | 33155471  | 33189265  | 3p22.3   | Cartilage-associated protein                                   |
| CRYAB   | 111779289 | 111794446 | 11q23.1  | Alpha-crystallin B chain                                       |

|           |           |           |          |   |
|-----------|-----------|-----------|----------|---|
| CSDA      | 10851683  | 10875911  | 12p13.2  | Y-box-binding protein 3   |
| CSF1      | 110452864 | 110473614 | 1p13.3   | Macrophage colony-stimulating factor 1  |
| CSF3      | 38171614  | 38174066  | 17q21.1  | Granulocyte colony-stimulating factor   |
| CSH2      | 61949372  | 61951126  | 17q23.3  | Chorionic somatomammotropin hormone 2   |
| CSNK1A1L  | 37677398  | 37679803  | 13q13.3  | Casein kinase I isoform alpha-like  |
| CSNK1E    | 38686697  | 38794527  | 22q13.1  | Casein kinase I isoform epsilon   |
| CSNK2A2   | 58191811  | 58231824  | 16q21    | Casein kinase II subunit alpha'   |
| CSNK2B    | 31633013  | 31638120  | 6p21.33  | Casein kinase II subunit beta   |
| CSRP2BP   | 18118762  | 18169031  | 20p11.23 | Cysteine-rich protein 2-binding protein                                       |
| CST3      | 23608534  | 23619110  | 20p11.21 | Cystatin-C  |
| CST6      | 65779312  | 65780976  | 11q13.1  | Cystatin-M  |
| CSTF1     | 54967427  | 54979518  | 20q13.2  | Cleavage stimulation factor subunit 1   |
| CSTF2     | 100075384 | 100095921 | Xq22.1   | Cleavage stimulation factor subunit 2   |
| CTBP1     | 1205236   | 1243741   | 4p16.3   | C-terminal-binding protein 1  |
| CTGF      | 132269316 | 132272513 | 6q23.2   | Connective tissue growth factor   |
| CTNNA1    | 137946656 | 138270723 | 5q31.2   | Catenin alpha-1   |
| CTNS      | 3539762   | 3564836   | 17p13.2  | Cystinosin  |
| CTSC      | 88026760  | 88070955  | 11q14.2  | Dipeptidyl peptidase 1  |
| CTSG      | 25042728  | 25045466  | 14q12    | Cathepsin G   |
| CTSH      | 79213400  | 79241916  | 15q25.1  | Pro-cathepsin H   |
| CTSL      | 90340434  | 90346308  | 9q21.33  | Cathepsin L1  |
| CTSZ      | 57570240  | 57582302  | 20q13.32 | Cathepsin Z   |
| CUL4B     | 119658464 | 119709649 | Xq24     | Cullin-4B   |
| CXADR     | 18884700  | 18965897  | 21q21.1  | Coxsackievirus and adenovirus receptor  |
| CXCL1     | 74735110  | 74736959  | 4q13.3   | Growth-regulated alpha protein  |
| CXCL10    | 76942273  | 76944650  | 4q21.1   | C-X-C motif chemokine 10  |
| CXCL11    | 76954835  | 76962568  | 4q21.1   | C-X-C motif chemokine 11  |
| CXCL2     | 74962752  | 74965010  | 4q13.3   | C-X-C motif chemokine 2   |
| CXCL5     | 74861359  | 74864496  | 4q13.3   | C-X-C motif chemokine 5   |
| CXCL6     | 74702214  | 74714781  | 4q13.3   | C-X-C motif chemokine 6   |
| CXCR3     | 70835766  | 70838367  | Xq13.1   | C-X-C chemokine receptor type 3   |
| CXorf20   | 18181051  | 18239024  | Xp22.13  | BEN domain-containing protein 2   |
| CXXC5     | 139026884 | 139063467 | 5q31.2   | CXXC-type zinc finger protein 5   |
| CYBA      | 88709691  | 88717560  | 16q24.3  | Cytochrome b-245 light chain  |
| CYC1      | 145149930 | 145152428 | 8q24.3   | Cytochrome c1, heme protein, mitochondrial                                    |
| CycA1     |           |           |          |   |
| CycB1     |           |           |          |   |
| CycB2     |           |           |          |   |
| CYCD1     |           |           |          |   |
| CycE2     | 95891998  | 95908906  | 8q22.1   | G1/S-specific cyclin-E2   |
| CYCS      | 25159710  | 25164980  | 7p15.3   | Cytochrome c  |
| CYFIP2    | 156693089 | 156822606 | 5q33.3   | Cytoplasmic FMR1-interacting protein 2  |
| CYP11A1   | 74630100  | 74660081  | 15q24.1  | Cholesterol side-chain cleavage enzyme, mitochondrial                         |
| CYP1A1    | 75011883  | 75017951  | 15q24.1  | Cytochrome P450 1A1   |
| CYP2C8    | 96796530  | 96829254  | 10q23.33 | Cytochrome P450 2C8   |
| CYP4B1    | 47223510  | 47285085  | 1p33     | Cytochrome P450 4B1   |
| CYP4F11   | 16023177  | 16045677  | 19p13.12 | Phylloquinone omega-hydroxylase CYP4F11                                       |
| CYR61     | 86046444  | 86049645  | 1p22.3   | Protein CYR61   |
| D21S2056E | 45209394  | 45225174  | 21q22.3  | Ribosomal RNA processing protein 1 homolog A                                  |
| DAD1      | 23033805  | 23058175  | 14q11.2  | Dolichyl-diphosphooligosaccharide--protein glycosyltransferase subunit DAD1   |
| DAPP1     | 100737990 | 100791311 | 4q23     | Dual adapter for phosphotyrosine and 3-phosphotyrosine and 3-phosphoinositide |
| DARC      | 159173097 | 159176290 | 1q23.2   | Atypical chemokine receptor 1   |

|              |            |            |          |   |
|--------------|------------|------------|----------|---|
| DC2          | 52558386   | 52569070   | 3p21.1   | 5'-nucleotidase domain-containing protein 2   |
| DCBLD2       | 98514785   | 98620533   | 3q12.1   | Discoidin, CUB and LCCL domain-containing protein 2                                       |
| DCC1         | 120846216  | 120868250  | 8q24.12  | Sister chromatid cohesion protein DCC1  |
| DCK          | 71858255   | 71896631   | 4q13.3   | Deoxycytidine kinase  |
| DCN          | 91539025   | 91576900   | 12q21.33 | Decorin   |
| DCP1A        | 53317447   | 53381654   | 3p21.1   | mRNA-decapping enzyme 1A  |
| DCT          | 95089558   | 95131936   | 13q32.1  | L-dopachrome tautomerase  |
| DCTN3        | 34613548   | 34620515   | 9p13.3   | Dynactin subunit 3  |
| DDOST        | 20978270   | 20988000   | 1p36.12  | Dolichyl-diphosphooligosaccharide--protein glycosyltransferase 48 kDa subunit             |
| DDT          | 24313554   | 24322660   | 22q11.23 | D-dopachrome decarboxylase  |
| DDX21        | 70715884   | 70744829   | 10q22.1  | Nucleolar RNA helicase 2  |
| DDX23        | 49223547   | 49246625   | 12q13.12 | Probable ATP-dependent RNA helicase DDX23   |
| DDX24        | 94517266   | 94547591   | 14q32.12 | ATP-dependent RNA helicase DDX24  |
| DDX39        | 14519631   | 14530192   | 19p13.12 | ATP-dependent RNA helicase DDX39A   |
| DDX50        | 70661034   | 70706603   | 10q22.1  | ATP-dependent RNA helicase DDX50  |
| DDX56        | 44605016   | 44614650   | 7p13     | Probable ATP-dependent RNA helicase DDX56   |
| DES          | 220283099  | 220291461  | 2q35     | Desmin  |
| DGAT1        | 145539954  | 145550573  | 8q24.3   | Diacylglycerol O-acyltransferase 1  |
| DHCR24       | 55315306   | 55352891   | 1p32.3   | Delta(24)-sterol reductase  |
| DHFR         | 79922047   | 79950802   | 5q14.1   | Dihydrofolate reductase   |
| DHRS3        | 12627939   | 12677737   | 1p36.22  | Short-chain dehydrogenase/reductase 3   |
| DHRSX        | 2137557    | 2420846    | Xp22.33  | Dehydrogenase/reductase SDR family member on chromosome X                                 |
| DHX16        | 30620896   | 30640814   | 6p21.33  | Putative pre-mRNA-splicing factor ATP-dependent RNA helicase DHX16                        |
| DHX32        | 127524906  | 127585005  | 10q26.2  | Putative pre-mRNA-splicing factor ATP-dependent RNA helicase DHX32                        |
| DIABLO       | 122692210  | 122712081  | 12q24.31 | Diablo homolog, mitochondrial   |
| DIDO1        | 61509090   | 61569304   | 20q13.33 | Death-inducer obliterator 1   |
| DIRAS3       | 68511645   | 68517314   | 1p31.3   | GTP-binding protein Di-Ras3   |
| DKC1         | 153991031  | 154005964  | Xq28     | H/ACA ribonucleoprotein complex subunit 4   |
| DKFZP564B147 | 134184962  | 134186226  | Xq26.3   | Protein FAM127B   |
| DKK3         | 11984653   | 12031316   | 11p15.3  | Dickkopf-related protein 3  |
| DLAT         | 111895538  | 111935114  | 11q23.1  | Dihydrolipoyllysine-residue acetyltransferase component of pyruvate dehydrogenase complex |
| DMAP1        | 44679127   | 44686353   | 1p34.1   | DNA methyltransferase 1-associated protein 1  |
| DNAJB1       | 14625582   | 14640582   | 19p13.12 | DnaJ homolog subfamily B member 1   |
| DNAJB4       | 78444859   | 78483648   | 1p31.1   | DnaJ homolog subfamily B member 4   |
| DNAJB9       | 108210012  | 108215294  | 7q31.1   | DnaJ homolog subfamily B member 9   |
| DNAJC7       | 40128451   | 40173394   | 17q21.2  | DnaJ homolog subfamily C member 7   |
| DNASE1       | 3661729    | 3730144    | 16p13.3  | Deoxyribonuclease-1   |
| DNASE1L3     | 58177984   | 58200424   | 3p14.3   | Deoxyribonuclease gamma   |
| DNM1L        | 32832134   | 32898486   | 12p11.21 | Dynammin-1-like protein   |
| DNPEP        | 220238268  | 220264744  | 2q35     | Aspartyl aminopeptidase   |
| DNTT         | 98064085   | 98098321   | 10q24.1  | DNA nucleotidylexotransferase   |
| DOC-1R       | 67,506,490 | 67,508,728 | 11q13.2  | Cyclin-Dependent Kinase 2 Associated Protein 2  |
| DOK4         | 57505863   | 57521239   | 16q21    | Docking protein 4   |
| DOM3Z        | 31937587   | 31940069   | 6p21.33  | Decapping and exoribonuclease protein   |
| DPM2         | 130697378  | 130700763  | 9q34.11  | Dolichol phosphate-mannose biosynthesis regulatory protein                                |
| DPP7         | 140004994  | 140009629  | 9q34.3   | Dipeptidyl peptidase 2  |
| DPP9         | 4675236    | 4724685    | 19p13.3  | Dipeptidyl peptidase 9  |
| DPPA4        | 109044988  | 109056419  | 3q13.13  | Developmental pluripotency-associated protein 4   |

|        |           |           |          |   |
|--------|-----------|-----------|----------|---|
| DRD2   | 113280318 | 113346413 | 11q23.2  | D(2) dopamine receptor  |
| DRD5   | 9783258   | 9785632   | 4p16.1   | D(1B) dopamine receptor   |
| DRG1   | 31795509  | 31924726  | 22q12.2  | Developmentally-regulated GTP-binding protein 1                 |
| DSCR2  | 40546695  | 40555777  | 21q22.2  | Proteasome assembly chaperone 1                                 |
| DSTN   | 17550508  | 17590564  | 20p12.1  | Destrin   |
| DTX2   | 76090993  | 76135312  | 7q11.23  | Probable E3 ubiquitin-protein ligase DTX2                       |
| DTYMK  | 242615157 | 242626406 | 2q37.3   | Thymidylate kinase  |
| DUSP11 | 73989311  | 74007284  | 2p13.1   | RNA/RNP complex-1-interacting phosphatase                       |
| DUSP12 | 161719548 | 161727028 | 1q23.3   | Dual specificity protein phosphatase 12                         |
| DUSP13 | 76854192  | 76868979  | 10q22.2  | Dual specificity protein phosphatase 13 isoform A               |
| DUSP14 | 35849937  | 35873603  | 17q12    | Dual specificity protein phosphatase 14                         |
| DUSP19 | 183943287 | 183964733 | 2q32.1   | Dual specificity protein phosphatase 19                         |
| DUSP22 | 291630    | 351355    | 6p25.3   | Dual specificity protein phosphatase 22                         |
| DUSP6  | 89741009  | 89747048  | 12q21.33 | Dual specificity protein phosphatase 6                          |
| DUT    | 48623208  | 48635570  | 15q21.1  | Deoxyuridine 5'-triphosphate nucleotidohydrolase, mitochondrial |
| DVL3   | 183873176 | 183891398 | 3q27.1   | Segment polarity protein dishevelled homolog DVL-3              |
| DYNLT1 | 159057506 | 159065771 | 6q25.3   | Dynein light chain Tctex-type 1                                 |
| DYRK1B | 40315990  | 40324841  | 19q13.2  | Dual specificity tyrosine-phosphorylation-regulated kinase 1B   |
| DYRK4  | 4671370   | 4723325   | 12p13.32 | Dual specificity tyrosine-phosphorylation-regulated kinase 4    |
| EBAG9  | 110551940 | 110578225 | 8q23.2   | Receptor-binding cancer antigen expressed on SiSo cells         |
| EBI2   | 99946784  | 99959659  | 13q32.3  | G-protein coupled receptor 183                                  |
| EBP    | 48379546  | 48387104  | Xp11.23  | 3-beta-hydroxysteroid-Delta(8),Delta(7)-isomerase               |
| ECGF1  | 50964181  | 50968485  | 22q13.33 | Thymidine phosphorylase   |
| ECM1   | 150480538 | 150486265 | 1q21.3   | Extracellular matrix protein 1                                  |
| ECRG4  | 106679702 | 106694615 | 2q12.2   | Augurin   |
| EDEM1  | 5229331   | 5261642   | 3p26.1   | ER degradation-enhancing alpha-mannosidase-like protein 1       |
| EDF1   | 139756571 | 139760738 | 9q34.3   | Endothelial differentiation-related factor 1                    |
| EDG1   | 101702444 | 101707074 | 1p21.2   | Sphingosine 1-phosphate receptor 1                              |
| EDG3   | 91606362  | 91619925  | 9q22.1   | Sphingosine 1-phosphate receptor 3                              |
| EEF1A1 | 74225473  | 74233520  | 6q13     | Elongation factor 1-alpha 1                                     |
| EEF1A2 | 62119366  | 62130505  | 20q13.33 | Elongation factor 1-alpha 2                                     |
| EEFSEC | 127872297 | 128127485 | 3q21.3   | Selenocysteine-specific elongation factor                       |
| EFEMP1 | 56093102  | 56151274  | 2p16.1   | EGF-containing fibulin-like extracellular matrix protein 1      |
| EFNB1  | 68048840  | 68061990  | Xq13.1   | Ephrin-B1   |
| EFTUD2 | 42927311  | 42977030  | 17q21.31 | 116 kDa U5 small nuclear ribonucleoprotein component            |
| EHD2   | 48216600  | 48246391  | 19q13.33 | EH domain-containing protein 2                                  |
| EHD4   | 42190950  | 42264776  | 15q15.1  | EH domain-containing protein 4                                  |
| EI24   | 125439112 | 125454575 | 11q24    | Etoposide-induced protein 2.4 homolog                           |
| EIF1   | 39845137  | 39848920  | 17q21.2  | Eukaryotic translation initiation factor 1                      |
| EIF2A  | 150264465 | 150302029 | 3q25.1   | Eukaryotic translation initiation factor 2A                     |
| EIF2B2 | 75469614  | 75476292  | 14q24.3  | Translation initiation factor eIF-2B subunit beta               |
| EIF2S3 | 24072833  | 24096088  | Xp22.11  | Eukaryotic translation initiation factor 2 subunit 3            |
| EIF3S2 | 32687529  | 32697205  | 1p35.1   | Eukaryotic translation initiation factor 3 subunit I            |
| EIF3S3 | 117654369 | 117779164 | 8q23.3   | Eukaryotic translation initiation factor 3 subunit H            |
| EIF3S6 | 109213445 | 109447562 | 8q23.1   | Eukaryotic translation initiation factor 3 subunit E            |
| EIF3S7 | 36906897  | 36925483  | 22q12.3  | Eukaryotic translation initiation factor 3 subunit D            |
| EIF3S8 | 28390900  | 28415200  | 16p11.2  | Eukaryotic translation initiation factor 3 subunit C            |

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|-----------|-------------|-------------|----------|---|
| EIF4A1    | 7476024     | 7482323     | 17p13.1  | Eukaryotic initiation factor 4A-I                                   |
| EIF4E     | 99792835    | 99851788    | 4q23     | Eukaryotic translation initiation factor 4E                         |
| EIF4ENIF1 | 31832963    | 31892094    | 22q12.2  | Eukaryotic translation initiation factor 4E trans-<br>porter        |
| EIF5A     | 7210318     | 7215774     | 17p13.1  | Eukaryotic translation initiation factor 5A-1                       |
| ELA3A     | 22303514    | 22325135    | 1p36.12  | Chymotrypsin-like elastase family member 3B                         |
| ELAC1     | 48494361    | 48514491    | 18q21.2  | Zinc phosphodiesterase ELAC protein 1                               |
| ELAVL2    | 23690102    | 23826335    | 9p21.3   | ELAV-like protein 2   |
| ELF3      | 201977073   | 201986316   | 1q32.1   | ETS-related transcription factor Elf-3                              |
| ELF5      | 34500340    | 34535352    | 11p13    | ETS-related transcription factor Elf-5                              |
| ELK1      | 47494920    | 47510003    | Xp11.23  | ETS domain-containing protein Elk-1                                 |
| ELL2      | 95220802    | 95297775    | 5q15     | RNA polymerase II elongation factor ELL2                            |
| ELP4      | 31531297    | 31805546    | 11p13    | Elongator complex protein 4   |
| EML1      | 100204030   | 100408397   | 14q32.2  | Echinoderm microtubule-associated protein-like 1                    |
| EMP1      | 13349650    | 13369708    | 12p13.1  | Epithelial membrane protein 1                                       |
| ENG       | 130577291   | 130617035   | 9q34.11  | Endoglin  |
| ENO1      | 8921061     | 8939308     | 1p36.23  | Alpha-enolase   |
| ENO3      | 4851387     | 4860426     | 17p13.2  | Beta-enolase  |
| ENPP2     | 120569326   | 120685693   | 8q24.12  | Ectonucleotide pyrophosphatase/phosphodiesterase<br>family member 2 |
| ENSA      | 150573327   | 150602088   | 1q21.3   | Alpha-endosulfine   |
| ENTPD2    | 139942550   | 139948497   | 9q34.3   | Ectonucleoside triphosphate diphosphohydrolase 2                    |
| EPB49     | 21906506    | 21940038    | 8p21.3   | Dematin   |
| EPHA2     | 16450832    | 16482582    | 1p36.13  | Ephrin type-A receptor 2  |
| EPHX1     | 225997794   | 226033260   | 1q42.12  | Epoxide hydrolase 1   |
| EPHX2     | 27348296    | 27403081    | 8p21.1   | Bifunctional epoxide hydrolase 2                                    |
| EPS8      | 15773092    | 16035263    | 12p12.3  | Epidermal growth factor receptor kinase substrate 8                 |
| EPSTI1    | 43460524    | 43566407    | 13q14.11 | Epithelial-stromal interaction protein 1                            |
| ERAL1     | 27181956    | 27188085    | 17q11.2  | GTPase Era, mitochondrial   |
| ERCC1     | 45910591    | 45982086    | 19q13.32 | DNA excision repair protein ERCC-1                                  |
| ERCC5     | 103497194   | 103528345   | 13q33.1  | DNA repair protein complementing XP-G cells                         |
| EREG      | 75230860    | 75254468    | 4q13.3   | Proepiregulin   |
| ERF       | 42751724    | 42759309    | 19q13.2  | ETS domain-containing transcription factor ERF                      |
| ESAM      | 124622026   | 124632186   | 11q24.2  | Endothelial cell-selective adhesion molecule                        |
| ET        | 128,458,761 | 128,587,558 | 11q24.3  | V-Ets Avian Erythroblastosis Virus E26 Oncogene<br>Homolog 1        |
| ETR101    | 13261229    | 13265722    | 19p13.2  | Immediate early response gene 2 protein                             |
| ETS1      | 128328656   | 128457453   | 11q24.3  | Protein C-ets-1   |
| ETS2      | 40177231    | 40196879    | 21q22.2  | Protein C-ets-2   |
| ETV3      | 157090983   | 157108266   | 1q23.1   | ETS translocation variant 3   |
| EXDL1     | 41474923    | 41522941    | 15q15.1  | Exonuclease 3'-5' domain-containing protein 1                       |
| EXOD1     | 20791515    | 20911671    | 16p12.3  | ERI1 exoribonuclease 2  |
| EXOSC3    | 37766975    | 37801434    | 9p13.2   | Exosome complex component RRP40                                     |
| F2R       | 76011868    | 76031606    | 5q13.3   | Proteinase-activated receptor 1                                     |
| F3        | 94994781    | 95007356    | 1p21.3   | Tissue factor   |
| FABP1     | 88422510    | 88427635    | 2p11.2   | Fatty acid-binding protein, liver                                   |
| FABP3     | 31838472    | 31849697    | 1p35.2   | Fatty acid-binding protein, heart                                   |
| FABP7     | 123100620   | 123105219   | 6q22.31  | Fatty acid-binding protein, brain                                   |
| FAIM      | 138327448   | 138352218   | 3q22.3   | Fas apoptotic inhibitory molecule 1                                 |
| FAM103A1  | 83654959    | 83659809    | 15q25.2  | RNMT-activating mini protein  |
| FAM107A   | 58549844    | 58613337    | 3p14.2   | Protein FAM107A   |
| FAM13C1   | 61005890    | 61122939    | 10q21.1  | Protein FAM13C  |
| FAM48A    | 37583449    | 37633850    | 13q13.3  | Transcription factor SPT20 homolog                                  |
| FAM76B    | 95502106    | 95523573    | 11q21    | Protein FAM76B  |
| FAP       | 163027194   | 163101661   | 2q24.2   | Prolyl endopeptidase FAP  |

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|---------|-----------|-----------|----------|---|
| FARS1   | 5261277   | 5771813   | 6p25.1   | Phenylalanine--tRNA ligase, mitochondrial                 |
| FAS     | 90750414  | 90775542  | 10q23.31 | Tumor necrosis factor receptor superfamily member 6       |
| FASLG   | 172628154 | 172636014 | 1q24.3   | Tumor necrosis factor ligand superfamily member 6         |
| FATE1   | 150884507 | 150891666 | Xq28     | Fetal and adult testis-expressed transcript protein       |
| FBL     | 40325098  | 40337054  | 19q13.2  | rRNA 2'-O-methyltransferase fibrillarin                   |
| FBXL13  | 102453308 | 102715286 | 7q22.1   | F-box/LRR-repeat protein 13                               |
| FBXL5   | 15606162  | 15683302  | 4p15.32  | F-box/LRR-repeat protein 5                                |
| FBXL8   | 67193834  | 67198473  | 16q22.1  | F-box/LRR-repeat protein 8                                |
| FBXO2   | 11708424  | 11715842  | 1p36.22  | F-box only protein 2                                      |
| FBXO5   | 153291664 | 153304714 | 6q25.2   | F-box only protein 5                                      |
| FBXW11  | 171288553 | 171433877 | 5q35.1   | F-box/WD repeat-containing protein 11                     |
| FBXW2   | 123514256 | 123555690 | 9q33.2   | F-box/WD repeat-containing protein 2                      |
| FCGR2A  | 161475220 | 161493803 | 1q23.3   | Low affinity immunoglobulin gamma Fc region receptor II-a |
| FCN1    | 137801431 | 137809809 | 9q34.3   | Ficolin-1   |
| FCN3    | 27695603  | 27701315  | 1p36.11  | Ficolin-3   |
| FCRL3   | 157644111 | 157670647 | 1q23.1   | Fc receptor-like protein 3                                |
| FCRLM1  | 161676762 | 161684142 | 1q23.3   | Fc receptor-like A  |
| FDPS    | 155278539 | 155290457 | 1q22     | Farnesyl pyrophosphate synthase                           |
| FEM1C   | 114856608 | 114880591 | 5q22.3   | Protein fem-1 homolog C                                   |
| FEN1    | 61560109  | 61564716  | 11q12.2  | Flap endonuclease 1                                       |
| FEV     | 219845809 | 219850379 | 2q35     | Protein FEV   |
| FFAR3   | 35849362  | 35851387  | 19q13.12 | Free fatty acid receptor 3                                |
| FGD2    | 36973422  | 36996846  | 6p21.2   | FYVE, RhoGEF and PH domain-containing protein 2           |
| FGF10   | 44303646  | 44389808  | 5p12     | Fibroblast growth factor 10                               |
| FGF13   | 137713735 | 138304939 | Xq26.3   | Fibroblast growth factor 13                               |
| FGF16   | 76709648  | 76712769  | Xq21.1   | Fibroblast growth factor 16                               |
| FGF18   | 170846660 | 170884627 | 5q35.1   | Fibroblast growth factor 18                               |
| FGF21   | 49258816  | 49261587  | 19q13.33 | Fibroblast growth factor 21                               |
| FGF7    | 49715293  | 49780972  | 15q21.2  | Fibroblast growth factor 7                                |
| FGFR1   | 38268656  | 38326352  | 8p11.22  | Fibroblast growth factor receptor 1                       |
| FGFR1OP | 167412670 | 167466201 | 6q27     | FGFR1 oncogene partner                                    |
| FGFR4   | 176513887 | 176525145 | 5q35.2   | Fibroblast growth factor receptor 4                       |
| FGFRL1  | 1003724   | 1020685   | 4p16.3   | Fibroblast growth factor receptor-like 1                  |
| FHIT    | 59735036  | 61237133  | 3p14.2   | Bis(5'-adenosyl)-triphosphatase                           |
| FHL2    | 105974169 | 106054970 | 2q12.1   | Four and a half LIM domains protein 2                     |
| FHL3    | 38462442  | 38471278  | 1p34.3   | Four and a half LIM domains protein 3                     |
| FHL5    | 97010424  | 97064512  | 6q16.1   | Four and a half LIM domains protein 5                     |
| FKBP10  | 39968932  | 39979465  | 17q21.2  | Peptidyl-prolyl cis-trans isomerase FKBP10                |
| FKBP14  | 30050203  | 30066300  | 7p14.3   | Peptidyl-prolyl cis-trans isomerase FKBP14                |
| FKBP3   | 45584803  | 45604522  | 14q21.2  | Peptidyl-prolyl cis-trans isomerase FKBP3                 |
| FKBP4   | 2904119   | 2914576   | 12p13.33 | Peptidyl-prolyl cis-trans isomerase FKBP4                 |
| FKBP5   | 35541362  | 35696360  | 6p21.31  | Peptidyl-prolyl cis-trans isomerase FKBP5                 |
| FKBP8   | 18642561  | 18654887  | 19p13.11 | Peptidyl-prolyl cis-trans isomerase FKBP8                 |
| FKBPL   | 32096484  | 32098068  | 6p21.33  | FK506-binding protein-like                                |
| FKHL18  | 30432103  | 30433420  | 20q11.21 | Forkhead box protein S1                                   |
| FKRP    | 47249303  | 47280245  | 19q13.32 | Fukutin-related protein                                   |
| FLI1    | 128556430 | 128683162 | 11q24.3  | Friend leukemia integration 1 transcription factor        |
| FLOT2   | 27206353  | 27224697  | 17q11.2  | Flotillin-2   |
| FLRT3   | 14303634  | 14318262  | 20p12.1  | Leucine-rich repeat transmembrane protein FLRT3           |
| FMO3    | 171060018 | 171086959 | 1q24.3   | Dimethylaniline monooxygenase [N-oxide-forming] 3         |
| FN1     | 216225163 | 216300895 | 2q35     | Fibronectin   |

|           |            |            |              |   |
|-----------|------------|------------|--------------|---|
| FOLH1     | 49168187   | 49230222   | 11p11.12     | Glutamate carboxypeptidase 2                                |
| FOLR1     | 71900602   | 71907345   | 11q13.4      | Folate receptor alpha                                       |
| FOS       | 75745477   | 75748933   | 14q24.3      | Proto-oncogene c-Fos  |
| FOSB      | 45971253   | 45978437   | 19q13.32     | Protein fosB  |
| FOSL1     | 65659520   | 65668044   | 11q13.1      | Fos-related antigen 1                                       |
| FOSL2     | 28615315   | 28640179   | 2p23.2       | Fos-related antigen 2                                       |
| FRAT2     | 99092255   | 99094458   | 10q24.1      | GSK-3-binding protein FRAT2                                 |
| FRK       | 116252312  | 116381921  | 6q22.1       | Tyrosine-protein kinase FRK                                 |
| FSCN1     | 5632439    | 5646286    | 7p22.1       | Fascin  |
| FST       | 52776239   | 52782964   | 5q11.2       | Follistatin   |
| FTH1      | 61727190   | 61735132   | 11q12.3      | Ferritin heavy chain  |
| FTL       | 49468558   | 49470135   | 19q13.33     | Ferritin light chain  |
| FTSJ3     | 61896793   | 61907372   | 17q23.3      | pre-rRNA processing protein FTSJ3                           |
| FUBP1     | 78409740   | 78444794   | 1p31.1       | Far upstream element-binding protein 1                      |
| FUT11     | 75532049   | 75540009   | 10q22.2      | Alpha-(1,3)-fucosyltransferase 11                           |
| FXYP2     | 117671559  | 117699413  | 11q23.3      | Sodium/potassium-transporting ATPase subunit gamma          |
| FXYP7     | 35634154   | 35645204   | 19q13.12     | FXYP domain-containing ion transport regulator 7            |
| G0S2      | 209848765  | 209849733  | 1q32.2       | G0/G1 switch protein 2                                      |
| G1P2      | 948803     | 949920     | 1p36.33      | Ubiquitin-like protein ISG15                                |
| G3BP      | 151150606  | 151192346  | 5q33.1       | Ras GTPase-activating protein-binding protein 1             |
| GABARAP   | 7143333    | 7146089    | 17p13.1      | Gamma-aminobutyric acid receptor-associated protein         |
| GABRA3    | 151334706  | 151619830  | Xq28         | Gamma-aminobutyric acid receptor subunit alpha-3            |
| GADD45A   | 68150744   | 68154021   | 1p31.3       | Growth arrest and DNA damage-inducible protein GADD45 alpha |
| GAGE2     | 49354132   | 49361430   | Xp11.23      | G antigen 2A  |
| GAGE4     | -          | -          | Xp11.2-p11.4 | G antigen 4   |
| GAGEB1    | 49452053   | 49460596   | Xp11.23      | P antigen family member 1                                   |
| GAL3ST1   | 30950622   | 30970574   | 22q12.2      | Galactosylceramide sulfotransferase                         |
| GALC      | 88304164   | 88460009   | 14q31.3      | Galactocerebrosidase  |
| GALE      | 24122089   | 24127271   | 1p36.11      | UDP-glucose 4-epimerase                                     |
| GALNACT-2 | 43633934   | 43680756   | 10q11.21     | Chondroitin sulfate N-acetylgalactosaminyltransferase 2     |
| GALNT6    | 51745031   | 51786651   | 12q13.13     | Polypeptide N-acetylgalactosaminyltransferase 6             |
| GAP43     | 115342171  | 115440337  | 3q13.31      | Neuromodulin  |
| GAPDH     | 6643093    | 6647537    | 12p13.31     | Glyceraldehyde-3-phosphate dehydrogenase                    |
| GARS      | 30634297   | 30673649   | 7p14.3       | Glycine--tRNA ligase  |
| GAS7      | 9813926    | 10101868   | 17p13.1      | Growth arrest-specific protein 7                            |
| GATA3     | 8095567    | 8117161    | 10p14        | Trans-acting T-cell-specific transcription factor GATA-3    |
| GBAS      | 56019486   | 56067874   | 7p11.2       | Protein NipSnap homolog 2                                   |
| GBL       | 27265232   | 27293490   | 2p23.3       | Cytosolic carboxypeptidase-like protein 5                   |
| GBP5      | 89724633   | 89738544   | 1p22.2       | Guanylate-binding protein 5                                 |
| GC20      | 40351175   | 40353915   | 3p22.1       | Eukaryotic translation initiation factor 1b                 |
| GCG       | 162999392  | 163008914  | 2q24.2       | Glucagon  |
| GCH1      | 55308726   | 55369570   | 14q22.2      | GTP cyclohydrolase 1  |
| GCLM      | 94350761   | 94374966   | 1p22.1       | Glutamate--cysteine ligase regulatory subunit               |
| GDB       | 138824815  | 138853226  | 9q34.3       | Ubiquitin-associated domain-containing protein 1            |
| GDBR1     |            |            |              |   |
| GDEP      | 79,827,471 | 79,877,770 | 4q21.21      | Prostate Cancer Associated Transcript 4                     |
| GDF3      | 7842378    | 7848372    | 12p13.31     | Growth/differentiation factor 3                             |
| GDNF      | 37812779   | 37839788   | 5p13.2       | Glial cell line-derived neurotrophic factor                 |
| GENX-3414 | 77172886   | 77232752   | 4q21.1       | Starch-binding domain-containing protein 1                  |
| GFI1      | 92940319   | 92952433   | 1p22.1       | Zinc finger protein Gfi-1                                   |

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| GGA2    | 23474863  | 23533316  | 16p12.2  | ADP-ribosylation factor-binding protein GGA2                       |
| GGN     | 38874905  | 38878722  | 19q13.2  | Gametogenetin  |
| GGT1    | 24979718  | 25024972  | 22q11.23 | Gamma-glutamyltranspeptidase 1                                     |
| GH2     | 61957578  | 61959295  | 17q23.3  | Growth hormone variant   |
| GIF     | 59596741  | 59612974  | 11q12.1  | Gastric intrinsic factor   |
| GIPC1   | 14588572  | 14606944  | 19p13.12 | PDZ domain-containing protein GIPC1                                |
| GJA1    | 121756838 | 121770873 | 6q22.31  | Gap junction alpha-1 protein                                       |
| GJA5    | 147228332 | 147245484 | 1q21.2   | Gap junction alpha-5 protein                                       |
| GJB1    | 70435044  | 70445366  | Xq13.1   | Gap junction beta-1 protein  |
| GJB2    | 20761609  | 20767037  | 13q12.11 | Gap junction beta-2 protein  |
| GK      | 30671476  | 30748725  | Xp21.2   | Glycerol kinase  |
| GLRX    | 95087023  | 95158709  | 5q15     | Glutaredoxin-1   |
| GLTSCR2 | 48248779  | 48260315  | 19q13.33 | Glioma tumor suppressor candidate region gene 2 protein            |
| GLUL    | 182350839 | 182361341 | 1q25.3   | Glutamine synthetase   |
| GLYAT   | 58407899  | 58499447  | 11q12.1  | Glycine N-acyltransferase  |
| GM2A    | 150591711 | 150650001 | 5q33.1   | Ganglioside GM2 activator  |
| GMD5    | 1624041   | 2245926   | 6p25.3   | GDP-mannose 4,6 dehydratase  |
| GMFB    | 54941202  | 54955914  | 14q22.2  | Glia maturation factor beta  |
| GMFG    | 39818993  | 39833012  | 19q13.2  | Glia maturation factor gamma                                       |
| GNAI3   | 63006833  | 63052957  | 17q24.1  | Guanine nucleotide-binding protein subunit alpha-13                |
| GNAI2   | 50263724  | 50296787  | 3p21.31  | Guanine nucleotide-binding protein G(i) subunit alpha-2            |
| GNAI3   | 110091233 | 110136975 | 1p13.3   | Guanine nucleotide-binding protein G(k) subunit alpha              |
| GNAT2   | 110145889 | 110155679 | 1p13.3   | Guanine nucleotide-binding protein G(t) subunit alpha-2            |
| GNB2L1  | 180663909 | 180675096 | 5q35.3   | Guanine nucleotide-binding protein subunit beta-2-like 1           |
| GNB3    | 6949118   | 6956557   | 12p13.31 | Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-3   |
| GNG10   | 114423615 | 114432526 | 9q31.3   | Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-10 |
| GNG11   | 93551011  | 93557922  | 7q21.3   | Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-11 |
| GNG3    | 62475130  | 62476673  | 11q12.3  | Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-3  |
| GNGT1   | 93220885  | 93540577  | 7q21.3   | Guanine nucleotide-binding protein G(T) subunit gamma-T1           |
| GNL1    | 30509154  | 30524951  | 6p21.33  | Guanine nucleotide-binding protein-like 1                          |
| GNLY    | 85912298  | 85925977  | 2p11.2   | Granulysin   |
| GNRH1   | 25276776  | 25282170  | 8p21.2   | Progonadoliberin-1   |
| GORASP2 | 171784974 | 171823639 | 2q31.1   | Golgi reassembly-stacking protein 2                                |
| GOSR2   | 45000483  | 45105003  | 17q21.32 | Golgi SNAP receptor complex member 2                               |
| GPBP1L1 | 46092976  | 46153785  | 1p34.1   | Vasculin-like protein 1  |
| GPC3    | 132669773 | 133119922 | Xq26.2   | Glypican-3   |
| GPC4    | 132434131 | 132549518 | Xq26.2   | Glypican-4   |
| GPHN    | 66974125  | 67648520  | 14q23.3  | Gephyrin   |
| GPIAP1  | 34073230  | 34122703  | 11p13    | Caprin-1   |
| GPM6B   | 13789150  | 13956757  | Xp22.2   | Neuronal membrane glycoprotein M6-b                                |
| GPR114  | 57576333  | 57625593  | 16q21    | Probable G-protein coupled receptor 114                            |
| GPR146  | 1084212   | 1098897   | 7p22.3   | Probable G-protein coupled receptor 146                            |
| GPR157  | 9160364   | 9189229   | 1p36.23  | Probable G-protein coupled receptor 157                            |
| GPR17   | 128403439 | 128410213 | 2q14.3   | Uracil nucleotide/cysteinyl leukotriene receptor                   |

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| GPR173   | 53078273  | 53109797  | Xp11.22  | Probable G-protein coupled receptor 173                              |
| GPR30    | 1121844   | 1133451   | 7p22.3   | G-protein coupled estrogen receptor 1                                |
| GPR4     | 46093022  | 46105466  | 19q13.32 | G-protein coupled receptor 4   |
| GPR41    | 35849362  | 35851387  | 19q13.12 | Free fatty acid receptor 3   |
| GPR55    | 231772033 | 231825781 | 2q37.1   | G-protein coupled receptor 55  |
| GPR84    | 54756229  | 54758271  | 12q13.13 | G-protein coupled receptor 84  |
| GPR92    | 6728001   | 6745613   | 12p13.31 | Lysophosphatidic acid receptor 5                                     |
| GPRC5C   | 72420990  | 72447792  | 17q25.1  | G-protein coupled receptor family C group 5 member C                 |
| GPSM2    | 109417972 | 109477167 | 1p13.3   | G-protein-signaling modulator 2                                      |
| GPSN2    | 14627897  | 14676792  | 19p13.12 | Very-long-chain enoyl-CoA reductase                                  |
| GRAP2    | 40297086  | 40369725  | 22q13.1  | GRB2-related adapter protein 2                                       |
| GRB2     | 73314157  | 73401790  | 17q25.1  | Growth factor receptor-bound protein 2                               |
| GRINL1A  | 57884231  | 58074960  | 15q21.3  | DNA-directed RNA polymerase II subunit GRINL1A                       |
| GRO1     | 74735110  | 74736959  | 4q13.3   | Growth-regulated alpha protein                                       |
| GRP      | 56887400  | 56898006  | 18q21.32 | Gastrin-releasing peptide  |
| GRPEL1   | 7060633   | 7069924   | 4p16.1   | GrpE protein homolog 1, mitochondrial                                |
| GRWD1    | 48949030  | 48960279  | 19q13.33 | Glutamate-rich WD repeat-containing protein 1                        |
| GSG1L    | 27798850  | 28074830  | 16p12.1  | Germ cell-specific gene 1-like protein                               |
| GSK3B    | 119540170 | 119813264 | 3q13.33  | Glycogen synthase kinase-3 beta                                      |
| GSS      | 33516236  | 33543620  | 20q11.22 | Glutathione synthetase   |
| GSTA3    | 52761437  | 52774483  | 6p12.2   | Glutathione S-transferase A3   |
| GSTP1    | 67351066  | 67354131  | 11q13.2  | Glutathione S-transferase P  |
| GSTT1    | 24376133  | 24384680  | 22q11.23 | Glutathione S-transferase theta-1                                    |
| GTF2A2   | 59930261  | 59949740  | 15q22.2  | Transcription initiation factor IIA subunit 2                        |
| GTF2H1   | 18343842  | 18388591  | 11p15.1  | General transcription factor IIH subunit 1                           |
| GTF2H4   | 30875961  | 30881883  | 6p21.33  | General transcription factor IIH subunit 4                           |
| GTF2IRD1 | 73868120  | 74016931  | 7q11.23  | General transcription factor II-I repeat domain-containing protein 1 |
| GTSE1    | 46692638  | 46726707  | 22q13.31 | G2 and S phase-expressed protein 1                                   |
| GUK1     | 228327663 | 228336685 | 1q42.13  | Guanylate kinase   |
| GYLTL1B  | 45943172  | 45950647  | 11p11.2  | Glycosyltransferase-like protein LARGE2                              |
| GZMA     | 54398476  | 54406080  | 5q11.2   | Granzyme A   |
| H2AFV    | 44866390  | 44887682  | 7p13     | Histone H2A.V  |
| H2AFZ    | 100869243 | 100871545 | 4q23     | Histone H2A.Z  |
| H3F3A    | 226249552 | 226259702 | 1q42.12  | Histone H3.3   |
| HAAO     | 42994229  | 43019733  | 2p21     | 3-hydroxyanthranilate 3,4-dioxygenase                                |
| HACL1    | 15602211  | 15643338  | 3p25.1   | 2-hydroxyacyl-CoA lyase 1  |
| HADHA    | 26413504  | 26467594  | 2p23.3   | Trifunctional enzyme subunit alpha, mitochondrial                    |
| HADHB    | 26466038  | 26513336  | 2p23.3   | Trifunctional enzyme subunit beta, mitochondrial                     |
| HADHSC   | 108910870 | 108956331 | 4q25     | Hydroxyacyl-coenzyme A dehydrogenase, mitochondrial                  |
| HAGH     | 1845621   | 1877195   | 16p13.3  | Hydroxyacylglutathione hydrolase, mitochondrial                      |
| HAO2     | 119911402 | 119936753 | 1p12     | Hydroxyacid oxidase 2  |
| HAS1     | 52216365  | 52227247  | 19q13.41 | Hyaluronan synthase 1  |
| HAVCR1   | 156456424 | 156486130 | 5q33.3   | Hepatitis A virus cellular receptor 1                                |
| HBA2     | 222846    | 223709    | 16p13.3  | Hemoglobin subunit alpha   |
| HBB      | 5246694   | 5250625   | 11p15.4  | Hemoglobin subunit beta  |
| HBE1     | 5289582   | 5526847   | 11p15.4  | Hemoglobin subunit epsilon   |
| HBG1     | 5269313   | 5271122   | 11p15.4  | Hemoglobin subunit gamma-1   |
| HDAC1    | 32757687  | 32799236  | 1p35.1   | Histone deacetylase 1  |
| HDAC3    | 141000443 | 141016437 | 5q31.3   | Histone deacetylase 3  |
| HDGF     | 156711899 | 156736717 | 1q23.1   | Hepatoma-derived growth factor                                       |
| HES4     | 934342    | 935552    | 1p36.33  | Transcription factor HES-4   |

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| HEXIM1    | 43224684  | 43229468  | 17q21.31 | Protein HEXIM1   |
| HGS       | 79650356  | 79670168  | 17q25.3  | Hepatocyte growth factor-regulated tyrosine kinase substrate |
| HHLA2     | 108015376 | 108097132 | 3q13.13  | HERV-H LTR-associating protein 2                             |
| HIBADH    | 27565061  | 27702614  | 7p15.2   | 3-hydroxyisobutyrate dehydrogenase, mitochondrial            |
| HIF1AN    | 102288829 | 102319755 | 10q24.31 | Hypoxia-inducible factor 1-alpha inhibitor                   |
| HIGD2A    | 175815748 | 175816772 | 5q35.2   | HIG1 domain family member 2A, mitochondrial                  |
| HIST1H2AC | 26124373  | 26139344  | 6p22.2   | Histone H2A type 1-C   |
| HIST1H2AM | 27860477  | 27860963  | 6p22.1   | Histone H2A type 1   |
| HIST1H3D  | 26197068  | 26199521  | 6p22.2   | Histone H3.1   |
| HIST1H4F  | 26240561  | 26240976  | 6p22.2   | Histone H4   |
| HIST2H2AA | 149822643 | 149823191 | 1q21.2   | Histone H2A type 2-A   |
| HIST3H3   | 228612546 | 228613026 | 1q42.13  | Histone H3.1t  |
| HK1       | 71029740  | 71161638  | 10q22.1  | Hexokinase-1   |
| HK2       | 75061108  | 75120486  | 2p12     | Hexokinase-2   |
| HLA-C     | 31226380  | 31229751  | 6p21.33  | HLA class I histocompatibility antigen, Cw-4 alpha chain     |
| HLA-DMB   | 32831136  | 32849631  | 6p21.32  | HLA class II histocompatibility antigen, DM beta chain       |
| HLA-DOB   | 32780540  | 32784825  | 6p21.32  | HLA class II histocompatibility antigen, DO beta chain       |
| HLA-DPA1  | 33032346  | 33048552  | 6p21.32  | HLA class II histocompatibility antigen, DP alpha 1 chain    |
| HLA-DQA1  | 32533367  | 32539589  | 6p21.32  | HLA class II histocompatibility antigen, DQ alpha 1 chain    |
| HLA-DQB1  | 32658022  | 32667070  | 6p21.32  | HLA class II histocompatibility antigen, DQ beta 1 chain     |
| HLA-DRA   | 32365090  | 32370300  | 6p21.32  | HLA class II histocompatibility antigen, DR alpha chain      |
| HLA-E     | 30446762  | 30451500  | 6p21.33  | HLA class I histocompatibility antigen, alpha chain E        |
| HLX1      | 221051699 | 221058401 | 1q41     | H2.0-like homeobox protein                                   |
| HM13      | 30102231  | 30157370  | 20q11.21 | Minor histocompatibility antigen H13                         |
| HMGB2     | 174252846 | 174256276 | 4q34.1   | High mobility group protein B2                               |
| HMGY      | 34204650  | 34214008  | 6p21.31  | High mobility group protein HMG-I/HMG-Y                      |
| HMOX1     | 35776354  | 35790207  | 22q12.3  | Heme oxygenase 1   |
| HMOX2     | 4524691   | 4560348   | 16p13.3  | Heme oxygenase 2   |
| HN1       | 73131343  | 73164376  | 17q25.1  | Hematological and neurological expressed 1 protein           |
| HNF4G     | 76320149  | 76479078  | 8q21.11  | Hepatocyte nuclear factor 4-gamma                            |
| HNMT      | 138721590 | 138773930 | 2q22.1   | Histamine N-methyltransferase                                |
| HOMER2    | 83509838  | 83654661  | 15q25.2  | Homer protein homolog 2                                      |
| HOMER3    | 19040010  | 19052070  | 19p13.11 | Homer protein homolog 3                                      |
| HOOK1     | 60280458  | 60342050  | 1p32.1   | Protein Hook homolog 1                                       |
| HOXA10    | 27210210  | 27219880  | 7p15.2   | Homeobox protein Hox-A10                                     |
| HOXA5     | 27180671  | 27183287  | 7p15.2   | Homeobox protein Hox-A5                                      |
| HOXA9     | 27202054  | 27210117  | 7p15.2   | Homeobox protein Hox-A9                                      |
| HOXB13    | 46802125  | 46806540  | 17q21.32 | Homeobox protein Hox-B13                                     |
| HOXB7     | 46684594  | 46710934  | 17q21.32 | Homeobox protein Hox-B7                                      |
| HOXD3     | 177001340 | 177037830 | 2q31.1   | Homeobox protein Hox-D3                                      |
| HPD       | 122277433 | 122301502 | 12q24.31 | 4-hydroxyphenylpyruvate dioxygenase                          |
| HPRT1     | 133594183 | 133654543 | Xq26.2   | Hypoxanthine-guanine phosphoribosyltransferase               |
| HRAS      | 532242    | 537287    | 11p15.5  | GTPase HRas  |
| HRASLS3   | 63340667  | 63384355  | 11q12.3  | HRAS-like suppressor 3                                       |
| HRSP12    | 99114572  | 99129469  | 8q22.2   | Ribonuclease UK114   |

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| HRY      | 193853934   | 193856521   | 3q29     | Transcription factor HES-1   |
| HSA9761  | 61683081    | 61699766    | 5q12.1   | Probable dimethyladenosine transferase                                 |
| HSD17B3  | 98997588    | 99064434    | 9q22.32  | Testosterone 17-beta-dehydrogenase 3                                   |
| HSD3B2   | 119957554   | 119965658   | 1p12     | 3 beta-hydroxysteroid dehydrogenase/Delta 5-->4-isomerase type 2       |
| HSP90AB1 | 44214824    | 44221620    | 6p21.1   | Heat shock protein HSP 90-beta   |
| HSPA2    | 65002623    | 65009955    | 14q23.3  | Heat shock-related 70 kDa protein 2                                    |
| HSPA6    | 161494036   | 161496681   | 1q23.3   | Heat shock 70 kDa protein 6  |
| HSPA8    | 122928197   | 122933938   | 11q24.1  | Heat shock cognate 71 kDa protein                                      |
| HSPB7    | 16340523    | 16346089    | 1p36.13  | Heat shock protein beta-7  |
| HSPBAP1  | 122458846   | 122512671   | 3q21.1   | HSPB1-associated protein 1   |
| HSPBP1   | 55773599    | 55791749    | 19q13.42 | Hsp70-binding protein 1  |
| HSPC023  | 13884982    | 13889276    | 19p13.2  | Leydig cell tumor 10 kDa protein homolog                               |
| HSPC047  | 102,672,879 | 102,678,856 | 7q22.1   | -  |
| HSPC152  | 64083932    | 64085556    | 11q13.1  | Multifunctional methyltransferase subunit TRM112-like protein          |
| HSPC171  | 67261006    | 67263181    | 16q22.1  | Transmembrane protein 208  |
| HSPC268  | 139024203   | 139031065   | 7q34     | UPF0562 protein C7orf55  |
| HSPD1    | 198351305   | 198381461   | 2q33.1   | 60 kDa heat shock protein, mitochondrial                               |
| HSPE1    | 198364718   | 198368181   | 2q33.1   | 10 kDa heat shock protein, mitochondrial                               |
| HTR3A    | 113845603   | 113861035   | 11q23.2  | 5-hydroxytryptamine receptor 3A  |
| HTRA3    | 8271492     | 8308838     | 4p16.1   | Serine protease HTRA3  |
| HUMMAT1H | 160175127   | 160185166   | 1q23.2   | Astrocytic phosphoprotein PEA-15                                       |
| HYPE     | 11200038    | 11244492    | 19p13.2  | Low-density lipoprotein receptor                                       |
| IBSP     | 88720733    | 88733074    | 4q22.1   | Bone sialoprotein 2  |
| ICAM2    | 62079954    | 62097994    | 17q23.3  | Intercellular adhesion molecule 2                                      |
| ICAM4    | 10397643    | 10399198    | 19p13.2  | Intercellular adhesion molecule 4                                      |
| ICMT     | 6281253     | 6296032     | 1p36.31  | Protein-S-isoprenylcysteine O-methyltransferase                        |
| ID1      | 30193086    | 30194318    | 20q11.21 | DNA-binding protein inhibitor ID-1                                     |
| ID2      | 8818975     | 8824583     | 2p25.1   | DNA-binding protein inhibitor ID-2                                     |
| ID3      | 23884409    | 23886285    | 1p36.12  | DNA-binding protein inhibitor ID-3                                     |
| IDH3A    | 78423840    | 78464291    | 15q25.1  | Isocitrate dehydrogenase [NAD] subunit alpha, mitochondrial            |
| IDH3B    | 2639041     | 2644865     | 20p13    | Isocitrate dehydrogenase [NAD] subunit beta, mitochondrial             |
| IER2     | 13261229    | 13265722    | 19p13.2  | Immediate early response gene 2 protein                                |
| IFI27    | 94571182    | 94583033    | 14q32.12 | Interferon alpha-inducible protein 27, mitochondrial                   |
| IFI30    | 18283972    | 18288927    | 19p13.11 | Gamma-interferon-inducible lysosomal thiol reductase                   |
| IFI35    | 41158742    | 41166473    | 17q21.31 | Interferon-induced 35 kDa protein                                      |
| IFITM1   | 313506      | 315272      | 11p15.5  | Interferon-induced transmembrane protein 1                             |
| IFITM2   | 307631      | 315272      | 11p15.5  | Interferon-induced transmembrane protein 2                             |
| IFNA17   | 21227242    | 21228221    | 9p21.3   | Interferon alpha-17  |
| IFNA2    | 21384254    | 21385396    | 9p21.3   | Interferon alpha-2   |
| IFNA21   | 21165636    | 21166659    | 9p21.3   | Interferon alpha-21  |
| IFNAR2   | 34602206    | 34637980    | 21q22.11 | Interferon alpha/beta receptor 2                                       |
| IFT57    | 107879659   | 107941417   | 3q13.12  | Intraflagellar transport protein 57 homolog                            |
| IGBP1    | 69353299    | 69386174    | Xq13.1   | Immunoglobulin-binding protein 1                                       |
| IGF1     | 102789645   | 102874423   | 12q23.2  | Insulin-like growth factor I   |
| IGF2     | 2150342     | 2170833     | 11p15.5  | Insulin-like growth factor II  |
| IGFALS   | 1840414     | 1844972     | 16p13.3  | Insulin-like growth factor-binding protein complex acid labile subunit |
| IGFBP1   | 45927956    | 45933267    | 7p12.3   | Insulin-like growth factor-binding protein 1                           |
| IGFBP3   | 45951949    | 45961473    | 7p12.3   | Insulin-like growth factor-binding protein 3                           |
| IGFBP4   | 38599702    | 38613983    | 17q21.2  | Insulin-like growth factor-binding protein 4                           |

|         |             |             |          |   |
|---------|-------------|-------------|----------|---|
| IGFBP5  | 217536828   | 217560248   | 2q35     | Insulin-like growth factor-binding protein 5                      |
| IGFBP6  | 53491220    | 53496129    | 12q13.13 | Insulin-like growth factor-binding protein 6                      |
| IGFBP7  | 57896939    | 57976551    | 4q12     | Insulin-like growth factor-binding protein 7                      |
| IGL@    | 22,026,076  | 22,922,913  | 22q11.2  | Immunoglobulin Lambda Locus                                       |
| IGLL1   | 23915312    | 23922495    | 22q11.23 | Immunoglobulin lambda-like polypeptide 1                          |
| IGSF9   | 159896829   | 159915386   | 1q23.2   | Protein turtle homolog A  |
| IHPK2   | 48725436    | 48777786    | 3p21.31  | Inositol hexakisphosphate kinase 2                                |
| IKBKG   | 153769414   | 153796782   | Xq28     | NF-kappa-B essential modulator                                    |
| IL10    | 206940947   | 206945839   | 1q32.1   | Interleukin-10  |
| IL10RB  | 34638663    | 34669539    | 21q22.11 | Interleukin-10 receptor subunit beta                              |
| IL11    | 55875757    | 55881831    | 19q13.42 | Interleukin-11  |
| IL11RA  | 34650699    | 34661889    | 9p13.3   | Interleukin-11 receptor subunit alpha                             |
| IL13    | 131991955   | 131996802   | 5q31.1   | Interleukin-13  |
| IL13RA1 | 117861535   | 117928502   | Xq24     | Interleukin-13 receptor subunit alpha-1                           |
| IL15    | 142557752   | 142655140   | 4q31.21  | Interleukin-15  |
| IL17RA  | 17565844    | 17596583    | 22q11.1  | Interleukin-17 receptor A   |
| IL18    | 112013974   | 112034840   | 11q23.1  | Interleukin-18  |
| IL1A    | 113531492   | 113542167   | 2q13     | Interleukin-1 alpha   |
| IL1B    | 113587328   | 113594480   | 2q13     | Interleukin-1 beta  |
| IL1RN   | 113864791   | 113891593   | 2q13     | Interleukin-1 receptor antagonist protein                         |
| IL21R   | 27413483    | 27462115    | 16p12.1  | Interleukin-21 receptor   |
| IL3RA   | 1455509     | 1501578     | Xp22.33  | Interleukin-3 receptor subunit alpha                              |
| IL4     | 132009678   | 132018368   | 5q31.1   | Interleukin-4   |
| IL6     | 22765503    | 22771621    | 7p15.3   | Interleukin-6   |
| IL6R    | 154377669   | 154441926   | 1q21.3   | Interleukin-6 receptor subunit alpha                              |
| IL7     | 79587978    | 79717758    | 8q21.12  | Interleukin-7   |
| IL8     | 219027568   | 219031718   | 2q35     | C-X-C chemokine receptor type 1                                   |
| IL8RA   | 218,162,845 | 218,166,995 | 2q35     | Chemokine (C-X-C Motif) Receptor 1                                |
| IL8RB   | 218990012   | 219001976   | 2q35     | C-X-C chemokine receptor type 2                                   |
| IL9     | 135227935   | 135231516   | 5q31.1   | Interleukin-9   |
| ILF2    | 153634512   | 153643524   | 1q21.3   | Interleukin enhancer-binding factor 2                             |
| ILK     | 6624961     | 6632102     | 11p15.4  | Integrin-linked protein kinase                                    |
| ILKAP   | 239079042   | 239112370   | 2q37.3   | Integrin-linked kinase-associated serine/threonine phosphatase 2C |
| IMP4    | 131099798   | 131105383   | 2q21.1   | U3 small nucleolar ribonucleoprotein protein IMP4                 |
| IMPDH2  | 49061758    | 49066841    | 3p21.31  | Inosine-5'-monophosphate dehydrogenase 2                          |
| INA     | 105036920   | 105050108   | 10q24.33 | Alpha-internexin  |
| INHBA   | 41724712    | 41742706    | 7p14.1   | Inhibin beta A chain  |
| INS     | 2181009     | 2182571     | 11p15.5  | Insulin   |
| INSL5   | 67263424    | 67266939    | 1p31.3   | Insulin-like peptide INSL5  |
| IRF1    | 131817301   | 131826490   | 5q31.1   | Interferon regulatory factor 1                                    |
| IRF3    | 50162826    | 50169132    | 19q13.33 | Interferon regulatory factor 3                                    |
| IRF4    | 391739      | 411447      | 6p25.3   | Interferon regulatory factor 4                                    |
| IRF5    | 128577666   | 128590089   | 7q32.1   | Interferon regulatory factor 5                                    |
| ISL1    | 50678921    | 50690564    | 5q11.1   | Insulin gene enhancer protein ISL-1                               |
| ISYNA1  | 18545198    | 18549111    | 19p13.11 | Inositol-3-phosphate synthase 1                                   |
| ITFG1   | 47188298    | 47498060    | 16q12.1  | T-cell immunomodulatory protein                                   |
| ITFG2   | 2921788     | 2968957     | 12p13.33 | Integrin-alpha FG-GAP repeat-containing protein 2                 |
| ITGAX   | 31366455    | 31394318    | 16p11.2  | Integrin alpha-X  |
| ITGB1   | 33189247    | 33294720    | 10p11.22 | Integrin beta-1   |
| ITGB2   | 46305868    | 46351904    | 21q22.3  | Integrin beta-2   |
| ITGB4BP | 33866714    | 33872788    | 20q11.22 | Eukaryotic translation initiation factor 6                        |
| ITGB5   | 124480795   | 124620265   | 3q21.2   | Integrin beta-5   |
| ITPK1   | 93403259    | 93582665    | 14q32.12 | Inositol-tetrakisphosphate 1-kinase                               |
| IVD     | 40697686    | 40728146    | 15q15.1  | Isovaleryl-CoA dehydrogenase, mitochondrial                       |

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| JAGN1   | 9932238   | 9936033   | 3p25.3   | Protein jagunal homolog 1  |
| JPH3    | 87635441  | 87731762  | 16q24.2  | Junctophilin-3   |
| JUB     | 23440383  | 23451851  | 14q11.2  | LIM domain-containing protein ajuba  |
| JUN     | 59246465  | 59249785  | 1p32.1   | Transcription factor AP-1  |
| JUNB    | 12902310  | 12904124  | 19p13.2  | Transcription factor jun-B   |
| JUP     | 39775692  | 39943183  | 17q21.2  | Junction plakoglobin   |
| KARS    | 75661622  | 75682541  | 16q23.1  | Lysine--tRNA ligase  |
| KATNAL1 | 30776767  | 30881621  | 13q12.3  | Katanin p60 ATPase-containing subunit A-like 1                                 |
| KAZALD1 | 102821598 | 102827888 | 10q24.31 | Kazal-type serine protease inhibitor domain-containing protein 1               |
| KBTBD10 | 170366212 | 170382772 | 2q31.1   | Kelch-like protein 41  |
| KCNAB2  | 6051526   | 6161253   | 1p36.31  | Voltage-gated potassium channel subunit beta-2                                 |
| KCNE1   | 35818988  | 35884573  | 21q22.12 | Potassium voltage-gated channel subfamily E member 1                           |
| KCNE2   | 35736323  | 35743688  | 21q22.11 | Potassium voltage-gated channel subfamily E member 2                           |
| KCNG4   | 84255823  | 84273356  | 16q24.1  | Potassium voltage-gated channel subfamily G member 4                           |
| KCNJ15  | 39529128  | 39679279  | 21q22.13 | ATP-sensitive inward rectifier potassium channel 15                            |
| KCNJ8   | 21917889  | 21928515  | 12p12.1  | ATP-sensitive inward rectifier potassium channel 8                             |
| KCNK6   | 38810484  | 38819660  | 19q13.2  | Potassium channel subfamily K member 6   |
| KCNN4   | 44270685  | 44285409  | 19q13.31 | Intermediate conductance calcium-activated potassium channel protein 4         |
| KCNRG   | 50589390  | 50595058  | 13q14.2  | Potassium channel regulatory protein   |
| KCNS3   | 18059114  | 18542882  | 2p24.2   | Potassium voltage-gated channel subfamily S member 3                           |
| KCTD13  | 29916333  | 29938356  | 16p11.2  | BTB/POZ domain-containing adapter for CUL3-mediated RhoA degradation protein 1 |
| KCTD14  | 77726761  | 77757237  | 11q14.1  | BTB/POZ domain-containing protein KCTD14                                       |
| KDELC1  | 103436631 | 103451357 | 13q33.1  | KDEL motif-containing protein 1  |
| KDELR1  | 48885827  | 48894810  | 19q13.33 | ER lumen protein-retaining receptor 1  |
| KDELR3  | 38864067  | 38879452  | 22q13.1  | ER lumen protein-retaining receptor 3  |
| KEL     | 142638201 | 142659768 | 7q34     | Kell blood group glycoprotein  |
| KIF22   | 29802040  | 29816706  | 16p11.2  | Kinesin-like protein KIF22   |
| KIF9    | 47269516  | 47324941  | 3p21.31  | Kinesin-like protein KIF9  |
| KISS1   | 204159469 | 204165614 | 1q32.1   | Metastasis-suppressor KiSS-1   |
| KLC2    | 66024765  | 66035331  | 11q13.2  | Kinesin light chain 2  |
| KLF12   | 74260226  | 74708394  | 13q22.1  | Krueppel-like factor 12  |
| KLF4    | 110247133 | 110252763 | 9q31.2   | Krueppel-like factor 4   |
| KLHL6   | 183205319 | 183273477 | 3q27.1   | Kelch-like protein 6   |
| KLK1    | 51322404  | 51327043  | 19q13.33 | Kallikrein-1   |
| KLK3    | 51358171  | 51364020  | 19q13.33 | Prostate-specific antigen  |
| KLRC1   | 10594863  | 10607284  | 12p13.2  | NKG2-A/NKG2-B type II integral membrane protein                                |
| KLRC4   | 10559983  | 10562356  | 12p13.2  | NKG2-F type II integral membrane protein                                       |
| KLRG1   | 9102640   | 9163356   | 12p13.31 | Killer cell lectin-like receptor subfamily G member 1                          |
| KNS2    | 104028233 | 104167888 | 14q32.33 | Kinesin light chain 1  |
| KPNA1   | 122140796 | 122233792 | 3q21.1   | Importin subunit alpha-5   |
| KPNA3   | 50273447  | 50367057  | 13q14.2  | Importin subunit alpha-4   |
| KPNA6   | 32573639  | 32642169  | 1p35.1   | Importin subunit alpha-7   |
| KREMEN2 | 3013945   | 3018384   | 16p13.3  | Kremen protein 2   |
| KRT15   | 39669995  | 39678781  | 17q21.2  | Keratin, type I cytoskeletal 15  |
| KRT17   | 39775689  | 39781094  | 17q21.2  | Keratin, type I cytoskeletal 17  |
| KRT19   | 39679869  | 39684560  | 17q21.2  | Keratin, type I cytoskeletal 19  |
| KRT33B  | 39519746  | 39526052  | 17q21.2  | Keratin, type I cuticular Ha3-II   |

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|-----------|------------|------------|----------|--|
| KRT5      | 52908359   | 52914471   | 12q13.13 | Keratin, type II cytoskeletal 5  |
| KRT7      | 52626304   | 52645970   | 12q13.13 | Keratin, type II cytoskeletal 7  |
| KRT8      | 53290977   | 53343738   | 12q13.13 | Keratin, type II cytoskeletal 8  |
| KRTAP4-12 | 39279343   | 39280419   | 17q21.2  | Keratin-associated protein 4-12  |
| L3MBTL2   | 41601209   | 41627275   | 22q13.2  | Lethal(3)malignant brain tumor-like protein 2                            |
| LAD1      | 201342372  | 201368736  | 1q32.1   | Ladinin-1  |
| LAIR1     | 54865362   | 54882165   | 19q13.42 | Leukocyte-associated immunoglobulin-like receptor 1                      |
| LALBA     | 48961467   | 48963849   | 12q13.11 | Alpha-lactalbumin  |
| LAMP1     | 113951556  | 113977987  | 13q34    | Lysosome-associated membrane glycoprotein 1                              |
| LAMP2     | 119561682  | 119603220  | Xq24     | Lysosome-associated membrane glycoprotein 2                              |
| LANCL1    | 211295973  | 211342376  | 2q34     | LanC-like protein 1  |
| LASP1     | 37026112   | 37078023   | 17q12    | LIM and SH3 domain protein 1   |
| LASS4     | 8271620    | 8327305    | 19p13.2  | Ceramide synthase 4  |
| LBP       | 36974759   | 37005665   | 20q11.23 | Lipopolysaccharide-binding protein                                       |
| LCN2      | 130911350  | 130915734  | 9q34.11  | Neutrophil gelatinase-associated lipocalin                               |
| LDB2      | 16503164   | 16900432   | 4p15.32  | LIM domain-binding protein 2   |
| LDHA      | 18415935   | 18429972   | 11p15.1  | L-lactate dehydrogenase A chain  |
| LDHB      | 21788276   | 21910791   | 12p12.1  | L-lactate dehydrogenase B chain  |
| LECT1     | 53277399   | 53313947   | 13q14.3  | Leukocyte cell-derived chemotaxin 1                                      |
| LEPROTL1  | 29952914   | 30034724   | 8p12     | Leptin receptor overlapping transcript-like 1                            |
| LGALS1    | 38071615   | 38075813   | 22q13.1  | Galectin-1   |
| LGALS3    | 55590828   | 55612126   | 14q22.3  | Galectin-3   |
| LGALS8    | 236681300  | 236716281  | 1q43     | Galectin-8   |
| LGR4      | 27387508   | 27494322   | 11p14.1  | Leucine-rich repeat-containing G-protein coupled receptor 4              |
| LGTN      | 206744620  | 206785904  | 1q32.1   | Eukaryotic translation initiation factor 2D                              |
| LHFP      | 39917029   | 40177665   | 13q13.3  | Lipoma HMGIC fusion partner  |
| LHFPL5    | 35773070   | 35801651   | 6p21.31  | Tetraspan membrane protein of hair cell stereocilia                      |
| LHX4      | 180199421  | 180249380  | 1q25.2   | LIM/homeobox protein Lhx4  |
| LIG4      | 108859787  | 108870716  | 13q33.3  | DNA ligase 4   |
| LIN28     | 26,410,778 | 26,429,728 | 1p36.11  | Lin-28 Homolog A   |
| LMAN1     | 56995055   | 57027194   | 18q21.32 | Protein ERGIC-53   |
| LMBR1L    | 49490919   | 49504683   | 12q13.12 | Protein LMBR1L   |
| LMCD1     | 8543393    | 8609805    | 3p26.1   | LIM and cysteine-rich domains protein 1                                  |
| LMO4      | 87794151   | 87814606   | 1p22.3   | LIM domain transcription factor LMO4                                     |
| LMO6      | 49031151   | 49042845   | Xp11.23  | Prickle-like protein 3   |
| LOC200420 | 73872046   | 73912703   | 2p13.1   | Putative ALMS1-like protein  |
| LOH12CR1  | 12510013   | 12619840   | 12p13.2  | Loss of heterozygosity 12 chromosomal region 1 protein                   |
| LOXL2     | 23154702   | 23282841   | 8p21.3   | Lysyl oxidase homolog 2  |
| LPIN1     | 11817721   | 11967535   | 2p25.1   | Phosphatidate phosphatase LPIN1  |
| LPXN      | 58294344   | 58345693   | 11q12.1  | Leupaxin   |
| LRCH3     | 197518097  | 197615307  | 3q29     | Leucine-rich repeat and calponin homology domain-containing protein 3    |
| LRFN3     | 36426260   | 36436669   | 19q13.12 | Leucine-rich repeat and fibronectin type-III domain-containing protein 3 |
| LRP12     | 105501459  | 105601252  | 8q22.3   | Low-density lipoprotein receptor-related protein 12                      |
| LRRC29    | 67241042   | 67260951   | 16q22.1  | Leucine-rich repeat-containing protein 29                                |
| LSM2      | 31765173   | 31774761   | 6p21.33  | U6 snRNA-associated Sm-like protein LSm2                                 |
| LSM7      | 2321516    | 2328619    | 19p13.3  | U6 snRNA-associated Sm-like protein LSm7                                 |
| LSS       | 47608055   | 47648738   | 21q22.3  | Lanosterol synthase  |
| LTA       | 31539831   | 31542101   | 6p21.33  | Lymphotoxin-alpha  |
| LUM       | 91496406   | 91505608   | 12q21.33 | Lumican  |
| LY6H      | 144239331  | 144242128  | 8q24.3   | Lymphocyte antigen 6H  |

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| LYPLA1   | 54958938  | 55014577  | 8q11.23  | Acyl-protein thioesterase 1   |
| LYPLA2   | 24117460  | 24122029  | 1p36.11  | Acyl-protein thioesterase 2   |
| LYSMD2   | 52015208  | 52043782  | 15q21.2  | LysM and putative peptidoglycan-binding domain-containing protein 2 |
| LYZ      | 69742121  | 69748014  | 12q15    | Lysozyme C  |
| LZTR1    | 21333751  | 21353327  | 22q11.21 | Leucine-zipper-like transcriptional regulator 1                     |
| M6PRBP1  | 4838353   | 4867780   | 19p13.3  | Perilipin-3   |
| MAD      | 35870717  | 35873955  | 14q13.2  | NF-kappa-B inhibitor alpha  |
| MAFK     | 1570350   | 1582679   | 7p22.3   | Transcription factor MafK   |
| Mage3    | 151934652 | 151938240 | Xq28     | Melanoma-associated antigen 3                                       |
| Mage6    | 151867214 | 151870825 | Xq28     | Melanoma-associated antigen 6                                       |
| MAGEA1   | 152481522 | 152486115 | Xq28     | Melanoma-associated antigen 1                                       |
| MAGEA10  | 151301782 | 151307033 | Xq28     | Melanoma-associated antigen 10                                      |
| MAGEA3   | 151934652 | 151938240 | Xq28     | Melanoma-associated antigen 3                                       |
| MAGEA6   | 151867214 | 151870825 | Xq28     | Melanoma-associated antigen 6                                       |
| MAGEA9   | 148863584 | 148869397 | Xq28     | Melanoma-associated antigen 9                                       |
| MAGEB4   | 30260057  | 30262293  | Xp21.2   | Melanoma-associated antigen B4                                      |
| MAGEB4   | 30260057  | 30262293  | Xp21.2   | Melanoma-associated antigen B4                                      |
| MAGED2   | 54834032  | 54842445  | Xp11.21  | Melanoma-associated antigen D2                                      |
| MAGEH1   | 55478538  | 55479998  | Xp11.21  | Melanoma-associated antigen H1                                      |
| MALT1    | 56338618  | 56417371  | 18q21.32 | Mucosa-associated lymphoid tissue lymphoma translocation protein 1  |
| MAP1LC3B | 87417601  | 87438385  | 16q24.2  | Microtubule-associated proteins 1A/1B light chain 3B                |
| MAP2K3   | 21187984  | 21218552  | 17p11.2  | Dual specificity mitogen-activated protein kinase kinase 3          |
| MAP2K6   | 67410839  | 67539472  | 17q24.3  | Dual specificity mitogen-activated protein kinase kinase 6          |
| MAP2K7   | 7968728   | 7979363   | 19p13.2  | Dual specificity mitogen-activated protein kinase kinase 7          |
| MAP3K8   | 30722866  | 30750762  | 10p11.23 | Mitogen-activated protein kinase kinase kinase 8                    |
| MAPBPIP  | 156024543 | 156028301 | 1q22     | Ragulator complex protein LAMTOR2                                   |
| MAPK10   | 86936276  | 87515284  | 4q21.3   | Mitogen-activated protein kinase 10                                 |
| MAPK12   | 50683879  | 50700254  | 22q13.33 | Mitogen-activated protein kinase 12                                 |
| MAPK13   | 36095586  | 36107842  | 6p21.31  | Mitogen-activated protein kinase 13                                 |
| MAPK15   | 144798429 | 144804628 | 8q24.3   | Mitogen-activated protein kinase 15                                 |
| MAPK3    | 30125426  | 30134827  | 16p11.2  | Mitogen-activated protein kinase 3                                  |
| MAPK6    | 52244303  | 52358462  | 15q21.2  | Mitogen-activated protein kinase 6                                  |
| MAPK8    | 49514698  | 49647403  | 10q11.22 | Mitogen-activated protein kinase 8                                  |
| MAPRE3   | 27193480  | 27250064  | 2p23.3   | Microtubule-associated protein RP/EB family member 3                |
| MAPRE3   | 27193480  | 27250064  | 2p23.3   | Microtubule-associated protein RP/EB family member 3                |
| MARCKSL1 | 32799433  | 32801980  | 1p35.1   | MARCKS-related protein  |
| MATR3    | 138609441 | 138667360 | 5q31.2   | Matrin-3  |
| MAX      | 65472892  | 65569413  | 14q23.3  | Protein max   |
| MB       | 36002811  | 36033998  | 22q12.3  | Myoglobin   |
| MBP      | 74690783  | 74845639  | 18q23    | Myelin basic protein  |
| MC1R     | 89978527  | 89987385  | 16q24.3  | Melanocyte-stimulating hormone receptor                             |
| MCEE     | 71336814  | 71357369  | 2p13.3   | Methylmalonyl-CoA epimerase, mitochondrial                          |
| MCF2L    | 113548692 | 113754053 | 13q34    | Guanine nucleotide exchange factor DBS                              |
| MCFD2    | 47129009  | 47168994  | 2p21     | Multiple coagulation factor deficiency protein 2                    |
| MCM3     | 52128807  | 52149679  | 6p12.2   | DNA replication licensing factor MCM3                               |
| MCM7     | 99690351  | 99699563  | 7q22.1   | DNA replication licensing factor MCM7                               |
| MCMD1    | 119134605 | 119256327 | 6q22.31  | DNA helicase MCM9   |

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| MDH2     | 75677369    | 75696826    | 7q11.23  | Malate dehydrogenase, mitochondrial                                    |
| MDK      | 46402306    | 46405375    | 11p11.2  | Midkine  |
| MDS1     | 169,083,499 | 169,663,775 | 3q26.2   | Myelodysplasia Syndrome-Associated Protein 1                           |
| MED28    | 17616254    | 17635728    | 4p15.32  | Mediator of RNA polymerase II transcription subunit 28                 |
| MED4     | 48627459    | 48669267    | 13q14.2  | Mediator of RNA polymerase II transcription subunit 4                  |
| MED8     | 43849588    | 43855479    | 1p34.2   | Mediator of RNA polymerase II transcription subunit 8                  |
| MEST     | 130126012   | 130146133   | 7q32.2   | Mesoderm-specific transcript homolog protein                           |
| METTL6   | 15422782    | 15482073    | 3p25.1   | Methyltransferase-like protein 6                                       |
| MFAP1    | 44096690    | 44117000    | 15q15.3  | Microfibrillar-associated protein 1                                    |
| MFAP3    | 153418466   | 153600038   | 5q33.2   | Microfibril-associated glycoprotein 3                                  |
| MGAT1    | 180217541   | 180242652   | 5q35.3   | Alpha-1,3-mannosyl-glycoprotein 2-beta-N-acetylglucosaminyltransferase |
| MGAT2    | 50087489    | 50090198    | 14q21.3  | Alpha-1,6-mannosyl-glycoprotein 2-beta-N-acetylglucosaminyltransferase |
| MGC16169 | 106962756   | 107242652   | 4q24     | TBC domain-containing protein kinase-like protein                      |
| MGC18216 | 98,648,971  | 98,964,530  | 15q26.3  | Insulin-Like Growth Factor 1 Receptor                                  |
| MGC26597 | 7,986,102   | 7,990,344   | 6p24.3   | Phosphatidylinositol-4-Phosphate 5-Kinase, Type I, Pseudogene 1        |
| MGC39372 | 2,854,657   | 2,881,407   | 6p25.2   | erpin Peptidase Inhibitor, Clade B (Ovalbumin), Member 9, Pseudogene 1 |
| MGC39518 | 201838441   | 201936394   | 2q33.1   | Protein FAM126B  |
| MGC40574 | 43,227,211  | 43,228,855  | 2p21     | Long Intergenic Non-Protein Coding RNA 1126                            |
| MGC40579 | 141882414   | 141944449   | 3q23     | Putative glycerol kinase 5   |
| MGC5509  | 105953816   | 105965668   | 2q12.1   | Ashwin   |
| MGC7036  | 123899936   | 123921264   | 12q24.31 | RILP-like protein 2  |
| MGLL     | 127407909   | 127542051   | 3q21.3   | Monoglyceride lipase   |
| MGP      | 15034115    | 15038860    | 12p12.3  | Matrix Gla protein   |
| MGST2    | 140586922   | 140661899   | 4q31.1   | Microsomal glutathione S-transferase 2                                 |
| MIA      | 41277553    | 41283395    | 19q13.2  | Melanoma-derived growth regulatory protein                             |
| MIF      | 24236191    | 24237414    | 22q11.23 | Macrophage migration inhibitory factor                                 |
| MINK1    | 4736683     | 4801356     | 17p13.2  | Misshapen-like kinase 1  |
| MIPEP    | 24304328    | 24463558    | 13q12.12 | Mitochondrial intermediate peptidase                                   |
| MIZF     | 118992297   | 119006752   | 11q23.3  | Histone H4 transcription factor  |
| MKNK1    | 47023090    | 47082515    | 1p33     | MAP kinase-interacting serine/threonine-protein kinase 1               |
| MKRN2    | 12598513    | 12625212    | 3p25.2   | Probable E3 ubiquitin-protein ligase makorin-2                         |
| MLANA    | 5890802     | 5910606     | 9p24.1   | Melanoma antigen recognized by T-cells 1                               |
| MLF2     | 6857170     | 6876641     | 12p13.31 | Myeloid leukemia factor 2  |
| MLH1     | 37034823    | 37107380    | 3p22.2   | DNA mismatch repair protein Mlh1                                       |
| ML-IAP   | 61867235    | 61871859    | 20q13.33 | Baculoviral IAP repeat-containing protein 7                            |
| MLLT11   | 151030234   | 151040970   | 1q21.3   | Protein AF1q   |
| MMP1     | 102660651   | 102668891   | 11q22.2  | Interstitial collagenase   |
| MMP10    | 102641234   | 102651359   | 11q22.2  | Stromelysin-2  |
| MMP2     | 55423612    | 55540603    | 16q12.2  | 72 kDa type IV collagenase   |
| MMP9     | 44637547    | 44645200    | 20q13.12 | Matrix metalloproteinase-9   |
| MOBK12B  | 27325207    | 27529779    | 9p21.2   | MOB kinase activator 3B  |
| MOCOS    | 33767482    | 33852120    | 18q12.2  | Molybdenum cofactor sulfurase  |
| MORF4L1  | 79102829    | 79190475    | 15q25.1  | Mortality factor 4-like protein 1                                      |
| MOSPD1   | 134021656   | 134049297   | Xq26.3   | Motile sperm domain-containing protein 1                               |
| MPB1     | 8921061     | 8939308     | 1p36.23  | Alpha-enolase  |
| MPG      | 127006      | 135852      | 16p13.3  | DNA-3-methyladenine glycosylase  |
| MPP1     | 154006959   | 154049282   | Xq28     | 55 kDa erythrocyte membrane protein                                    |

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|--------|-----------|-----------|----------|---|
| MPP6   | 24612887  | 24733812  | 7p15.3   | MAGUK p55 subfamily member 6  |
| MPST   | 37415676  | 37425863  | 22q12.3  | 3-mercaptopyruvate sulfurtransferase                                |
| MPV17  | 27532360  | 27548547  | 2p23.3   | Protein Mpv17   |
| MPZ    | 161274525 | 161279762 | 1q23.3   | Myelin protein P0   |
| MRAS   | 138066539 | 138124375 | 3q22.3   | Ras-related protein M-Ras   |
| MRCL3  | 3247479   | 3256234   | 18p11.31 | Myosin regulatory light chain 12A                                   |
| MRFAP1 | 6641818   | 6644472   | 4p16.1   | MORF4 family-associated protein 1                                   |
| MRP63  | 21750784  | 21753223  | 13q12.11 | Ribosomal protein 63, mitochondrial                                 |
| MRPL10 | 45900638  | 45908900  | 17q21.32 | 39S ribosomal protein L10, mitochondrial                            |
| MRPL17 | 6702013   | 6704632   | 11p15.4  | 39S ribosomal protein L17, mitochondrial                            |
| MRPL19 | 75873909  | 75917977  | 2p12     | 39S ribosomal protein L19, mitochondrial                            |
| MRPL40 | 19419425  | 19423598  | 22q11.21 | 39S ribosomal protein L40, mitochondrial                            |
| MRPS11 | 89010684  | 89022222  | 15q25.3  | 28S ribosomal protein S11, mitochondrial                            |
| MRPS5  | 95752952  | 95815179  | 2q11.1   | 28S ribosomal protein S5, mitochondrial                             |
| MS4A1  | 60223225  | 60238233  | 11q12.2  | B-lymphocyte antigen CD20   |
| MS4A4A | 60048014  | 60076445  | 11q12.2  | Membrane-spanning 4-domains subfamily A member 4A                   |
| MS4A6A | 59939081  | 59952139  | 11q12.2  | Membrane-spanning 4-domains subfamily A member 6A                   |
| MS4A7  | 60145955  | 60163424  | 11q12.2  | Membrane-spanning 4-domains subfamily A member 7                    |
| MSH2   | 47630108  | 47789450  | 2p21     | DNA mismatch repair protein Msh2                                    |
| MSH4   | 76262567  | 76378923  | 1p31.1   | MutS protein homolog 4  |
| MSI2   | 55333212  | 55762046  | 17q22    | RNA-binding protein Musashi homolog 2                               |
| MSMB   | 51549498  | 51562517  | 10q11.23 | Beta-microseminoprotein   |
| MSN    | 64808257  | 64961791  | Xq12     | Moesin  |
| MSX2   | 174151536 | 174157896 | 5q35.2   | Homeobox protein MSX-2  |
| MT1A   | 56672578  | 56673999  | 16q12.2  | Metallothionein-1A  |
| MT1M   | 56666145  | 56667898  | 16q12.2  | Metallothionein-1M  |
| MT3    | 56622986  | 56625000  | 16q12.2  | Metallothionein-3   |
| MTAP   | 21802542  | 21931646  | 9p21.3   | S-methyl-5'-thioadenosine phosphorylase                             |
| MTCH2  | 47638867  | 47664175  | 11p11.2  | Mitochondrial carrier homolog 2                                     |
| MTHFD1 | 64854749  | 64926722  | 14q23.3  | C-1-tetrahydrofolate synthase, cytoplasmic                          |
| MUC1   | 155158300 | 155162707 | 1q22     | Mucin-1   |
| MVK    | 110011060 | 110035067 | 12q24.11 | Mevalonate kinase   |
| MVP    | 29831715  | 29859355  | 16p11.2  | Major vault protein   |
| MX1    | 42792231  | 42831141  | 21q22.3  | Interferon-induced GTP-binding protein Mx1                          |
| MXD3   | 176728462 | 176739758 | 5q35.3   | Max dimerization protein 3  |
| MYB    | 135502453 | 135540311 | 6q23.3   | Transcriptional activator Myb                                       |
| MYBL2  | 42295754  | 42345136  | 20q13.12 | Myb-related protein B   |
| MYC    | 128747680 | 128753674 | 8q24.21  | Myc proto-oncogene protein  |
| MYCBP  | 39328636  | 39347289  | 1p34.3   | C-Myc-binding protein   |
| MYF6   | 81101277  | 81103253  | 12q21.31 | Myogenic factor 6   |
| MYL2   | 111348623 | 111358526 | 12q24.11 | Myosin regulatory light chain 2, ventricular/cardiac muscle isoform |
| MYNN   | 169490619 | 169507504 | 3q26.2   | Myoneurin   |
| MYOC   | 171604557 | 171621823 | 1q24.3   | Myocilin  |
| MYOZ1  | 75391412  | 75401515  | 10q22.2  | Myozenin-1  |
| NAGK   | 71291474  | 71306935  | 2p13.3   | N-acetyl-D-glucosamine kinase                                       |
| NAPSA  | 50861734  | 50869087  | 19q13.33 | Napsin-A  |
| NASP   | 46049518  | 46084566  | 1p34.1   | Nuclear autoantigenic sperm protein                                 |
| NAT13  | 113435307 | 113465147 | 3q13.2   | N-alpha-acetyltransferase 50  |
| NAT5   | 19997760  | 20014299  | 20p11.23 | N-alpha-acetyltransferase 20  |
| NBL1   | 19967048  | 19984945  | 1p36.13  | Neuroblastoma suppressor of tumorigenicity 1                        |
| NCDN   | 36023074  | 36032875  | 1p34.3   | Neurochondrin   |

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|---------|-----------|-----------|----------|--|
| NCF1    | 74188309  | 74203659  | 7q11.23  | Neutrophil cytosol factor 1  |
| NCF2    | 183524698 | 183560011 | 1q25.3   | Neutrophil cytosol factor 2  |
| NCOA4   | 51565108  | 51590734  | 10q11.23 | Nuclear receptor coactivator 4                                       |
| NDUFA3  | 54606036  | 54612564  | 19q13.42 | NADH dehydrogenase [ubiquinone] 1 alpha sub-complex subunit 3        |
| NDUFA6  | 42481529  | 42486959  | 22q13.2  | NADH dehydrogenase [ubiquinone] 1 alpha sub-complex subunit 6        |
| NDUFB3  | 201936156 | 201950473 | 2q33.1   | NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3          |
| NDUFB4  | 120315156 | 120321347 | 3q13.33  | NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4          |
| NDUFB7  | 14676890  | 14682874  | 19p13.12 | NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7          |
| NDUFS3  | 47586888  | 47606114  | 11p11.2  | NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial |
| NDUFV1  | 67374323  | 67380006  | 11q13.2  | NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial        |
| NDUFV2  | 9102628   | 9134343   | 18p11.22 | NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial        |
| NDUFV3  | 44299754  | 44333414  | 21q22.3  | NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial        |
| NEDD1   | 97301001  | 97347129  | 12q23.1  | Protein NEDD1  |
| NEFL    | 24808468  | 24814624  | 8p21.2   | Neurofilament light polypeptide                                      |
| NEIL1   | 75639296  | 75647592  | 15q24.2  | Endonuclease 8-like 1  |
| NEUROD1 | 182537815 | 182545603 | 2q31.3   | Neurogenic differentiation factor 1                                  |
| NEUROG1 | 134869991 | 134871639 | 5q31.1   | Neurogenin-1   |
| NF2     | 29999545  | 30094587  | 22q12.2  | Merlin   |
| NFE2    | 54685895  | 54694905  | 12q13.13 | Transcription factor NF-E2 45 kDa subunit                            |
| NFIA    | 61330931  | 61928465  | 1p31.3   | Nuclear factor 1 A-type  |
| NFIB    | 14081842  | 14398982  | 9p22.3   | Nuclear factor 1 B-type  |
| NFIC    | 3359561   | 3469215   | 19p13.3  | Nuclear factor 1 C-type  |
| NFKBIA  | 35870717  | 35873955  | 14q13.2  | NF-kappa-B inhibitor alpha   |
| NFKBIL2 | 145654165 | 145669827 | 8q24.3   | Tonsoku-like protein   |
| NFX1    | 33290509  | 33371155  | 9p13.3   | Transcriptional repressor NF-X1                                      |
| NFYB    | 104510855 | 104532067 | 12q23.3  | Nuclear transcription factor Y subunit beta                          |
| NGFB    | 115828539 | 115880857 | 1p13.2   | Beta-nerve growth factor   |
| NGLY1   | 25760435  | 25831530  | 3p24.2   | Peptide-N(4)-(N-acetyl-beta-glucosaminyl)asparagine amidase          |
| NIF3L1  | 201754050 | 201768655 | 2q33.1   | NIF3-like protein 1  |
| NIFUN   | 108956358 | 108963160 | 12q23.3  | Iron-sulfur cluster assembly enzyme ISCU, mitochondrial              |
| NIP30   | 57186378  | 57220028  | 16q13    | Protein FAM192A  |
| NIP7    | 69373333  | 69377014  | 16q22.1  | 60S ribosome subunit biogenesis protein NIP7 homolog                 |
| NIPA1   | 23043277  | 23100005  | 15q11.2  | Magnesium transporter NIPA1  |
| NIT1    | 161087876 | 161095235 | 1q23.3   | Nitrilase homolog 1  |
| NKG7    | 51874860  | 51875969  | 19q13.41 | Protein NKG7   |
| NKIRAS2 | 40163400  | 40177659  | 17q21.2  | NF-kappa-B inhibitor-interacting Ras-like protein 2                  |
| NME6    | 48334754  | 48343175  | 3p21.31  | Nucleoside diphosphate kinase 6                                      |
| NMUR2   | 151771093 | 151812929 | 5q33.1   | Neuromedin-U receptor 2  |
| NOL3    | 67204057  | 67209643  | 16q22.1  | Nucleolar protein 3  |
| NOV     | 120428546 | 120436593 | 8q24.12  | Protein NOV homolog  |
| NPC2    | 74942895  | 74960880  | 14q24.3  | Epididymal secretory protein E1                                      |
| NPEPL1  | 57264187  | 57294294  | 20q13.32 | Probable aminopeptidase NPEPL1                                       |
| NPM1    | 170814120 | 170838141 | 5q35.1   | Nucleophosmin  |

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| NPPB    | 11917521  | 11918988  | 1p36.22  | Natriuretic peptides B  |
| NPTX2   | 98246609  | 98259180  | 7q22.1   | Neuronal pentraxin-2  |
| NPY1R   | 164245113 | 164265984 | 4q32.2   | Neuropeptide Y receptor type 1  |
| NR1D2   | 23986751  | 24022109  | 3p24.2   | Nuclear receptor subfamily 1 group D member 2                           |
| NR1H3   | 47269851  | 47290396  | 11p11.2  | Oxysterols receptor LXR-alpha   |
| NR2E1   | 108487262 | 108510013 | 6q21     | Nuclear receptor subfamily 2 group E member 1                           |
| NRBP1   | 27650657  | 27665126  | 2p23.3   | Nuclear receptor-binding protein  |
| NRIP1   | 16333556  | 16437321  | 21q11.2  | Nuclear receptor-interacting protein 1                                  |
| NRSN1   | 24126350  | 24155128  | 6p22.3   | Neurensin-1   |
| NSDHL   | 151999511 | 152038273 | Xq28     | Sterol-4-alpha-carboxylate 3-dehydrogenase, decarboxylating             |
| NSFL1C  | 1422807   | 1454487   | 20p13    | NSFL1 cofactor p47  |
| NSUN5   | 72716514  | 72722864  | 7q11.23  | Probable 28S rRNA (cytosine-C(5))-methyltransferase                     |
| NT5C2   | 104845940 | 104953056 | 10q24.32 | Cytosolic purine 5'-nucleotidase  |
| NUCKS1  | 205681947 | 205719404 | 1q32.1   | Nuclear ubiquitous casein and cyclin-dependent kinase substrate 1       |
| NUDT1   | 2281857   | 2290781   | 7p22.3   | 7,8-dihydro-8-oxoguanine triphosphatase                                 |
| NUDT2   | 34329504  | 34343709  | 9p13.3   | Bis(5'-nucleosyl)-tetraphosphatase [asymmetrical]                       |
| NUDT3   | 34247456  | 34360451  | 6p21.31  | Diphosphoinositol polyphosphate phosphohydrolase 1                      |
| NUDT4   | 93771659  | 93797024  | 12q22    | Diphosphoinositol polyphosphate phosphohydrolase 2                      |
| NUDT5   | 12207324  | 12238143  | 10p13    | ADP-sugar pyrophosphatase   |
| NUDT6   | 123809852 | 123844123 | 4q28.1   | Nucleoside diphosphate-linked moiety X motif 6                          |
| NUMB    | 73741815  | 73930348  | 14q24.2  | Protein numb homolog  |
| NUP54   | 77035812  | 77069668  | 4q21.1   | Nucleoporin p54   |
| NUP62   | 50410082  | 50433020  | 19q13.33 | Nuclear pore glycoprotein p62   |
| NUSAP1  | 41624892  | 41673248  | 15q15.1  | Nucleolar and spindle-associated protein 1                              |
| NXF2    | 101470280 | 101581634 | Xq22.1   | Nuclear RNA export factor 2   |
| OAS1    | 113344582 | 113369990 | 12q24.13 | 2'-5'-oligoadenylate synthase 1   |
| OBRGRP  | 65886270  | 65901690  | 1p31.3   | Leptin receptor gene-related protein                                    |
| OCLN    | 68788119  | 68853931  | 5q13.2   | Occludin  |
| OGG1    | 9791628   | 9829903   | 3p25.3   | N-glycosylase/DNA lyase   |
| OGN     | 95146249  | 95166978  | 9q22.31  | Mimecan   |
| OLFML3  | 114522063 | 114524876 | 1p13.2   | Olfactomedin-like protein 3   |
| OLIG1   | 34442450  | 34444726  | 21q22.11 | Oligodendrocyte transcription factor 1                                  |
| OLR1    | 10310902  | 10324737  | 12p13.2  | Oxidized low-density lipoprotein receptor 1                             |
| OPRL1   | 62711526  | 62731996  | 20q13.33 | Nociceptin receptor   |
| OPTN    | 13141449  | 13180291  | 10p13    | Optineurin  |
| OR2C3   | 247693434 | 247697141 | 1q44     | Olfactory receptor 2C3  |
| OR51E2  | 4701401   | 4719084   | 11p15.4  | Olfactory receptor 51E2   |
| ORC2L   | 201773696 | 201828403 | 2q33.1   | Origin recognition complex subunit 2                                    |
| ORC5L   | 103766788 | 103848495 | 7q22.1   | Origin recognition complex subunit 5                                    |
| OS9     | 58087738  | 58115340  | 12q13.3  | Protein OS-9  |
| OSBPL2  | 60813580  | 60871268  | 20q13.33 | Oxysterol-binding protein-related protein 2                             |
| OSCAR   | 54597933  | 54606000  | 19q13.42 | Osteoclast-associated immunoglobulin-like receptor                      |
| OSGEP   | 20914570  | 20923264  | 14q11.2  | Probable tRNA N6-adenosine threonylcarbamoyl-transferase                |
| OSGEPL1 | 190611386 | 190627953 | 2q32.2   | Probable tRNA N6-adenosine threonylcarbamoyl-transferase, mitochondrial |
| OSM     | 30658818  | 30662829  | 22q12.2  | Oncostatin-M  |
| OTX1    | 63277192  | 63284971  | 2p15     | Homeobox protein OTX1   |
| OXCT    | 41730167  | 41870621  | 5p13.1   | Succinyl-CoA:3-ketoacid coenzyme A transferase 1, mitochondrial         |

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|---------|-----------|-----------|----------|---|
| OXCT1   | 41730167  | 41870621  | 5p13.1   | Succinyl-CoA:3-ketoacid coenzyme A transferase 1, mitochondrial                   |
| OXSRI   | 38206580  | 38296979  | 3p22.2   | Serine/threonine-protein kinase OSR1  |
| p21     | 112084840 | 112259313 | 1p13.2   | Ras-related protein Rap-1A  |
| P2RX7   | 121570622 | 121623876 | 12q24.31 | P2X purinoceptor 7  |
| P2RY12  | 151055168 | 151102600 | 3q25.1   | P2Y purinoceptor 12   |
| P2RY2   | 72929343  | 72947397  | 11q13.4  | P2Y purinoceptor 2  |
| P2RY6   | 72975550  | 73009662  | 11q13.4  | P2Y purinoceptor 6  |
| p53     | 7565097   | 7590856   | 17p13.1  | Cellular tumor antigen p53  |
| PA2G4   | 56498103  | 56507691  | 12q13.2  | Proliferation-associated protein 2G4  |
| PABPC1  | 101698044 | 101735037 | 8q22.3   | Polyadenylate-binding protein 1   |
| PACSN1  | 34433916  | 34503006  | 6p21.31  | Protein kinase C and casein kinase substrate in neurons protein 1                 |
| PACSN3  | 47199076  | 47207994  | 11p11.2  | Protein kinase C and casein kinase substrate in neurons protein 3                 |
| PAFAH2  | 26286258  | 26324648  | 1p36.11  | Platelet-activating factor acetylhydrolase 2, cytoplasmic                         |
| PAGE1   | 49452053  | 49460596  | Xp11.23  | P antigen family member 1   |
| PAGE4   | 49593863  | 49598576  | Xp11.23  | P antigen family member 4   |
| PAICS   | 57301907  | 57327534  | 4q12     | Multifunctional protein ADE2  |
| PAK1IP1 | 10694928  | 10710015  | 6p24.2   | p21-activated protein kinase-interacting protein 1                                |
| PAPOLB  | 4897364   | 4901625   | 7p22.1   | Poly(A) polymerase beta   |
| PAQR5   | 69591286  | 69700119  | 15q23    | Membrane progesterin receptor gamma   |
| PARD6A  | 67694849  | 67696681  | 16q22.1  | Partitioning defective 6 homolog alpha  |
| PARL    | 183547173 | 183602721 | 3q27.1   | Presenilins-associated rhomboid-like protein, mitochondrial                       |
| PARP1   | 226548392 | 226595780 | 1q42.12  | Poly [ADP-ribose] polymerase 1  |
| PAX6    | 31806340  | 31839509  | 11p13    | Paired box protein Pax-6  |
| PAX8    | 113973574 | 114036527 | 2q13     | Paired box protein Pax-8  |
| PCDHGC3 | 140855580 | 140892542 | 5q31.3   | Protocadherin gamma-C3  |
| PCK1    | 56136136  | 56141513  | 20q13.31 | Phosphoenolpyruvate carboxykinase, cytosolic [GTP]                                |
| PCNA    | 5095599   | 5107272   | 20p12.3  | Proliferating cell nuclear antigen  |
| PCOLCE  | 100199800 | 100205798 | 7q22.1   | Procollagen C-endopeptidase enhancer 1  |
| PCSK2   | 17206752  | 17465223  | 20p12.1  | Neuroendocrine convertase 2   |
| PCSK5   | 78505560  | 78977255  | 9q21.13  | Proprotein convertase subtilisin/kexin type 5                                     |
| PDCD10  | 167401086 | 167452727 | 3q26.1   | Programmed cell death protein 10  |
| PDCD2   | 170884383 | 170893780 | 6q27     | Programmed cell death protein 2   |
| PDCD4   | 112631565 | 112659764 | 10q25.2  | Programmed cell death protein 4   |
| PDCD5   | 33071974  | 33078358  | 19q13.11 | Programmed cell death protein 5   |
| PDCD6   | 271736    | 353971    | 5p15.33  | Programmed cell death protein 6   |
| PDCL    | 125560668 | 125590910 | 9q33.2   | Phosducin-like protein  |
| PDE4A   | 10527449  | 10580305  | 19p13.2  | cAMP-specific 3',5'-cyclic phosphodiesterase 4A                                   |
| PDE6B   | 619373    | 664571    | 4p16.3   | Rod cGMP-specific 3',5'-cyclic phosphodiesterase subunit beta                     |
| PDE6D   | 232597135 | 232650982 | 2q37.1   | Retinal rod rhodopsin-sensitive cGMP 3',5'-cyclic phosphodiesterase subunit delta |
| PDEF    | 34505579  | 34524110  | 6p21.31  | SAM pointed domain-containing Ets transcription factor                            |
| PDGFB   | 39619364  | 39640756  | 22q13.1  | Platelet-derived growth factor subunit B  |
| PDHB    | 58413357  | 58419584  | 3p14.3   | Pyruvate dehydrogenase E1 component subunit beta, mitochondrial                   |
| PDIA3   | 44038590  | 44065477  | 15q15.3  | Protein disulfide-isomerase A3  |
| PDIA4   | 148700154 | 148725733 | 7q36.1   | Protein disulfide-isomerase A4  |
| PDIA6   | 10923517  | 10978103  | 2p25.1   | Protein disulfide-isomerase A6  |

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| PDK4     | 95212811  | 95225803  | 7q21.3   | [Pyruvate dehydrogenase (acetyl-transferring)] kinase isozyme 4, mitochondrial    |
| PDPK1    | 2587965   | 2653189   | 16p13.3  | 3-phosphoinositide-dependent protein kinase 1                                     |
| PEA15    | 160175127 | 160185166 | 1q23.2   | Astrocytic phosphoprotein PEA-15  |
| PENK     | 57349233  | 57359293  | 8q12.1   | Proenkephalin-A   |
| PEX10    | 2336236   | 2345236   | 1p36.32  | Peroxisome biogenesis factor 10   |
| PEX11A   | 90220995  | 90234014  | 15q26.1  | Peroxisomal membrane protein 11A  |
| PEX11B   | 145516252 | 145523730 | 1q21.1   | Peroxisomal membrane protein 11B  |
| PEX14    | 10532345  | 10690815  | 1p36.22  | Peroxisomal membrane protein PEX14  |
| PEX19    | 160246602 | 160256138 | 1q23.2   | Peroxisomal biogenesis factor 19  |
| PEX3     | 143771944 | 143811147 | 6q24.2   | Peroxisomal biogenesis factor 3   |
| PEX5     | 7341281   | 7371170   | 12p13.31 | Peroxisomal targeting signal 1 receptor   |
| PFKFB4   | 48555117  | 48599448  | 3p21.31  | 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 4                            |
| PFKL     | 45719934  | 45747259  | 21q22.3  | ATP-dependent 6-phosphofructokinase, liver type                                   |
| PFKP     | 3108525   | 3179904   | 10p15.2  | ATP-dependent 6-phosphofructokinase, platelet type                                |
| PFN1     | 4848947   | 4852356   | 17p13.2  | Profilin-1  |
| PGAM1    | 99185917  | 99193198  | 10q24.1  | Phosphoglycerate mutase 1   |
| PGCP     | 97657455  | 98161882  | 8q22.1   | Carboxypeptidase Q  |
| PGDS     | 139871956 | 139879887 | 9q34.3   | Prostaglandin-H2 D-isomerase  |
| PGLS     | 17622438  | 17632097  | 19p13.11 | 6-phosphogluconolactonase   |
| PGRMC1   | 118370216 | 118378429 | Xq24     | Membrane-associated progesterone receptor component 1                             |
| PGS1     | 76374721  | 76421195  | 17q25.3  | CDP-diacylglycerol--glycerol-3-phosphate 3-phosphatidyltransferase, mitochondrial |
| PHB      | 47481414  | 47492246  | 17q21.33 | Prohibitin  |
| PHF10    | 170104001 | 170124151 | 6q27     | PHD finger protein 10   |
| PHF11    | 50069746  | 50103123  | 13q14.2  | PHD finger protein 11   |
| PHF17    | 129730779 | 129796379 | 4q28.2   | Protein Jade-1  |
| PHKA2    | 18910418  | 19002716  | Xp22.13  | Phosphorylase b kinase regulatory subunit alpha, liver isoform                    |
| PHYH     | 13319796  | 13344412  | 10p13    | Phytanoyl-CoA dioxygenase, peroxisomal  |
| PII4     | 167159577 | 167196792 | 3q26.1   | Serpin I2   |
| PI3      | 43803517  | 43805185  | 20q13.12 | Elafin  |
| PIAS4    | 4007644   | 4039384   | 19p13.3  | E3 SUMO-protein ligase PIAS4  |
| PIGF     | 46808076  | 46844258  | 2p21     | Phosphatidylinositol-glycan biosynthesis class F protein                          |
| PIGQ     | 616995    | 634136    | 16p13.3  | Phosphatidylinositol N-acetylglucosaminyltransferase subunit Q                    |
| PIK3R3   | 46505812  | 46642160  | 1p34.1   | Phosphatidylinositol 3-kinase regulatory subunit gamma                            |
| PIP      | 142829170 | 142836839 | 7q34     | Prolactin-inducible protein   |
| PIP5K2C  | 57984957  | 57997198  | 12q13.3  | Phosphatidylinositol 5-phosphate 4-kinase type-2 gamma                            |
| PIPOX    | 27277531  | 27384234  | 17q11.2  | Peroxisomal sarcosine oxidase   |
| PIR      | 15402921  | 15511687  | Xp22.2   | Pirin   |
| PITX2    | 111538579 | 111563279 | 4q25     | Pituitary homeobox 2  |
| PITX3    | 103989943 | 104001231 | 10q24.32 | Pituitary homeobox 3  |
| PIWIL4   | 94277006  | 94354587  | 11q21    | Piwi-like protein 4   |
| PKD2L1   | 102047903 | 102090243 | 10q24.31 | Polycystic kidney disease 2-like 1 protein  |
| PKIA     | 79428374  | 79517502  | 8q21.12  | cAMP-dependent protein kinase inhibitor alpha                                     |
| PKNOX1   | 44394620  | 44453691  | 21q22.3  | Homeobox protein PKNOX1   |
| PLA2G12A | 110631145 | 110651233 | 4q25     | Group XIIA secretory phospholipase A2   |
| PLA2G2A  | 20301925  | 20306932  | 1p36.13  | Phospholipase A2, membrane associated   |

|         |           |           |          |   |
|---------|-----------|-----------|----------|---|
| PLA2G3  | 31530795  | 31536593  | 22q12.2  | Group 3 secretory phospholipase A2                                |
| PLA2G4D | 42359207  | 42386752  | 15q15.1  | Cytosolic phospholipase A2 delta                                  |
| PLAC1   | 133699868 | 133898352 | Xq26.3   | Placenta-specific protein 1                                       |
| PLAGL1  | 144261437 | 144385735 | 6q24.2   | Zinc finger protein PLAGL1  |
| PLAGL2  | 30780306  | 30795594  | 20q11.21 | Zinc finger protein PLAGL2  |
| PLAT    | 42032236  | 42065242  | 8p11.21  | Tissue-type plasminogen activator                                 |
| PLAUR   | 44150247  | 44174699  | 19q13.31 | Urokinase plasminogen activator surface receptor                  |
| PLCD4   | 219472488 | 219501907 | 2q35     | 1-phosphatidylinositol 4,5-bisphosphate phosphodiesterase delta-4 |
| PLCG2   | 81772702  | 81991899  | 16q23.3  | 1-phosphatidylinositol 4,5-bisphosphate phosphodiesterase gamma-2 |
| PLEK    | 68592305  | 68624585  | 2p13.3   | Pleckstrin  |
| PLEK2   | 67853700  | 67878917  | 14q23.3  | Pleckstrin-2  |
| PLEKHA1 | 124134212 | 124191867 | 10q26.13 | Pleckstrin homology domain-containing family A member 1           |
| PLEKHA8 | 30067020  | 30170096  | 7p14.3   | Pleckstrin homology domain-containing family A member 8           |
| PLEKHB2 | 131862420 | 132111282 | 2q21.1   | Pleckstrin homology domain-containing family B member 2           |
| PLEKHF2 | 96146032  | 96168912  | 8q22.1   | Pleckstrin homology domain-containing family F member 2           |
| PLEKHO1 | 150121373 | 150136916 | 1q21.2   | Pleckstrin homology domain-containing family O member 1           |
| PLK2    | 57749809  | 57756087  | 5q11.2   | Serine/threonine-protein kinase PLK2                              |
| PLN     | 118869461 | 118881893 | 6q22.31  | Cardiac phospholamban   |
| PLS3    | 114795501 | 114885181 | Xq23     | Plastin-3   |
| PLSCR3  | 7293046   | 7307416   | 17p13.1  | Phospholipid scramblase 3   |
| PLTP    | 44527399  | 44540794  | 20q13.12 | Phospholipid transfer protein                                     |
| PMP2    | 82352561  | 82359758  | 8q21.13  | Myelin P2 protein   |
| PMP22   | 15133095  | 15168643  | 17p12    | Peripheral myelin protein 22                                      |
| PMVK    | 154897210 | 154909467 | 1q21.3   | Phosphomevalonate kinase  |
| PNPLA4  | 7866288   | 7895780   | Xp22.31  | Patatin-like phospholipase domain-containing protein 4            |
| PODN    | 53527854  | 53551174  | 1p32.3   | Podocan   |
| POLA2   | 65029233  | 65073060  | 11q13.1  | DNA polymerase alpha subunit B                                    |
| POLB    | 42195972  | 42229326  | 8p11.21  | DNA polymerase beta   |
| POLD1   | 50887461  | 50921273  | 19q13.33 | DNA polymerase delta catalytic subunit                            |
| POLD2   | 44154286  | 44163957  | 7p13     | DNA polymerase delta subunit 2                                    |
| POLR2C  | 57496299  | 57505922  | 16q21    | DNA-directed RNA polymerase II subunit RPB3                       |
| POLR2I  | 36604612  | 36606248  | 19q13.12 | DNA-directed RNA polymerase II subunit RPB9                       |
| POLR2J  | 102113565 | 102119354 | 7q22.1   | DNA-directed RNA polymerase II subunit RPB11-a                    |
| POLR2K  | 101162812 | 101166230 | 8q22.2   | DNA-directed RNA polymerases I, II, and III subunit RPABC4        |
| POLR2L  | 837356    | 842545    | 11p15.5  | DNA-directed RNA polymerases I, II, and III subunit RPABC5        |
| POLR3K  | 96407     | 103628    | 16p13.3  | DNA-directed RNA polymerase III subunit RPC10                     |
| POMC    | 25383722  | 25391772  | 2p23.3   | Pro-opiomelanocortin  |
| POP4    | 30094924  | 30108144  | 19q12    | Ribonuclease P protein subunit p29                                |
| PORCN   | 48367350  | 48379202  | Xp11.23  | Protein-serine O-palmitoleoyltransferase porcupine                |
| POT1    | 124462440 | 124570037 | 7q31.33  | Protection of telomeres protein 1                                 |
| PPAP2B  | 56960419  | 57110974  | 1p32.2   | Lipid phosphate phosphohydrolase 3                                |
| PPARG   | 12328867  | 12475855  | 3p25.2   | Peroxisome proliferator-activated receptor gamma                  |
| PPFIBP2 | 7534529   | 7678358   | 11p15.4  | Liprin-beta-2   |
| PPGB    | 44518783  | 44527459  | 20q13.12 | Lysosomal protective protein                                      |
| PPIA    | 44836279  | 44864163  | 7p13     | Peptidyl-prolyl cis-trans isomerase A                             |

|             |            |            |          |   |
|-------------|------------|------------|----------|---|
| PPIB        | 64448011   | 64455404   | 15q22.31 | Peptidyl-prolyl cis-trans isomerase B   |
| PPID        | 159630286  | 159644548  | 4q32.1   | Peptidyl-prolyl cis-trans isomerase D   |
| PPIH        | 43124096   | 43142429   | 1p34.2   | Peptidyl-prolyl cis-trans isomerase H   |
| PPIL1       | 36822603   | 36842800   | 6p21.2   | Peptidyl-prolyl cis-trans isomerase-like 1  |
| PPIL5       | 50065415   | 50081390   | 14q21.3  | Leucine-rich repeat protein 1   |
| PPM1A       | 60712470   | 60765805   | 14q23.1  | Protein phosphatase 1A  |
| PPME1       | 73882144   | 73965748   | 11q13.4  | Protein phosphatase methylesterase 1  |
| PPP1CB      | 28974506   | 29025806   | 2p23.2   | Serine/threonine-protein phosphatase PP1-beta catalytic subunit                   |
| PPP2R1A     | 52693292   | 52730687   | 19q13.41 | Serine/threonine-protein phosphatase 2A 65 kDa regulatory subunit A alpha isoform |
| PPP2R2B     | 145967936  | 146464347  | 5q32     | Serine/threonine-protein phosphatase 2A 55 kDa regulatory subunit B beta isoform  |
| PPP4C       | 30087299   | 30096698   | 16p11.2  | Serine/threonine-protein phosphatase 4 catalytic subunit                          |
| PRAME       | 22890123   | 22901768   | 22q11.22 | Melanoma antigen preferentially expressed in tumors                               |
| PRCP        | 82534544   | 82681626   | 11q14.1  | Lysosomal Pro-X carboxypeptidase  |
| PRDM4       | 108126643  | 108155049  | 12q23.3  | PR domain zinc finger protein 4   |
| PRDX1       | 45976708   | 45988719   | 1p34.1   | Peroxiredoxin-1   |
| PRDX2       | 12907634   | 12912694   | 19p13.2  | Peroxiredoxin-2   |
| PRDX4       | 23682379   | 23704516   | Xp22.11  | Peroxiredoxin-4   |
| PRELP       | 203444956  | 203460480  | 1q32.1   | Prolargin   |
| PRG1        | 43,349,056 | 43,349,548 | 19q13.2  | P53-Responsive Gene 1   |
| PRG2        | 57154267   | 57158130   | 11q12.1  | Bone marrow proteoglycan  |
| PRKAR1A     | 66507921   | 66547460   | 17q24.2  | cAMP-dependent protein kinase type I-alpha regulatory subunit                     |
| PRKCA       | 64298754   | 64806861   | 17q24.2  | Protein kinase C alpha type   |
| PRKCDBP     | 6340176    | 6341877    | 11p15.4  | Protein kinase C delta-binding protein  |
| PRKR        | 102004319  | 102067123  | 7q22.1   | PRKR-interacting protein 1  |
| PRKRIP1     | 102004319  | 102067123  | 7q22.1   | PRKR-interacting protein 1  |
| PRL         | 22287480   | 22297730   | 6p22.3   | Prolactin   |
| PRM1        | 11374693   | 11375207   | 16p13.13 | Sperm protamine P1  |
| PRMT5       | 23389720   | 23398794   | 14q11.2  | Protein arginine N-methyltransferase 5  |
| PRNP        | 4666882    | 4682236    | 20p13    | Major prion protein   |
| Progranulin | 42422614   | 42430470   | 17q21.31 | Granulins   |
| PROK1       | 110993822  | 110999976  | 1p13.3   | Prokineticin-1  |
| ProSAPiP1   | 3143263    | 3154192    | 20p13    | Leucine zipper putative tumor suppressor 3  |
| PRPF19      | 60658202   | 60674060   | 11q12.2  | Pre-mRNA-processing factor 19   |
| PRPS1       | 106871737  | 106894256  | Xq22.3   | Ribose-phosphate pyrophosphokinase 1  |
| PRUNE       | 150980896  | 151008189  | 1q21.3   | Protein prune homolog   |
| PRV1        | 43857811   | 43867480   | 19q13.31 | CD177 antigen   |
| PSAP        | 73576055   | 73611126   | 10q22.1  | Prosaposin  |
| PSCD2       | 48972289   | 48985571   | 19q13.33 | Cytohesin-2   |
| PSG3        | 43225790   | 43244721   | 19q13.2  | Pregnancy-specific beta-1-glycoprotein 3  |
| PSG9        | 43715943   | 43773682   | 19q13.31 | Pregnancy-specific beta-1-glycoprotein 9  |
| PSMA1       | 14515329   | 14665181   | 11p15.2  | Proteasome subunit alpha type-1   |
| PSMA3       | 58711549   | 58738730   | 14q23.1  | Proteasome subunit alpha type-3   |
| PSMA4       | 78832747   | 78841604   | 15q25.1  | Proteasome subunit alpha type-4   |
| PSMA6       | 35747839   | 35786699   | 14q13.2  | Proteasome subunit alpha type-6   |
| PSMB4       | 151372010  | 151374420  | 1q21.3   | Proteasome subunit beta type-4  |
| PSMB6       | 4699439    | 4701790    | 17p13.2  | Proteasome subunit beta type-6  |
| PSMB8       | 32808494   | 32812480   | 6p21.32  | Proteasome subunit beta type-8  |
| PSMC3       | 47440320   | 47447993   | 11p11.2  | 26S protease regulatory subunit 6A  |
| PSMD12      | 65334032   | 65362743   | 17q24.2  | 26S proteasome non-ATPase regulatory subunit 12                                   |

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|---------|-----------|-----------|----------|--|
| PSME1   | 24605367  | 24608176  | 14q12    | Proteasome activator complex subunit 1   |
| PSME2   | 24612574  | 24616779  | 14q12    | Proteasome activator complex subunit 2   |
| PSME3   | 40976402  | 40995774  | 17q21.31 | Proteasome activator complex subunit 3   |
| PSPC1   | 20248896  | 20357142  | 13q12.11 | Paraspeckle component 1  |
| PSTPIP1 | 77285700  | 77329673  | 15q24.3  | Proline-serine-threonine phosphatase-interacting protein 1   |
| PTE1    | 44470360  | 44486045  | 20q13.12 | Acyl-coenzyme A thioesterase 8   |
| PTEN    | 89622870  | 89731687  | 10q23.31 | Phosphatidylinositol 3,4,5-trisphosphate 3-phosphatase and dual-specificity protein phosphatase PTEN |
| PTGES2  | 130882972 | 130890741 | 9q34.11  | Prostaglandin E synthase 2   |
| PTGES3  | 57057127  | 57082159  | 12q13.3  | Prostaglandin E synthase 3   |
| PTGS1   | 125132824 | 125157982 | 9q33.2   | Prostaglandin G/H synthase 1   |
| PTK9    | 44187526  | 44200178  | 12q12    | Twinfilin-1  |
| PTK9L   | 52262626  | 52273276  | 3p21.2   | Twinfilin-2  |
| PTMA    | 232571605 | 232578251 | 2q37.1   | Prothymosin alpha  |
| PTMS    | 6874682   | 6880116   | 12p13.31 | Parathymosin   |
| PTPN1   | 49126891  | 49201299  | 20q13.13 | Tyrosine-protein phosphatase non-receptor type 1   |
| PTPN6   | 7055631   | 7070479   | 12p13.31 | Tyrosine-protein phosphatase non-receptor type 6   |
| PTPRA   | 2844830   | 3019722   | 20p13    | Receptor-type tyrosine-protein phosphatase alpha   |
| PTTG1   | 159848829 | 159855748 | 5q33.3   | Securin  |
| PTTG1IP | 46269500  | 46293752  | 21q22.3  | Pituitary tumor-transforming gene 1 protein-interacting protein                                      |
| PUS1    | 132413745 | 132428406 | 12q24.33 | tRNA pseudouridine synthase A, mitochondrial   |
| PVRL4   | 161040785 | 161059389 | 1q23.3   | Nectin-4   |
| PWP1    | 108079509 | 108106944 | 12q23.3  | Periodic tryptophan protein 1 homolog  |
| PYGB    | 25228705  | 25278650  | 20p11.21 | Glycogen phosphorylase, brain form   |
| PYGO2   | 154929502 | 154936329 | 1q21.3   | Pygopus homolog 2  |
| QDPR    | 17461884  | 17513857  | 4p15.32  | Dihydropteridine reductase   |
| RAB11A  | 66018392  | 66184329  | 15q22.31 | Ras-related protein Rab-11A  |
| RAB11B  | 8454865   | 8469318   | 19p13.2  | Ras-related protein Rab-11B  |
| RAB13   | 153954127 | 153958834 | 1q21.3   | Ras-related protein Rab-13   |
| RAB13   | 153954127 | 153958834 | 1q21.3   | Ras-related protein Rab-13   |
| RAB27A  | 55495164  | 55611311  | 15q21.3  | Ras-related protein Rab-27A  |
| RAB27A  | 55495164  | 55611311  | 15q21.3  | Ras-related protein Rab-27A  |
| RAB2B   | 21927179  | 21945132  | 14q11.2  | Ras-related protein Rab-2B   |
| RAB31   | 9708162   | 9862548   | 18p11.22 | Ras-related protein Rab-31   |
| RAB35   | 120532899 | 120555306 | 12q24.23 | Ras-related protein Rab-35   |
| RAB3IL1 | 61664773  | 61687741  | 11q12.2  | Guanine nucleotide exchange factor for Rab-3A  |
| RAB4A   | 229406822 | 229441641 | 1q42.13  | Ras-related protein Rab-4A   |
| RAB5A   | 19988571  | 20026667  | 3p24.3   | Ras-related protein Rab-5A   |
| RAB5B   | 56367697  | 56388490  | 12q13.2  | Ras-related protein Rab-5B   |
| RAB7L1  | 205737114 | 205744588 | 1q32.1   | Ras-related protein Rab-7L1  |
| RAB8A   | 16222439  | 16245044  | 19p13.12 | Ras-related protein Rab-8A   |
| RAB9A   | 13707244  | 13728625  | Xp22.2   | Ras-related protein Rab-9A   |
| RABAC1  | 42460833  | 42463542  | 19q13.2  | Prenylated Rab acceptor protein 1  |
| RABL2B  | 51205929  | 51222091  | 22q13.33 | Rab-like protein 2B  |
| RACGAP1 | 50370706  | 50426919  | 12q13.12 | Rac GTPase-activating protein 1  |
| RAD1    | 34905369  | 34919094  | 5p13.2   | Cell cycle checkpoint protein RAD1   |
| RAD17   | 68665120  | 68710628  | 5q13.2   | Cell cycle checkpoint protein RAD17  |
| RAD18   | 8817088   | 9005457   | 3p25.3   | E3 ubiquitin-protein ligase RAD18  |
| RAD23B  | 110045418 | 110094475 | 9q31.2   | UV excision repair protein RAD23 homolog B   |
| RAD51   | 40986972  | 41024354  | 15q15.1  | DNA repair protein RAD51 homolog 1   |
| RAD51L1 | 68286496  | 69196935  | 14q24.1  | DNA repair protein RAD51 homolog 2   |
| RAD51L3 | 33426811  | 33448541  | 17q12    | DNA repair protein RAD51 homolog 4   |
| RAG2    | 36597124  | 36619829  | 11p12    | V(D)J recombination-activating protein 2   |

|               |           |           |          |  |
|---------------|-----------|-----------|----------|--|
| RAMP1         | 238767536 | 238820756 | 2q37.3   | Receptor activity-modifying protein 1                        |
| RAMP1         | 238767536 | 238820756 | 2q37.3   | Receptor activity-modifying protein 1                        |
| RAPGEF3       | 48128455  | 48164823  | 12q13.11 | Rap guanine nucleotide exchange factor 3                     |
| RARB          | 25215823  | 25639423  | 3p24.2   | Retinoic acid receptor beta                                  |
| RARRES2       | 150035408 | 150038763 | 7q36.1   | Retinoic acid receptor responder protein 2                   |
| RARRES3       | 63304281  | 63313934  | 11q12.3  | Retinoic acid receptor responder protein 3                   |
| RASD2         | 35936915  | 35950048  | 22q12.3  | GTP-binding protein Rhes                                     |
| RASSF5        | 206680879 | 206762616 | 1q32.1   | Ras association domain-containing protein 5                  |
| RB1           | 48877887  | 49056122  | 13q14.2  | Retinoblastoma-associated protein                            |
| RBBP4         | 33116743  | 33151812  | 1p35.1   | Histone-binding protein RBBP4                                |
| RBBP5         | 205055270 | 205091143 | 1q32.1   | Retinoblastoma-binding protein 5                             |
| RBM38         | 55966463  | 55984389  | 20q13.31 | RNA-binding protein 38                                       |
| RBM8A         | 145507598 | 145513536 | 1q21.1   | RNA-binding protein 8A                                       |
| RBMX          | 135930163 | 135962923 | Xq26.3   | RNA-binding motif protein, X chromosome                      |
| RBMX1F        | 24314689  | 24329129  | Yq11.223 | RNA-binding motif protein, Y chromosome, family 1 member F/J |
| RBP1          | 139236276 | 139258671 | 3q23     | Retinol-binding protein 1                                    |
| RBP4          | 95351444  | 95361501  | 10q23.33 | Retinol-binding protein 4                                    |
| RBP5          | 7276280   | 7281538   | 12p13.31 | Retinol-binding protein 5                                    |
| RCC1          | 28832455  | 28865812  | 1p35.3   | Regulator of chromosome condensation                         |
| RCV1          | 9799637   | 9808938   | 17p13.1  | Recoverin  |
| REG4          | 120336641 | 120354283 | 1p12     | Regenerating islet-derived protein 4                         |
| RENBP         | 153200716 | 153210232 | Xq28     | N-acylglucosamine 2-epimerase                                |
| REXO4         | 136271186 | 136283164 | 9q34.2   | RNA exonuclease 4  |
| RFC3          | 34392186  | 34540695  | 13q13.2  | Replication factor C subunit 3                               |
| RFC4          | 186507669 | 186524847 | 3q27.3   | Replication factor C subunit 4                               |
| RFP2          | 50570024  | 50594617  | 13q14.2  | E3 ubiquitin-protein ligase TRIM13                           |
| RFXAP         | 37393361  | 37403241  | 13q13.3  | Regulatory factor X-associated protein                       |
| RGS18         | 192127587 | 192154945 | 1q31.2   | Regulator of G-protein signaling 18                          |
| RGS19         | 62704534  | 62711323  | 20q13.33 | Regulator of G-protein signaling 19                          |
| RGS2          | 192778169 | 192781403 | 1q31.2   | Regulator of G-protein signaling 2                           |
| RHAG          | 49572871  | 49604552  | 6p12.3   | Ammonium transporter Rh type A                               |
| RHOBTB1       | 62629196  | 62761198  | 10q21.2  | Rho-related BTB domain-containing protein 1                  |
| RHOC          | 113243728 | 113250056 | 1p13.2   | Rho-related GTP-binding protein RhoC                         |
| RHOD          | 66824289  | 66839484  | 11q13.2  | Rho-related GTP-binding protein RhoD                         |
| RHOH          | 40192673  | 40248587  | 4p14     | Rho-related GTP-binding protein RhoH                         |
| RILP          | 1549444   | 1553371   | 17p13.3  | Rab-interacting lysosomal protein                            |
| RIN1          | 66097713  | 66104311  | 11q13.2  | Ras and Rab interactor 1                                     |
| RLN1          | 5334969   | 5339873   | 9p24.1   | Prorolaxin H1  |
| RNASEH1       | 3592383   | 3606206   | 2p25.3   | Ribonuclease H1  |
| RNF12         | 73805052  | 73834452  | Xq13.2   | E3 ubiquitin-protein ligase RLIM                             |
| RNF182        | 13924677  | 13980533  | 6p23     | E3 ubiquitin-protein ligase RNF182                           |
| RNF183        | 116059373 | 116065656 | 9q32     | RING finger protein 183                                      |
| RNF26         | 119205237 | 119208023 | 11q23.3  | RING finger protein 26                                       |
| RNF40         | 30773066  | 30787628  | 16p11.2  | E3 ubiquitin-protein ligase BRE1B                            |
| RNF6          | 26706253  | 26796791  | 13q12.13 | E3 ubiquitin-protein ligase RNF6                             |
| RNF7          | 141457046 | 141466402 | 3q23     | RING-box protein 2   |
| RNP24         | 124069078 | 124083116 | 12q24.31 | Transmembrane emp24 domain-containing protein 2              |
| RNPEP         | 201951500 | 201975275 | 1q32.1   | Aminopeptidase B   |
| RNPS1         | 2303117   | 2318413   | 16p13.3  | RNA-binding protein with serine-rich domain 1                |
| RNU3IP2       | 51967446  | 51975957  | 3p21.2   | U3 small nucleolar RNA-interacting protein 2                 |
| RP11-444E17.2 | 44246480  | 44265458  | 6p21.1   | T-complex-associated testis-expressed protein 1              |
| RP13-36C9.1   | 134945598 | 134953994 | Xq26.3   | Cancer/testis antigen family 45 member A5                    |
| RPA2          | 28218035  | 28241257  | 1p35.3   | Replication protein A 32 kDa subunit                         |

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| RPL10   | 153618315 | 153637504 | Xq28     | 60S ribosomal protein L10  |
| RPL10A  | 35436185  | 35438562  | 6p21.31  | 60S ribosomal protein L10a   |
| RPL11   | 24018269  | 24022915  | 1p36.11  | 60S ribosomal protein L11  |
| RPL13   | 89627065  | 89630950  | 16q24.3  | 60S ribosomal protein L13  |
| RPL14   | 40498783  | 40503861  | 3p22.1   | 60S ribosomal protein L14  |
| RPL18   | 49118585  | 49122793  | 19q13.33 | 60S ribosomal protein L18  |
| RPL23   | 37004118  | 37010096  | 17q12    | 60S ribosomal protein L23  |
| RPL24   | 101399935 | 101405626 | 3q12.3   | 60S ribosomal protein L24  |
| RPL26L1 | 172385732 | 172396774 | 5q35.1   | 60S ribosomal protein L26-like 1   |
| RPL27   | 41150290  | 41154976  | 17q21.31 | 60S ribosomal protein L27  |
| RPL28   | 55896713  | 55914612  | 19q13.42 | 60S ribosomal protein L28  |
| RPL31   | 101618177 | 101640494 | 2q11.2   | 60S ribosomal protein L31  |
| RPL32   | 12875984  | 12883087  | 3p25.2   | 60S ribosomal protein L32  |
| RPL34   | 109541722 | 109551568 | 4q25     | 60S ribosomal protein L34  |
| RPL35   | 127620159 | 127624260 | 9q33.3   | 60S ribosomal protein L35  |
| RPL35A  | 197676858 | 197683481 | 3q29     | 60S ribosomal protein L35a   |
| RPL36   | 5674958   | 5691887   | 19p13.3  | 60S ribosomal protein L36  |
| RPL39   | 118920467 | 118925606 | Xq24     | 60S ribosomal protein L39  |
| RPL7A   | 136215069 | 136218281 | 9q34.2   | 60S ribosomal protein L7a  |
| RPL9    | 39455744  | 39460568  | 4p14     | 60S ribosomal protein L9   |
| RPLP0   | 120634489 | 120639038 | 12q24.23 | 60S acidic ribosomal protein P0  |
| RPN2    | 35806813  | 35870022  | 20q11.23 | Dolichyl-diphosphooligosaccharide--protein glycosyltransferase subunit 2 |
| RPP30   | 92631473  | 92668312  | 10q23.31 | Ribonuclease P protein subunit p30                                       |
| RPS11   | 49999622  | 50002946  | 19q13.33 | 40S ribosomal protein S11  |
| RPS13   | 17095936  | 17099334  | 11p15.1  | 40S ribosomal protein S13  |
| RPS16   | 39923847  | 39926588  | 19q13.2  | 40S ribosomal protein S16  |
| RPS17   | 82821158  | 82824972  | 15q25.2  | 40S ribosomal protein S17  |
| RPS20   | 56979854  | 56987069  | 8q12.1   | 40S ribosomal protein S20  |
| RPS21   | 60962172  | 60963576  | 20q13.33 | 40S ribosomal protein S21  |
| RPS25   | 118886422 | 118889401 | 11q23.3  | 40S ribosomal protein S25  |
| RPS26   | 56435637  | 56438116  | 12q13.2  | 40S ribosomal protein S26  |
| RPS28   | 8386042   | 8388224   | 19p13.2  | 40S ribosomal protein S28  |
| RPS3A   | 152020725 | 152025804 | 4q31.3   | 40S ribosomal protein S3a  |
| RPS4Y1  | 2709527   | 2800041   | Yp11.31  | 40S ribosomal protein S4, Y isoform 1                                    |
| RPS5    | 58897767  | 58906173  | 19q13.43 | 40S ribosomal protein S5   |
| RPS7    | 3622795   | 3628509   | 2p25.3   | 40S ribosomal protein S7   |
| RPS9    | 54704610  | 54752862  | 19q13.42 | 40S ribosomal protein S9   |
| RPSA    | 39448180  | 39454033  | 3p22.1   | 40S ribosomal protein SA   |
| RRAD    | 66955582  | 66959547  | 16q22.1  | GTP-binding protein RAD  |
| RRAS    | 50138549  | 50143458  | 19q13.33 | Ras-related protein R-Ras  |
| RRM1    | 4115937   | 4160106   | 11p15.4  | Ribonucleoside-diphosphate reductase large subunit                       |
| RSAD2   | 7005937   | 7038370   | 2p25.2   | Radical S-adenosyl methionine domain-containing protein 2                |
| RSPO3   | 127439749 | 127518910 | 6q22.33  | R-spondin-3  |
| RSU1    | 16632610  | 16859527  | 10p13    | Ras suppressor protein 1   |
| RTKN    | 74652963  | 74669549  | 2p13.1   | Rhotekin   |
| RUTBC3  | 40766595  | 40806293  | 22q13.1  | Small G protein signaling modulator 3                                    |
| RUVBL1  | 127783621 | 127872757 | 3q21.3   | RuvB-like 1  |
| RUVBL2  | 49496705  | 49519252  | 19q13.33 | RuvB-like 2  |
| RWDD1   | 116892530 | 116918838 | 6q22.1   | RWD domain-containing protein 1  |
| RWDD2   | 30376705  | 30391699  | 21q21.3  | RWD domain-containing protein 2B   |
| S100A11 | 152004982 | 152020383 | 1q21.3   | Protein S100-A11   |
| S100A16 | 153579362 | 153585621 | 1q21.3   | Protein S100-A16   |

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| S100A3   | 153519805   | 153521848   | 1q21.3   | Protein S100-A3  |
| S100A4   | 153516089   | 153522612   | 1q21.3   | Protein S100-A4  |
| S100A6   | 153507075   | 153508720   | 1q21.3   | Protein S100-A6  |
| S100A7   | 153430220   | 153433177   | 1q21.3   | Protein S100-A7  |
| S100A9   | 153330330   | 153333503   | 1q21.3   | Protein S100-A9  |
| S100P    | 6694796     | 6698897     | 4p16.1   | Protein S100-P   |
| SAA1     | 18287721    | 18291524    | 11p15.1  | Serum amyloid A-1 protein  |
| SAA4     | 18252896    | 18258440    | 11p15.1  | Serum amyloid A-4 protein  |
| SAE1     | 47616531    | 47713886    | 19q13.32 | SUMO-activating enzyme subunit 1   |
| SART2    | 116575336   | 116762424   | 6q22.1   | Dermatan-sulfate epimerase   |
| SCAMP1   | 77656339    | 77776562    | 5q14.1   | Secretory carrier-associated membrane protein 1                                  |
| SCAMP3   | 155225770   | 155232221   | 1q22     | Secretory carrier-associated membrane protein 3                                  |
| SCAP2    | 26706681    | 27034858    | 7p15.2   | Src kinase-associated phosphoprotein 2   |
| SCARB1   | 125261402   | 125367214   | 12q24.31 | Scavenger receptor class B member 1  |
| SCGB1A1  | 62172575    | 62190667    | 11q12.3  | Uteroglobin  |
| SCGB1A1  | 62172575    | 62190667    | 11q12.3  | Uteroglobin  |
| SCHIP1   | 159557650   | 159615149   | 3q25.33  | Schwannomin-interacting protein 1  |
| SCIN     | 12610203    | 12693228    | 7p21.3   | Adseverin  |
| SCLY     | 238969530   | 239008054   | 2q37.3   | Selenocysteine lyase   |
| SCMH1    | 41492872    | 41707826    | 1p34.2   | Polycomb protein SCMH1   |
| SCNM1    | 151129140   | 151142773   | 1q21.3   | Sodium channel modifier 1  |
| SCO1     | 10583654    | 10601692    | 17p13.1  | Protein SCO1 homolog, mitochondrial  |
| SCYB6    | 73,836,497  | 73,849,064  | 4q13.3   | Small Inducible Cytokine Subfamily B (Cys-X-Cys)                                 |
| SCYD1    | 57406370    | 57418960    | 16q21    | Fractalkine  |
| SCYE1    | 106,315,544 | 106,349,226 | 4q24     | Small Inducible Cytokine Subfamily E, Member 1 (Endothelial Monocyte-Activating) |
| SCYL3    | 169818772   | 169863408   | 1q24.2   | Protein-associating with the carboxyl-terminal domain of ezrin                   |
| SDC1     | 20400558    | 20425194    | 2p24.1   | Syndecan-1   |
| SDC3     | 31342314    | 31381608    | 1p35.2   | Syndecan-3   |
| SDCCAG3  | 139296377   | 139305061   | 9q34.3   | Serologically defined colon cancer antigen 3                                     |
| SDF2     | 26975374    | 26989207    | 17q11.2  | Stromal cell-derived factor 2  |
| SDHD     | 111957497   | 111990353   | 11q23.1  | Succinate dehydrogenase [ubiquinone] cytochrome b small subunit, mitochondrial   |
| SDPR     | 192699028   | 192711981   | 2q32.3   | Serum deprivation-response protein   |
| SEC22C   | 42589461    | 42642572    | 3p22.1   | Vesicle-trafficking protein SEC22c   |
| SEC23B   | 18488137    | 18542059    | 20p11.23 | Protein transport protein Sec23B   |
| SEC24D   | 119643978   | 119759838   | 4q26     | Protein transport protein Sec24D   |
| SELL     | 169659808   | 169680839   | 1q24.2   | L-selectin   |
| SEMA3D   | 84624869    | 84816171    | 7q21.11  | Semaphorin-3D  |
| SEMA4F   | 74881355    | 74909186    | 2p13.1   | Semaphorin-4F  |
| SERF2    | 44069285    | 44094787    | 15q15.3  | Small EDRK-rich factor 2   |
| SERINC3  | 43124862    | 43150750    | 20q13.12 | Serine incorporator 3  |
| SERPINA5 | 95027779    | 95059457    | 14q32.13 | Plasma serine protease inhibitor   |
| SERPINA7 | 105277197   | 105282729   | Xq22.3   | Thyroxine-binding globulin   |
| SERPINB4 | 61304493    | 61311532    | 18q21.33 | Serpin B4  |
| SERPIND1 | 21128167    | 21142008    | 22q11.21 | Heparin cofactor 2   |
| SERPINE1 | 100770370   | 100782547   | 7q22.1   | Plasminogen activator inhibitor 1  |
| SERPING1 | 57364860    | 57382326    | 11q12.1  | Plasma protease C1 inhibitor   |
| SERTAD1  | 40927499    | 40931932    | 19q13.2  | SERTA domain-containing protein 1  |
| SERTAD4  | 210406144   | 210419976   | 1q32.2   | SERTA domain-containing protein 4  |
| SESN2    | 28586038    | 28609002    | 1p35.3   | Sestrin-2  |
| SET      | 131445703   | 131458679   | 9q34.11  | Protein SET  |
| SF3A1    | 30727977    | 30752936    | 22q12.2  | Splicing factor 3A subunit 1   |
| SF3A2    | 2236520     | 2248678     | 19p13.3  | Splicing factor 3A subunit 2   |

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| SFN      | 27189633  | 27190947  | 1p36.11  | 14-3-3 protein sigma   |
| SFRS2    | 74730197  | 74733456  | 17q25.1  | Serine/arginine-rich splicing factor 2                                 |
| SFTPD    | 81697496  | 81742370  | 10q22.3  | Pulmonary surfactant-associated protein D                              |
| SFXN2    | 104474295 | 104503249 | 10q24.32 | Sideroflexin-2   |
| SGCD     | 155297354 | 156194799 | 5q33.2   | Delta-sarcoglycan  |
| SGK      | 134490384 | 134639250 | 6q23.2   | Serine/threonine-protein kinase Sgk1                                   |
| SGNE1    | 32933877  | 32989299  | 15q13.3  | Neuroendocrine protein 7B2   |
| SGTA     | 2754712   | 2783369   | 19p13.3  | Small glutamine-rich tetratricopeptide repeat-containing protein alpha |
| SH2D1A   | 123480194 | 123507005 | Xq25     | SH2 domain-containing protein 1A                                       |
| SH2D1B   | 162365056 | 162381928 | 1q23.3   | SH2 domain-containing protein 1B                                       |
| SH2D3A   | 6752171   | 6767599   | 19p13.3  | SH2 domain-containing protein 3A                                       |
| SH3BGR13 | 26605667  | 26608007  | 1p36.11  | SH3 domain-binding glutamic acid-rich-like protein 3                   |
| SH3BP1   | 38030661  | 38062939  | 22q13.1  | SH3 domain-binding protein 1   |
| SH3GL1   | 4360367   | 4400544   | 19p13.3  | Endophilin-A2  |
| SH3GL2   | 17579080  | 17797127  | 9p22.2   | Endophilin-A1  |
| SH3GLB1  | 87170259  | 87213867  | 1p22.3   | Endophilin-B1  |
| SH3PX3   | 75940247  | 75954642  | 15q24.2  | Sorting nexin-33   |
| SIGIRR   | 405716    | 417455    | 11p15.5  | Single Ig IL-1-related receptor  |
| SIGLEC9  | 51628165  | 51639908  | 19q13.41 | Sialic acid-binding Ig-like lectin 9                                   |
| SIRT7    | 79869815  | 79879199  | 17q25.3  | NAD-dependent protein deacetylase sirtuin-7                            |
| SKIP     | 228844666 | 229046361 | 2q36.3   | A-kinase anchor protein SPHKAP   |
| SKP1A    | 133484633 | 133512729 | 5q31.1   | S-phase kinase-associated protein 1                                    |
| SLC13A3  | 45186463  | 45304714  | 20q13.12 | Solute carrier family 13 member 3                                      |
| SLC16A7  | 59989848  | 60176395  | 12q14.1  | Monocarboxylate transporter 2  |
| SLC17A3  | 25833294  | 25882514  | 6p22.2   | Sodium-dependent phosphate transport protein 4                         |
| SLC18A1  | 20002366  | 20040717  | 8p21.3   | Chromaffin granule amine transporter                                   |
| SLC19A3  | 228549926 | 228582728 | 2q36.3   | Thiamine transporter 2   |
| SLC1A4   | 65215611  | 65250999  | 2p14     | Neutral amino acid transporter A                                       |
| SLC1A7   | 53552855  | 53608289  | 1p32.3   | Excitatory amino acid transporter 5                                    |
| SLC20A2  | 42273993  | 42397069  | 8p11.21  | Sodium-dependent phosphate transporter 2                               |
| SLC22A5  | 131705444 | 131731306 | 5q31.1   | Solute carrier family 22 member 5                                      |
| SLC22A8  | 62756626  | 62783311  | 11q12.3  | Solute carrier family 22 member 8                                      |
| SLC25A10 | 79670404  | 79688042  | 17q25.3  | Mitochondrial dicarboxylate carrier                                    |
| SLC25A15 | 41363548  | 41384247  | 13q14.11 | Mitochondrial ornithine transporter 1                                  |
| SLC25A18 | 18043139  | 18073760  | 22q11.21 | Mitochondrial glutamate carrier 2                                      |
| SLC25A19 | 73269073  | 73285591  | 17q25.1  | Mitochondrial thiamine pyrophosphate carrier                           |
| SLC25A20 | 48894369  | 48936426  | 3p21.31  | Mitochondrial carnitine/acylcarnitine carrier protein                  |
| SLC25A4  | 186064395 | 186071536 | 4q35.1   | ADP/ATP translocase 1  |
| SLC25A6  | 1505045   | 1511617   | Xp22.33  | ADP/ATP translocase 3  |
| SLC27A3  | 153746830 | 153752633 | 1q21.3   | Long-chain fatty acid transport protein 3                              |
| SLC2A3   | 8071826   | 8088871   | 12p13.31 | Solute carrier family 2, facilitated glucose transporter member 3      |
| SLC2A5   | 9095166   | 9148537   | 1p36.23  | Solute carrier family 2, facilitated glucose transporter member 5      |
| SLC2A6   | 136336217 | 136344259 | 9q34.2   | Solute carrier family 2, facilitated glucose transporter member 6      |
| SLC2A9   | 9772777   | 10056560  | 4p16.1   | Solute carrier family 2, facilitated glucose transporter member 9      |
| SLC31A1  | 115983808 | 116028674 | 9q32     | High affinity copper uptake protein 1                                  |
| SLC31A2  | 115913222 | 115926417 | 9q32     | Probable low affinity copper uptake protein 2                          |
| SLC33A1  | 155538813 | 155572218 | 3q25.31  | Acetyl-coenzyme A transporter 1  |
| SLC35B1  | 47778305  | 47786376  | 17q21.33 | Solute carrier family 35 member B1                                     |
| SLC35C2  | 44978167  | 44993043  | 20q13.12 | Solute carrier family 35 member C2                                     |

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| SLC38A2 | 46751972   | 46766650   | 12q13.11 | Sodium-coupled neutral amino acid transporter 2            |
| SLC38A5 | 48316920   | 48328644   | Xp11.23  | Sodium-coupled neutral amino acid transporter 5            |
| SLC39A7 | 33168222   | 33172216   | 6p21.32  | Zinc transporter SLC39A7                                   |
| SLC3A1  | 44502599   | 44548633   | 2p21     | Neutral and basic amino acid transport protein rBAT        |
| SLC44A5 | 75667816   | 76076801   | 1p31.1   | Choline transporter-like protein 5                         |
| SLC4A2  | 150754297  | 150773614  | 7q36.1   | Anion exchange protein 2                                   |
| SLC6A1  | 11034410   | 11080933   | 3p25.3   | Sodium- and chloride-dependent GABA transporter 1          |
| SLC6A13 | 329789     | 372039     | 12p13.33 | Sodium- and chloride-dependent GABA transporter 2          |
| SLC6A8  | 152953554  | 152962048  | Xq28     | Sodium- and chloride-dependent creatine transporter 1      |
| SLC7A4  | 21383007   | 21387129   | 22q11.21 | Cationic amino acid transporter 4                          |
| SLC7A9  | 33321415   | 33360672   | 19q13.11 | b(0,+)-type amino acid transporter 1                       |
| SLCO3A1 | 92396925   | 92715665   | 15q26.1  | Solute carrier organic anion transporter family member 3A1 |
| SLCO4A1 | 61273797   | 61317137   | 20q13.33 | Solute carrier organic anion transporter family member 4A1 |
| SLPI    | 43880880   | 43883205   | 20q13.12 | Antileukoproteinase  |
| SMA3    | 58711549   | 58738730   | 14q23.1  | Proteasome subunit alpha type-3                            |
| SMAD1   | 146402346  | 146479231  | 4q31.21  | Mothers against decapentaplegic homolog 1                  |
| SMAD2   | 45357922   | 45457515   | 18q21.1  | Mothers against decapentaplegic homolog 2                  |
| SMAF1   | 38,581,195 | 38,588,463 | 20q11.23 | Small Adipocyte Factor 1                                   |
| SMN1    | 70220768   | 70249769   | 5q13.2   | Survival motor neuron protein                              |
| SMOC1   | 70320848   | 70499083   | 14q24.2  | SPARC-related modular calcium-binding protein 1            |
| SMTN    | 31460091   | 31500743   | 22q12.2  | Smoothelin   |
| SMU1    | 33041762   | 33076665   | 9p21.1   | WD40 repeat-containing protein SMU1                        |
| SMYD3   | 245912642  | 246670614  | 1q44     | Histone-lysine N-methyltransferase SMYD3                   |
| SNAI1   | 48599536   | 48605423   | 20q13.13 | Zinc finger protein SNAI1                                  |
| SNAPC1  | 62229075   | 62263146   | 14q23.2  | snRNA-activating protein complex subunit 1                 |
| SNCB    | 176047085  | 176057530  | 5q35.2   | Beta-synuclein   |
| SNCG    | 88718375   | 88723017   | 10q23.2  | Gamma-synuclein  |
| SND1    | 127292234  | 127732661  | 7q32.1   | Staphylococcal nuclease domain-containing protein 1        |
| SNRPA1  | 101821715  | 101835487  | 15q26.3  | U2 small nuclear ribonucleoprotein A'                      |
| SNRPD1  | 19192228   | 19210417   | 18q11.2  | Small nuclear ribonucleoprotein Sm D1                      |
| SNRPD2  | 46190712   | 46195827   | 19q13.32 | Small nuclear ribonucleoprotein Sm D2                      |
| SNTA1   | 31995761   | 32031698   | 20q11.21 | Alpha-1-syntrophin   |
| SNX10   | 26331541   | 26413949   | 7p15.2   | Sorting nexin-10   |
| SNX8    | 2291405    | 2393953    | 7p22.3   | Sorting nexin-8  |
| SNX9    | 158244296  | 158366109  | 6q25.3   | Sorting nexin-9  |
| SOAT1   | 179262925  | 179327815  | 1q25.2   | Sterol O-acyltransferase 1                                 |
| SOCS3   | 76352864   | 76356158   | 17q25.3  | Suppressor of cytokine signaling 3                         |
| SOCS5   | 46926091   | 46990268   | 2p21     | Suppressor of cytokine signaling 5                         |
| SORD    | 45315302   | 45369383   | 15q21.1  | Sorbitol dehydrogenase                                     |
| SORT1   | 109852192  | 109940573  | 1p13.3   | Sortilin   |
| SOX10   | 38366693   | 38383429   | 22q13.1  | Transcription factor SOX-10                                |
| SOX5    | 23682440   | 24103966   | 12p12.1  | Transcription factor SOX-5                                 |
| SPARC   | 151040657  | 151066726  | 5q33.1   | SPARC  |
| SPARC   | 151040657  | 151066726  | 5q33.1   | SPARC  |
| SPATA22 | 3343313    | 3417146    | 17p13.2  | Spermatogenesis-associated protein 22                      |
| SPATA6  | 48761044   | 48937845   | 1p33     | Spermatogenesis-associated protein 6                       |
| SPHK2   | 49122548   | 49133974   | 19q13.33 | Sphingosine kinase 2                                       |
| SPINT1  | 41136216   | 41150405   | 15q15.1  | Kunitz-type protease inhibitor 1                           |

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| SPN      | 29674300  | 29682187  | 16p11.2  | Leukosialin  |
| SPOCK2   | 73818793  | 73848790  | 10q22.1  | Testican-2   |
| SPP1     | 88896819  | 88904562  | 4q22.1   | Osteopontin  |
| SPTLC2   | 77972340  | 78083116  | 14q24.3  | Serine palmitoyltransferase 2  |
| SQLE     | 126010739 | 126034525 | 8q24.13  | Squalene monooxygenase   |
| SQRDL    | 45923346  | 45983492  | 15q21.1  | Sulfide:quinone oxidoreductase, mitochondrial                            |
| SRD5A1   | 6633456   | 6669675   | 5p15.31  | 3-oxo-5-alpha-steroid 4-dehydrogenase 1                                  |
| SRPR     | 126132814 | 126139039 | 11q24.2  | Signal recognition particle receptor subunit alpha                       |
| SS18     | 23596578  | 23671181  | 18q11.2  | Protein SSXT   |
| SSB      | 170648443 | 170668574 | 2q31.1   | Lupus La protein   |
| SSBP2    | 80708840  | 81047616  | 5q14.1   | Single-stranded DNA-binding protein 2                                    |
| SSR3     | 156257929 | 156272973 | 3q25.31  | Translocon-associated protein subunit gamma                              |
| SSRP1    | 57093459  | 57103351  | 11q12.1  | FACT complex subunit SSRP1   |
| SSSCA1   | 65337901  | 65341413  | 11q13.1  | Sjogren syndrome/scleroderma autoantigen 1                               |
| SST      | 187386694 | 187388187 | 3q27.3   | Somatostatin   |
| SSTR2    | 71161151  | 71167185  | 17q25.1  | Somatostatin receptor type 2   |
| SSU72    | 1477053   | 1510249   | 1p36.33  | RNA polymerase II subunit A C-terminal domain phosphatase SSU72          |
| ST14     | 130029457 | 130080271 | 11q24.3  | Suppressor of tumorigenicity 14 protein                                  |
| ST3GAL1  | 134467091 | 134584183 | 8q24.22  | CMP-N-acetylneuraminate-beta-galactosamide-alpha-2,3-sialyltransferase 1 |
| ST5      | 8714898   | 8932498   | 11p15.4  | Suppression of tumorigenicity 5 protein                                  |
| ST7      | 116593292 | 116870157 | 7q31.2   | Suppressor of tumorigenicity 7 protein                                   |
| STAM2    | 152973315 | 153032506 | 2q23.3   | Signal transducing adapter molecule 2                                    |
| STAMBP   | 74056086  | 74100786  | 2p13.1   | STAM-binding protein   |
| STAR     | 38001167  | 38008783  | 8p11.23  | Steroidogenic acute regulatory protein, mitochondrial                    |
| STAU2    | 74332604  | 74659943  | 8q21.11  | Double-stranded RNA-binding protein Staufen homolog 2                    |
| STC2     | 172741716 | 172756506 | 5q35.1   | Stanniocalcin-2  |
| STIM1    | 3875757   | 4114439   | 11p15.4  | Stromal interaction molecule 1   |
| STK11    | 1189406   | 1228428   | 19p13.3  | Serine/threonine-protein kinase STK11                                    |
| STK17B   | 196998290 | 197041227 | 2q32.3   | Serine/threonine-protein kinase 17B                                      |
| STK24    | 99102455  | 99230194  | 13q32.2  | Serine/threonine-protein kinase 24                                       |
| STK25    | 242432089 | 242449145 | 2q37.3   | Serine/threonine-protein kinase 25                                       |
| STK38L   | 27396901  | 27478892  | 12p11.23 | Serine/threonine-protein kinase 38-like                                  |
| STMN2    | 80523049  | 80578410  | 8q21.13  | Stathmin-2   |
| STOM     | 124101355 | 124132531 | 9q33.2   | Erythrocyte band 7 integral membrane protein                             |
| STOML2   | 35099888  | 35103154  | 9p13.3   | Stomatin-like protein 2, mitochondrial                                   |
| STUB1    | 730224    | 732870    | 16p13.3  | E3 ubiquitin-protein ligase CHIP   |
| STX6     | 180941861 | 180992047 | 1q25.3   | Syntaxin-6   |
| STYXL1   | 75625656  | 75677322  | 7q11.23  | Serine/threonine/tyrosine-interacting-like protein 1                     |
| SUCNR1   | 151591431 | 151602405 | 3q25.1   | Succinate receptor 1   |
| SUFU     | 104263744 | 104393292 | 10q24.32 | Suppressor of fused homolog  |
| SULT1A1  | 28616903  | 28634946  | 16p11.2  | Sulfotransferase 1A1   |
| SULT2A1  | 48373723  | 48389654  | 19q13.33 | Bile salt sulfotransferase   |
| SUMO1    | 203070903 | 203103331 | 2q33.1   | Small ubiquitin-related modifier 1                                       |
| SUMO2    | 73163408  | 73179078  | 17q25.1  | Small ubiquitin-related modifier 2                                       |
| SUPT5H   | 39926796  | 39967310  | 19q13.2  | Transcription elongation factor SPT5                                     |
| SURF2    | 136223428 | 136228045 | 9q34.2   | Surfeit locus protein 2  |
| SURF4    | 136228325 | 136242970 | 9q34.2   | Surfeit locus protein 4  |
| SURVIVIN | 76210267  | 76221717  | 17q25.3  | Baculoviral IAP repeat-containing protein 5                              |
| SUV39H1  | 48553945  | 48567403  | Xp11.23  | Histone-lysine N-methyltransferase SUV39H1                               |
| SUV39H2  | 14920819  | 14946314  | 10p13    | Histone-lysine N-methyltransferase SUV39H2                               |
| SYNGR3   | 2039661   | 2044276   | 16p13.3  | Synaptogyrin-3   |

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| SYT12   | 66774249  | 66818334  | 11q13.2  | Synaptotagmin-12  |
| SYT3    | 51124564  | 51171651  | 19q13.33 | Synaptotagmin-3   |
| SYTL1   | 27668513  | 27680421  | 1p36.11  | Synaptotagmin-like protein 1  |
| TAC3    | 57403784  | 57422667  | 12q13.3  | Tachykinin-3  |
| TACSTD1 | 47572297  | 47614740  | 2p21     | Epithelial cell adhesion molecule                                     |
| TACSTD2 | 59041099  | 59043166  | 1p32.1   | Tumor-associated calcium signal transducer 2                          |
| TAF11   | 34845555  | 34855866  | 6p21.31  | Transcription initiation factor TFIID subunit 11                      |
| TAF1B   | 9983483   | 10074545  | 2p25.1   | TATA box-binding protein-associated factor RNA polymerase I subunit B |
| TAF2I   | 34845555  | 34855866  | 6p21.31  | Transcription initiation factor TFIID subunit 11                      |
| TAF6    | 99704693  | 99717464  | 7q22.1   | Transcription initiation factor TFIID subunit 6                       |
| TAF9B   | 77385245  | 77395203  | Xq21.1   | Transcription initiation factor TFIID subunit 9B                      |
| TAGLN2  | 159887897 | 159895522 | 1q23.2   | Transgelin-2  |
| TAP1    | 32812986  | 32821755  | 6p21.32  | Antigen peptide transporter 1   |
| TARS    | 33440802  | 33469644  | 5p13.3   | Threonine--tRNA ligase, cytoplasmic                                   |
| TBL2    | 72983262  | 72993121  | 7q11.23  | Transducin beta-like protein 2  |
| TBX3    | 115108059 | 115121969 | 12q24.21 | T-box transcription factor TBX3                                       |
| TCEA1   | 54879112  | 54935089  | 8q11.23  | Transcription elongation factor A protein 1                           |
| TCEAL1  | 102883632 | 102885881 | Xq22.2   | Transcription elongation factor A protein-like 1                      |
| TCEB3   | 24069645  | 24088549  | 1p36.11  | Transcription elongation factor B polypeptide 3                       |
| TCF19   | 31126319  | 31134936  | 6p21.33  | Transcription factor 19   |
| TCL1A   | 96176304  | 96180533  | 14q32.13 | T-cell leukemia/lymphoma protein 1A                                   |
| TCN1    | 59620273  | 59634048  | 11q12.1  | Transcobalamin-1  |
| TD52    | 49411431  | 49493714  | 20q13.13 | Breast carcinoma-amplified sequence 4                                 |
| TEAD2   | 49843852  | 49865714  | 19q13.33 | Transcriptional enhancer factor TEF-4                                 |
| TEF     | 41763337  | 41795330  | 22q13.2  | Thyrotroph embryonic factor   |
| TEKT3   | 15207128  | 15244958  | 17p12    | Tektin-3  |
| TERF1   | 73921099  | 73960357  | 8q21.11  | Telomeric repeat-binding factor 1                                     |
| TESC    | 117476728 | 117537284 | 12q24.22 | Calcineurin B homologous protein 3                                    |
| TEX11   | 69748790  | 70128581  | Xq13.1   | Testis-expressed sequence 11 protein                                  |
| TFAP2A  | 10393419  | 10419892  | 6p24.3   | Transcription factor AP-2-alpha                                       |
| TFAP2B  | 50786436  | 50815326  | 6p12.3   | Transcription factor AP-2-beta  |
| TFB1M   | 155578643 | 155635627 | 6q25.3   | Dimethyladenosine transferase 1, mitochondrial                        |
| TFF1    | 43782391  | 43786703  | 21q22.3  | Trefoil factor 1  |
| TFF3    | 43731777  | 43735761  | 21q22.3  | Trefoil factor 3  |
| TFPI2   | 93514709  | 93520303  | 7q21.3   | Tissue factor pathway inhibitor 2                                     |
| TFRC    | 195754054 | 195809060 | 3q29     | Transferrin receptor protein 1  |
| TGFBR2  | 30647994  | 30735634  | 3p24.1   | TGF-beta receptor type-2  |
| TGIF    | 3411606   | 3458409   | 18p11.31 | Homeobox protein TGIF1  |
| TGIF2   | 35201891  | 35222353  | 20q11.23 | Homeobox protein TGIF2  |
| TGM4    | 44916100  | 44956482  | 3p21.31  | Protein-glutamine gamma-glutamyltransferase 4                         |
| THAP11  | 67876213  | 67878097  | 16q22.1  | THAP domain-containing protein 11                                     |
| THRA    | 38214543  | 38250120  | 17q21.1  | Thyroid hormone receptor alpha  |
| THRAP5  | 867962    | 893218    | 19p13.3  | Mediator of RNA polymerase II transcription subunit 16                |
| THRAP6  | 118532952 | 118552501 | 8q24.11  | Mediator of RNA polymerase II transcription subunit 30                |
| TIMM13  | 2425622   | 2427892   | 19p13.3  | Mitochondrial import inner membrane translocase subunit Tim13         |
| TIMP1   | 47441712  | 47446188  | Xp11.23  | Metalloproteinase inhibitor 1   |
| TIMP3   | 33197687  | 33259030  | 22q12.3  | Metalloproteinase inhibitor 3   |
| TIMP4   | 12194551  | 12200851  | 3p25.2   | Metalloproteinase inhibitor 4   |
| TINF2   | 24708849  | 24711880  | 14q12    | TERF1-interacting nuclear factor 2                                    |
| TITF1   | 36985602  | 36990354  | 14q13.3  | Homeobox protein Nkx-2.1  |
| TLE1    | 84198598  | 84304220  | 9q21.32  | Transducin-like enhancer protein 1                                    |

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| TLR7      | 12885202  | 12908499  | Xp22.2   | Toll-like receptor 7   |
| TLX3      | 170736288 | 170739138 | 5q35.1   | T-cell leukemia homeobox protein 3   |
| TM4SF1    | 149086809 | 149095652 | 3q25.1   | Transmembrane 4 L6 family member 1   |
| TMC6      | 76106539  | 76128488  | 17q25.3  | Transmembrane channel-like protein 6   |
| TMED1     | 10943114  | 10946994  | 19p13.2  | Transmembrane emp24 domain-containing protein 1                                |
| TMED6     | 69377151  | 69385712  | 16q22.1  | Transmembrane emp24 domain-containing protein 6                                |
| TMEM126B  | 85339629  | 85347580  | 11q14.1  | Complex I assembly factor TMEM126B, mitochondrial                              |
| TMEM138   | 61129473  | 61136981  | 11q12.2  | Transmembrane protein 138  |
| TMEM14C   | 10723148  | 10731362  | 6p24.2   | Transmembrane protein 14C  |
| TMEM161B  | 87485450  | 87565293  | 5q14.3   | Transmembrane protein 161B   |
| TMEM31    | 102965837 | 102968956 | Xq22.2   | Transmembrane protein 31   |
| TMEM66    | 29920528  | 29940723  | 8p12     | Store-operated calcium entry-associated regulatory factor                      |
| TMEM8     | 55738007  | 55741647  | 19q13.42 | Lysoplasmalogenase   |
| TMOD1     | 100263462 | 100364030 | 9q22.33  | Tropomodulin-1   |
| TNA       | 45043040  | 45077563  | 3p21.31  | Tetranectin  |
| TNF       | 31543344  | 31546113  | 6p21.33  | Tumor necrosis factor  |
| TNFAIP1   | 26662628  | 26674035  | 17q11.2  | BTB/POZ domain-containing adapter for CUL3-mediated RhoA degradation protein 2 |
| TNFRSF10A | 23047965  | 23082639  | 8p21.3   | Tumor necrosis factor receptor superfamily member 10A                          |
| TNFRSF11B | 119935796 | 119964439 | 8q24.12  | Tumor necrosis factor receptor superfamily member 11B                          |
| TNFRSF12A | 3068446   | 3072384   | 16p13.3  | Tumor necrosis factor receptor superfamily member 12A                          |
| TNFRSF14  | 2487078   | 2496821   | 1p36.32  | Tumor necrosis factor receptor superfamily member 14                           |
| TNFRSF19L | 73087309  | 73108519  | 11q13.4  | Tumor necrosis factor receptor superfamily member 19L                          |
| TNFRSF1A  | 6437923   | 6451280   | 12p13.31 | Tumor necrosis factor receptor superfamily member 1A                           |
| TNFRSF9   | 7979907   | 8000926   | 1p36.23  | Tumor necrosis factor receptor superfamily member 9                            |
| TNFSF13   | 7461609   | 7464925   | 17p13.1  | Tumor necrosis factor ligand superfamily member 13                             |
| TNFSF14   | 6663148   | 6670599   | 19p13.3  | Tumor necrosis factor ligand superfamily member 14                             |
| TNFSF6    | 172628154 | 172636014 | 1q24.3   | Tumor necrosis factor ligand superfamily member 6                              |
| TNIP1     | 150409506 | 150473138 | 5q33.1   | TNFAIP3-interacting protein 1  |
| TNK1      | 7283853   | 7293093   | 17p13.1  | Non-receptor tyrosine-protein kinase TNK1                                      |
| TNNC1     | 52485118  | 52488086  | 3p21.1   | Troponin C, slow skeletal and cardiac muscles                                  |
| TNNC2     | 44451853  | 44462384  | 20q13.12 | Troponin C, skeletal muscle  |
| TNNI1     | 201373625 | 201398994 | 1q32.1   | Troponin I, slow skeletal muscle   |
| TNNI2     | 1860219   | 1862910   | 11p15.5  | Troponin I, fast skeletal muscle   |
| TNNI3     | 55663137  | 55669141  | 19q13.42 | Troponin I, cardiac muscle   |
| TOB1      | 48939584  | 48945339  | 17q21.33 | Protein Tob1   |
| TOB2      | 41829496  | 41843027  | 22q13.2  | Protein Tob2   |
| TOLLIP    | 1295601   | 1330884   | 11p15.5  | Toll-interacting protein   |
| TOMM22    | 39077953  | 39080818  | 22q13.1  | Mitochondrial import receptor subunit TOM22 homolog                            |
| TOR1A     | 132575223 | 132586413 | 9q34.11  | Torsin-1A  |
| TP53      | 7565097   | 7590856   | 17p13.1  | Cellular tumor antigen p53   |

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| TP53TG3 | 32684852   | 32688053   | 16p11.2  | TP53-target gene 3 protein  |
| TPD52   | 80870571   | 81143467   | 8q21.13  | Tumor protein D52   |
| TPD52L2 | 62496596   | 62522898   | 20q13.33 | Tumor protein D54   |
| TPI1    | 6976283    | 6980112    | 12p13.31 | Triosephosphate isomerase   |
| TPM1    | 63334831   | 63364114   | 15q22.2  | Tropomyosin alpha-1 chain   |
| TPSB1   | 1290697    | 1292555    | 16p13.3  | Tryptase alpha/beta-1   |
| TPTE    | 10906201   | 11029719   | 21p11.1  | Putative tyrosine-protein phosphatase TPTE                            |
| TRA2A   | 23544399   | 23571660   | 7p15.3   | Transformer-2 protein homolog alpha                                   |
| TRADD   | 67188083   | 67194201   | 16q22.1  | Tumor necrosis factor receptor type 1-associated DEATH domain protein |
| TRAF2   | 139776364  | 139821059  | 9q34.3   | TNF receptor-associated factor 2                                      |
| TRAF4   | 27071002   | 27077974   | 17q11.2  | TNF receptor-associated factor 4                                      |
| TRAF6   | 36508577   | 36531822   | 11p12    | TNF receptor-associated factor 6                                      |
| TRAFD1  | 112563305  | 112591407  | 12q24.13 | TRAF-type zinc finger domain-containing protein 1                     |
| TRAM1   | 71485677   | 71520622   | 8q13.3   | Translocating chain-associated membrane protein 1                     |
| TRAP1   | 3701640    | 3767598    | 16p13.3  | Heat shock protein 75 kDa, mitochondrial                              |
| TRAPPC2 | 13730363   | 13752754   | Xp22.2   | Trafficking protein particle complex subunit 2                        |
| TREM1   | 41235664   | 41254457   | 6p21.1   | Triggering receptor expressed on myeloid cells 1                      |
| TREX2   | 152710178  | 152736045  | Xq28     | Three prime repair exonuclease 2                                      |
| TRIM22  | 5710919    | 5758319    | 11p15.4  | E3 ubiquitin-protein ligase TRIM22                                    |
| TRIM31  | 30070674   | 30080883   | 6p22.1   | E3 ubiquitin-protein ligase TRIM31                                    |
| TRIM32  | 119449581  | 119463579  | 9q33.1   | E3 ubiquitin-protein ligase TRIM32                                    |
| TRIM38  | 25963030   | 25987384   | 6p22.2   | E3 ubiquitin-protein ligase TRIM38                                    |
| TRIM7   | 180620924  | 180632293  | 5q35.3   | Tripartite motif-containing protein 7                                 |
| TRIM8   | 104404253  | 104418164  | 10q24.32 | Probable E3 ubiquitin-protein ligase TRIM8                            |
| TRIP10  | 6737936    | 6751537    | 19p13.3  | Cdc42-interacting protein 4   |
| TROVE2  | 193028552  | 193060907  | 1q31.2   | 60 kDa SS-A/Ro ribonucleoprotein                                      |
| TRPV2   | 16318856   | 16340317   | 17p11.2  | Transient receptor potential cation channel subfamily V member 2      |
| TSG101  | 18489883   | 18548779   | 11p15.1  | Tumor susceptibility gene 101 protein                                 |
| TSG101  | 18489883   | 18548779   | 11p15.1  | Tumor susceptibility gene 101 protein                                 |
| TSSC1   | 3192696    | 3381653    | 2p25.3   | Protein TSSC1   |
| TSSK6   | 19623227   | 19626838   | 19p13.11 | Testis-specific serine/threonine-protein kinase 6                     |
| TTC2    | 41,976,421 | 42,021,376 | 17q21.2  | Tetratricopeptide Repeat Protein 2                                    |
| TTK     | 80713604   | 80752244   | 6q14.1   | Dual specificity protein kinase TTK                                   |
| TUBA6   | 49582519   | 49667114   | 12q13.12 | Tubulin alpha-1C chain  |
| TUBB2A  | 3153903    | 3157760    | 6p25.2   | Tubulin beta-2A chain   |
| TUBE1   | 112391980  | 112408732  | 6q21     | Tubulin epsilon chain   |
| TUBG1   | 40761694   | 40767252   | 17q21.2  | Tubulin gamma-1 chain   |
| TWIST1  | 19060614   | 19157295   | 7p21.1   | Twist-related protein 1   |
| TWIST2  | 239756673  | 239795893  | 2q37.3   | Twist-related protein 2   |
| TXN2    | 36863083   | 36878077   | 22q12.3  | Thioredoxin, mitochondrial  |
| TXN2    | 36863083   | 36878077   | 22q12.3  | Thioredoxin, mitochondrial  |
| TYK2    | 10461209   | 10491352   | 19p13.2  | Non-receptor tyrosine-protein kinase TYK2                             |
| TYMS    | 657604     | 673578     | 18p11.32 | Thymidylate synthase  |
| TYROBP  | 36395303   | 36399197   | 19q13.12 | TYRO protein tyrosine kinase-binding protein                          |
| U2AF1L4 | 36233365   | 36236346   | 19q13.12 | Splicing factor U2AF 26 kDa subunit                                   |
| UBADC1  | 138824815  | 138853226  | 9q34.3   | Ubiquitin-associated domain-containing protein 1                      |
| UBAP1   | 34179003   | 34252521   | 9p13.3   | Ubiquitin-associated protein 1  |
| UBD     | 29523292   | 29527702   | 6p22.1   | Ubiquitin D   |
| UBE1C   | 69103881   | 69129559   | 3p14.1   | NEDD8-activating enzyme E1 catalytic subunit                          |
| UBE2A   | 118708501  | 118718381  | Xq24     | Ubiquitin-conjugating enzyme E2 A                                     |
| UBE2B   | 133706870  | 133727683  | 5q31.1   | Ubiquitin-conjugating enzyme E2 B                                     |
| UBE2B   | 133706870  | 133727683  | 5q31.1   | Ubiquitin-conjugating enzyme E2 B                                     |
| UBE2C   | 44441215   | 44445596   | 20q13.12 | Ubiquitin-conjugating enzyme E2 C                                     |

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| UBE2I   | 1355548     | 1377019     | 16p13.3  | SUMO-conjugating enzyme UBC9                                   |
| UBE2J1  | 90036344    | 90062567    | 6q15     | Ubiquitin-conjugating enzyme E2 J1                             |
| UBE2T   | 202300785   | 202311108   | 1q32.1   | Ubiquitin-conjugating enzyme E2 T                              |
| UBE2V2  | 48920960    | 48977268    | 8q11.21  | Ubiquitin-conjugating enzyme E2 variant 2                      |
| UBOX5   | 3088219     | 3140842     | 20p13    | RING finger protein 37   |
| UBXD2   | 135,741,619 | 135,785,063 | 2q21.3   | UBX Domain-Containing Protein 2                                |
| UBXD8   | 175874629   | 175937075   | 5q35.2   | FAS-associated factor 2  |
| UCHL1   | 41258430    | 41270472    | 4p13     | Ubiquitin carboxyl-terminal hydrolase isozyme L1               |
| UCP2    | 73685712    | 73694352    | 11q13.4  | Mitochondrial uncoupling protein 2                             |
| UFC1    | 161122566   | 161128646   | 1q23.3   | Ubiquitin-fold modifier-conjugating enzyme 1                   |
| UGB     | 62172575    | 62190667    | 11q12.3  | Uteroglobin  |
| UGDH    | 39500375    | 39529931    | 4p14     | UDP-glucose 6-dehydrogenase                                    |
| UGT2B4  | 70345883    | 70391732    | 4q13.2   | UDP-glucuronosyltransferase 2B4                                |
| UGT2B7  | 69917081    | 69978705    | 4q13.2   | UDP-glucuronosyltransferase 2B7                                |
| UNRIP   | 16035325    | 16056412    | 12p12.3  | Serine-threonine kinase receptor-associated protein            |
| UQCRC2  | 21963981    | 21994981    | 16p12.2  | Cytochrome b-c1 complex subunit 2, mitochondrial               |
| UROD    | 45477819    | 45481247    | 1p34.1   | Uroporphyrinogen decarboxylase                                 |
| UROS    | 127477146   | 127511817   | 10q26.13 | Uroporphyrinogen-III synthase                                  |
| USP10   | 84733584    | 84813528    | 16q24.1  | Ubiquitin carboxyl-terminal hydrolase 10                       |
| USP13   | 179370543   | 179507189   | 3q26.33  | Ubiquitin carboxyl-terminal hydrolase 13                       |
| USP2    | 119225925   | 119252436   | 11q23.3  | Ubiquitin carboxyl-terminal hydrolase 2                        |
| USP30   | 109460894   | 109525831   | 12q24.11 | Ubiquitin carboxyl-terminal hydrolase 30                       |
| USP33   | 78161672    | 78225537    | 1p31.1   | Ubiquitin carboxyl-terminal hydrolase 33                       |
| USP5    | 6961292     | 6975796     | 12p13.31 | Ubiquitin carboxyl-terminal hydrolase 5                        |
| UTP14A  | 129040097   | 129063737   | Xq26.1   | U3 small nucleolar RNA-associated protein 14 homolog A         |
| UXS1    | 106709759   | 106810795   | 2q12.2   | UDP-glucuronic acid decarboxylase 1                            |
| VAMP1   | 6571403     | 6580153     | 12p13.31 | Vesicle-associated membrane protein 1                          |
| VAMP5   | 85811531    | 85820535    | 2p11.2   | Vesicle-associated membrane protein 5                          |
| VCL     | 75757872    | 75879918    | 10q22.2  | Vinculin   |
| VDAC1   | 133307606   | 133340824   | 5q31.1   | Voltage-dependent anion-selective channel protein 1            |
| VDRIP   | 48627459    | 48669267    | 13q14.2  | Mediator of RNA polymerase II transcription subunit 4          |
| VEGFB   | 64002010    | 64006259    | 11q13.1  | Vascular endothelial growth factor B                           |
| VEGFC   | 177604689   | 177713881   | 4q34.3   | Vascular endothelial growth factor C                           |
| VIL2    | 159186773   | 159240444   | 6q25.3   | Ezrin  |
| VILL    | 38029550    | 38048679    | 3p22.2   | Villin-like protein  |
| VPS18   | 41186628    | 41196173    | 15q15.1  | Vacuolar protein sorting-associated protein 18 homolog         |
| VSIG4   | 65241580    | 65259967    | Xq12     | V-set and immunoglobulin domain-containing protein 4           |
| VTI2    | 68113792    | 68141548    | 14q24.1  | Vesicle transport through interaction with t-SNAREs homolog 1B |
| VTN     | 26691290    | 26700110    | 17q11.2  | Vitronectin  |
| WBP11   | 14939410    | 14956474    | 12p12.3  | WW domain-binding protein 11                                   |
| WBSCR1  | 73588575    | 73611431    | 7q11.23  | Eukaryotic translation initiation factor 4H                    |
| WBSCR27 | 73248920    | 73256865    | 7q11.23  | Williams-Beuren syndrome chromosomal region 27 protein         |
| WDR20   | 102605840   | 102691184   | 14q32.31 | WD repeat-containing protein 20                                |
| WDR68   | 61627822    | 61671639    | 17q23.3  | DDB1- and CUL4-associated factor 7                             |
| WNT11   | 75897369    | 75921780    | 11q13.5  | Protein Wnt-11   |
| WNT2    | 116916685   | 116963343   | 7q31.2   | Protein Wnt-2  |
| WNT5A   | 55499743    | 55523973    | 3p14.3   | Protein Wnt-5a   |
| WNT7A   | 13857755    | 13921618    | 3p25.1   | Protein Wnt-7a   |

|         |           |           |          |  |
|---------|-----------|-----------|----------|--|
| WNT9A   | 228106357 | 228135599 | 1q42.13  | Protein Wnt-9a   |
| WRNIP1  | 2765648   | 2787186   | 6p25.2   | ATPase WRNIP1  |
| WWOX    | 78133310  | 79246564  | 16q23.1  | WW domain-containing oxidoreductase                    |
| WWTR1   | 149235022 | 149454501 | 3q25.1   | WW domain-containing transcription regulator protein 1 |
| XAB1    | 27851114  | 27874375  | 2p23.3   | GPN-loop GTPase 1                                      |
| XAB2    | 7684411   | 7694451   | 19p13.2  | Pre-mRNA-splicing factor SYF1                          |
| XAGE2   | 52380351  | 52387001  | Xp11.22  | X antigen family member 2                              |
| XCL2    | 168510003 | 168513235 | 1q24.2   | Cytokine SCM-1 beta                                    |
| XLKD1   | 10578513  | 10633236  | 11p15.4  | Lymphatic vessel endothelial hyaluronan receptor 1     |
| XPA     | 100437191 | 100459639 | 9q22.33  | DNA repair protein complementing XP-A cells            |
| XRCC5   | 216972187 | 217071026 | 2q35     | X-ray repair cross-complementing protein 5             |
| YARS2   | 32880424  | 32908836  | 12p11.21 | Tyrosine-tRNA ligase, mitochondrial                    |
| YBX1    | 43148098  | 43168020  | 1p34.2   | Nuclease-sensitive element-binding protein 1           |
| YKT6    | 44240567  | 44253893  | 7p13     | Synaptobrevin homolog YKT6                             |
| YWHAG   | 75956116  | 75988348  | 7q11.23  | 14-3-3 protein gamma                                   |
| YWHAZ   | 101928753 | 101965616 | 8q22.3   | 14-3-3 protein zeta/delta                              |
| ZCCHC17 | 31769842  | 31837783  | 1p35.2   | Nucleolar protein of 40 kDa                            |
| ZDHHC4  | 6617065   | 6629005   | 7p22.1   | Probable palmitoyltransferase ZDHHC4                   |
| ZDHHC5  | 57435219  | 57468659  | 11q12.1  | Palmitoyltransferase ZDHHC5                            |
| ZDHHC7  | 85007787  | 85045141  | 16q24.1  | Palmitoyltransferase ZDHHC7                            |
| ZFAND3  | 37787275  | 38122400  | 6p21.2   | AN1-type zinc finger protein 3                         |
| ZFP36L2 | 43449541  | 43453748  | 2p21     | Zinc finger protein 36, C3H1 type-like 2               |
| ZMYND12 | 42896000  | 42921938  | 1p34.2   | Zinc finger MYND domain-containing protein 12          |
| ZMYND19 | 140476531 | 140484942 | 9q34.3   | Zinc finger MYND domain-containing protein 19          |
| ZNF350  | 52467596  | 52490109  | 19q13.41 | Zinc finger protein 350                                |
| ZNF426  | 9638667   | 9649303   | 19p13.2  | Zinc finger protein 426                                |
| ZNF461  | 37128094  | 37157755  | 19q13.12 | Zinc finger protein 461                                |
| ZNF496  | 247460714 | 247495148 | 1q44     | Zinc finger protein 496                                |
| ZNF559  | 9434448   | 9461838   | 19p13.2  | Zinc finger protein 559                                |
| ZNHIT1  | 100860949 | 100867471 | 7q22.1   | Zinc finger HIT domain-containing protein 1            |

**Table S2.** Positive aAb for EBNA spots (n=14) defined taking into account the normalization values (> mean of the normalized values of pCite spots + 3SD).

| Samples | Diagnostic      | Mean of normalized intensity data of EBNA spots | N° of EBNA spots > mean pCite+3SD |
|---------|-----------------|---|-----------------------------------|
| 51      | Healthy donor   | 1.33  | 4/14                              |
| 52      | Healthy donor   | 1.02  | 0/14                              |
| 53      | Healthy donor   | 0.73  | 2/14                              |
| 54      | Healthy donor   | 0.66  | 2/14                              |
| 55      | Healthy donor   | 0.70  | 0/14                              |
| 56      | Healthy donor   | 0.88  | 0/14                              |
| 57      | Healthy donor   | 1.16  | 1/14                              |
| 1       | Metastatic sCRC | 1.06  | 1/14                              |
| 2       | Metastatic sCRC | 3.74  | 5/14                              |
| 3       | Metastatic sCRC | 0.80  | 2/14                              |
| 4       | Metastatic sCRC | 3.42  | 1/14                              |
| 7       | Metastatic sCRC | 0.49  | 4/14                              |
| 13      | Metastatic sCRC | 0.65  | 0/14                              |
| 15      | Metastatic sCRC | 0.57  | 1/14                              |
| 16      | Metastatic sCRC | 0.36  | 0/14                              |
| 20      | Metastatic sCRC | 1.77  | 0/14                              |
| 25      | Metastatic sCRC | 0.57  | 0/14                              |
| 35      | Metastatic sCRC | 1.20  | 0/14                              |
| 45      | Metastatic sCRC | 0.73  | 1/14                              |

|    |                        |      |      |
|----|------------------------|------|------|
| 5  | Non-metastatic<br>sCRC | 2.30 | 1/14 |
| 6  | Non-metastatic<br>sCRC | 3.46 | 1/14 |
| 8  | Non-metastatic<br>sCRC | 1.25 | 2/14 |
| 9  | Non-metastatic<br>sCRC | 1.85 | 2/14 |
| 10 | Non-metastatic<br>sCRC | 0.15 | 0/14 |
| 11 | Non-metastatic<br>sCRC | 0.25 | 0/14 |
| 12 | Non-metastatic<br>sCRC | 0.88 | 3/14 |
| 14 | Non-metastatic<br>sCRC | 0.15 | 0/14 |
| 17 | Non-metastatic<br>sCRC | 0.22 | 4/14 |
| 18 | Non-metastatic<br>sCRC | 0.15 | 1/14 |
| 19 | Non-metastatic<br>sCRC | 1.36 | 0/14 |
| 21 | Non-metastatic<br>sCRC | 2.70 | 5/14 |
| 22 | Non-metastatic<br>sCRC | 0.73 | 4/14 |
| 23 | Non-metastatic<br>sCRC | 1.18 | 0/14 |
| 24 | Non-metastatic<br>sCRC | 1.50 | 4/14 |
| 26 | Non-metastatic<br>sCRC | 1.28 | 2/14 |
| 27 | Non-metastatic<br>sCRC | 1.72 | 0/14 |
| 28 | Non-metastatic<br>sCRC | 0.53 | 2/14 |
| 29 | Non-metastatic<br>sCRC | 2.29 | 0/14 |
| 30 | Non-metastatic<br>sCRC | 1.12 | 0/14 |
| 31 | Non-metastatic<br>sCRC | 1.24 | 3/14 |
| 32 | Non-metastatic<br>sCRC | 1.44 | 0/14 |
| 33 | Non-metastatic<br>sCRC | 1.57 | 2/14 |
| 34 | Non-metastatic<br>sCRC | 1.74 | 0/14 |
| 36 | Non-metastatic<br>sCRC | 1.71 | 0/14 |
| 37 | Non-metastatic<br>sCRC | 0.50 | 3/14 |
| 38 | Non-metastatic<br>sCRC | 1.17 | 0/14 |
| 39 | Non-metastatic<br>sCRC | 1.42 | 1/14 |
| 40 | Non-metastatic<br>sCRC | 1.32 | 1/14 |
| 41 | Non-metastatic<br>sCRC | 1.25 | 0/14 |
| 42 | Non-metastatic<br>sCRC | 0.32 | 0/14 |

|    |                     |      |      |
|----|---------------------|------|------|
| 43 | Non-metastatic sCRC | 1.88 | 1/14 |
| 44 | Non-metastatic sCRC | 1.64 | 0/14 |
| 46 | Non-metastatic sCRC | 0.93 | 0/14 |
| 47 | Non-metastatic sCRC | 1.09 | 0/14 |
| 48 | Non-metastatic sCRC | 0.43 | 0/14 |
| 49 | Non-metastatic sCRC | 1.44 | 0/14 |
| 50 | Non-metastatic sCRC | 0.44 | 0/14 |

**Table S3.** aAbs profile against TAAs that exhibited implication to discriminate healthy donors ( $n = 7$ ) vs. sCRC patients ( $n = 50$ ). None of these TAAs have been identified as positive aAb in healthy donors.

| TAA ID      | <i>p</i> -value (U-Mann-Withney) | N° sCRC ( $n = 50$ ) with aAb positive | Fold change (FC) |              |
|-------------|----------------------------------|--|------------------|--------------|
|             |                                  |  | Median FC sCRC   | % sCRC > FC1 |
| TEX11       | 0.0005                           | 8/50                                   | 2.6              | 90           |
| GORASP2     | 0.0007                           | 2/50                                   | 3.1              | 82           |
| C9orf80     | 0.0007                           | 3/50                                   | 3.9              | 92           |
| HMOX2       | 0.0008                           | 13/50                                  | 3.0              | 92           |
| KIF9        | 0.0008                           | 14/50                                  | 2.7              | 92           |
| ICAM2       | 0.0012                           | 16/50                                  | 2.4              | 94           |
| MARCKSL1    | 0.0012                           | 10/50                                  | 2.4              | 88           |
| RB1         | 0.0012                           | 2/50                                   | 2.6              | 92           |
| SPP1        | 0.0012                           | 3/50                                   | 2.8              | 86           |
| STC2        | 0.0013                           | 10/50                                  | 2.0              | 84           |
| BHMT2       | 0.0014                           | 10/50                                  | 2.2              | 86           |
| D21S2056E   | 0.0016                           | 10/50                                  | 2.2              | 84           |
| DLAT        | 0.0016                           | 2/50                                   | 2.3              | 86           |
| CKMT1B      | 0.0017                           | 27/50                                  | 2.6              | 86           |
| GTF2H1      | 0.0017                           | 8/50                                   | 2.3              | 82           |
| ALDOA       | 0.0019                           | 8/50                                   | 2.0              | 88           |
| COX11       | 0.0020                           | 14/50                                  | 2.4              | 88           |
| RPL11       | 0.0020                           | 2/50                                   | 2.4              | 86           |
| ASB3        | 0.0020                           | 8/50                                   | 2.3              | 84           |
| PRCP        | 0.0024                           | 21/50                                  | 1.9              | 86           |
| PDEF        | 0.0024                           | 10/50                                  | 2.2              | 86           |
| ANP32A      | 0.0024                           | 2/50                                   | 2.3              | 82           |
| GNAI3       | 0.0026                           | 5/50                                   | 2.5              | 86           |
| HBG1        | 0.0026                           | 2/50                                   | 3.5              | 84           |
| ARHI        | 0.0028                           | 11/50                                  | 1.9              | 86           |
| RCV1        | 0.0028                           | 3/50                                   | 2.9              | 86           |
| RAB8A       | 0.0028                           | 5/50                                   | 2.4              | 84           |
| GDEP        | 0.0030                           | 11/50                                  | 2.2              | 82           |
| PLAC1       | 0.0030                           | 7/50                                   | 2.0              | 84           |
| HSD17B3     | 0.0030                           | 2/50                                   | 2.3              | 80           |
| SH3BP1      | 0.0033                           | 3/50                                   | 2.0              | 84           |
| USP5        | 0.0033                           | 2/50                                   | 2.1              | 82           |
| TCEAL1      | 0.0033                           | 5/50                                   | 2.5              | 84           |
| KPNA6       | 0.0035                           | 18/50                                  | 2.3              | 84           |
| Progranulin | 0.0038                           | 4/50                                   | 1.8              | 86           |
| CHODL       | 0.0038                           | 4/50                                   | 2.2              | 86           |
| KCNE2       | 0.0041                           | 13/50                                  | 2.0              | 82           |
| SERPINA5    | 0.0041                           | 5/50                                   | 2.2              | 80           |
| SLCO4A1     | 0.0041                           | 4/50                                   | 2.5              | 80           |
| SDPR        | 0.0041                           | 10/50                                  | 1.8              | 86           |
| JUP         | 0.0041                           | 3/50                                   | 2.5              | 82           |
| FRK         | 0.0041                           | 6/50                                   | 2.1              | 84           |
| DDX39       | 0.0044                           | 2/50                                   | 2.1              | 80           |

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|          |        |       |     |    |
|----------|--------|-------|-----|----|
| PSAP     | 0.0048 | 2/50  | 2.1 | 84 |
| SCARB1   | 0.0048 | 2/50  | 2.6 | 84 |
| AMY2A    | 0.0052 | 9/50  | 2.1 | 84 |
| BECN1    | 0.0056 | 16/50 | 2.0 | 84 |
| ST14     | 0.0056 | 16/50 | 1.7 | 80 |
| LDHB     | 0.0056 | 8/50  | 2.3 | 84 |
| SNX10    | 0.0056 | 2/50  | 2.1 | 82 |
| PSTPIP1  | 0.0060 | 17/50 | 2.1 | 84 |
| SLC6A1   | 0.0065 | 6/50  | 2.0 | 78 |
| HM13     | 0.0070 | 10/50 | 1.7 | 84 |
| RHOH     | 0.0070 | 7/50  | 1.9 | 82 |
| KIF22    | 0.0075 | 5/50  | 2.4 | 78 |
| SYTL1    | 0.0075 | 4/50  | 2.1 | 80 |
| Mage3    | 0.0075 | 10/50 | 1.9 | 82 |
| HIST1H3D | 0.0075 | 4/50  | 2.3 | 82 |
| RWDD1    | 0.0080 | 9/50  | 2.1 | 80 |
| RILP     | 0.0080 | 6/50  | 2.0 | 76 |
| RPL35    | 0.0080 | 4/50  | 1.9 | 82 |
| PLAGL1   | 0.0086 | 21/50 | 1.6 | 82 |
| DDX56    | 0.0086 | 9/50  | 1.7 | 84 |
| CTNNA1   | 0.0086 | 9/50  | 2.2 | 82 |
| BET1     | 0.0086 | 4/50  | 2.0 | 78 |
| HLA-DOB  | 0.0093 | 28/50 | 1.6 | 80 |
| HSPC047  | 0.0093 | 4/50  | 1.9 | 80 |
| PLEKHA8  | 0.0100 | 14/50 | 2.4 | 78 |
| ANXA9    | 0.0100 | 2/50  | 1.7 | 80 |
| GMD5     | 0.0100 | 7/50  | 1.7 | 84 |
| CNP      | 0.0100 | 13/50 | 1.8 | 82 |
| HSPA2    | 0.0100 | 2/50  | 2.2 | 76 |
| FSCN1    | 0.0100 | 4/50  | 2.2 | 80 |
| SERPING1 | 0.0107 | 5/50  | 2.2 | 80 |
| TNIP1    | 0.0107 | 22/50 | 1.7 | 84 |
| BCL2L13  | 0.0107 | 10/50 | 1.6 | 82 |
| COPS5    | 0.0115 | 2/50  | 1.9 | 76 |
| SKIP     | 0.0115 | 4/50  | 2.1 | 82 |
| MAGEA9   | 0.0123 | 6/50  | 1.8 | 84 |
| MGC26597 | 0.0131 | 16/50 | 1.8 | 80 |
| OR2C3    | 0.0131 | 16/50 | 2.3 | 78 |
| LOXL2    | 0.0131 | 6/50  | 2.1 | 80 |
| SNCB     | 0.0131 | 7/50  | 1.8 | 78 |
| SLC44A5  | 0.0131 | 4/50  | 1.8 | 80 |
| RPS28    | 0.0131 | 4/50  | 2.2 | 80 |
| PKNOX1   | 0.0141 | 13/50 | 1.6 | 80 |
| PITX3    | 0.0141 | 2/50  | 1.8 | 80 |
| C5AR1    | 0.0141 | 8/50  | 2.0 | 78 |
| FHIT     | 0.0150 | 17/50 | 1.7 | 74 |
| SND1     | 0.0150 | 6/50  | 1.7 | 80 |
| ECRG4    | 0.0150 | 3/50  | 1.8 | 78 |
| TCL1A    | 0.0161 | 20/50 | 1.6 | 80 |
| NUP54    | 0.0161 | 11/50 | 2.3 | 78 |
| SLC6A8   | 0.0161 | 16/50 | 1.9 | 76 |
| DRD2     | 0.0172 | 8/50  | 1.6 | 78 |
| FKRP     | 0.0172 | 6/50  | 1.6 | 78 |
| PEX10    | 0.0172 | 2/50  | 1.7 | 82 |
| COPB1    | 0.0172 | 3/50  | 1.8 | 78 |
| YBX1     | 0.0184 | 9/50  | 1.5 | 76 |
| NAT5     | 0.0184 | 15/50 | 1.7 | 76 |
| CBLB     | 0.0184 | 3/50  | 1.7 | 76 |
| SGTA     | 0.0196 | 6/50  | 1.6 | 76 |
| BBS2     | 0.0209 | 4/50  | 1.6 | 76 |
| CPSF1    | 0.0223 | 28/50 | 1.8 | 76 |
| UGDH     | 0.0223 | 22/50 | 1.9 | 74 |
| BGN      | 0.0223 | 10/50 | 1.6 | 76 |

|          |        |       |     |    |
|----------|--------|-------|-----|----|
| ARRB2    | 0.0238 | 8/50  | 1.5 | 82 |
| RPL18    | 0.0253 | 12/50 | 1.6 | 74 |
| RPS9     | 0.0253 | 11/50 | 1.7 | 76 |
| IFNGR2   | 0.0269 | 16/50 | 1.7 | 78 |
| ANXA13   | 0.0269 | 13/50 | 1.6 | 76 |
| OLR1     | 0.0269 | 7/50  | 1.9 | 70 |
| RSU1     | 0.0287 | 14/50 | 1.6 | 76 |
| LYZ      | 0.0287 | 8/50  | 1.5 | 74 |
| P2RY6    | 0.0305 | 6/50  | 1.6 | 76 |
| SAE1     | 0.0324 | 17/50 | 1.5 | 76 |
| EIF3S8   | 0.0324 | 16/50 | 1.7 | 74 |
| PENK     | 0.0324 | 15/50 | 1.7 | 72 |
| H3F3A    | 0.0324 | 4/50  | 1.5 | 76 |
| EBAG9    | 0.0324 | 2/50  | 1.9 | 70 |
| C21orf66 | 0.0344 | 13/50 | 1.6 | 74 |
| TSSK6    | 0.0344 | 11/50 | 1.6 | 74 |
| ALDH1A2  | 0.0344 | 13/50 | 1.6 | 76 |
| GNL1     | 0.0344 | 5/50  | 1.5 | 74 |
| TOLLIP   | 0.0344 | 3/50  | 1.7 | 74 |
| CXADR    | 0.0365 | 23/50 | 1.8 | 78 |
| LASP1    | 0.0388 | 5/50  | 1.7 | 74 |
| SERF2    | 0.0388 | 2/50  | 1.7 | 70 |
| RAB2B    | 0.0411 | 14/50 | 1.5 | 72 |
| ML-IAP   | 0.0411 | 8/50  | 1.5 | 76 |
| ASPSCR1  | 0.0411 | 9/50  | 1.6 | 72 |
| TEF      | 0.0436 | 12/50 | 1.7 | 76 |
| STUB1    | 0.0436 | 18/50 | 1.6 | 74 |
| VIL2     | 0.0436 | 8/50  | 2.1 | 72 |
| EFNB1    | 0.0436 | 6/50  | 1.6 | 74 |
| HPD      | 0.0436 | 3/50  | 1.9 | 72 |
| TPTE     | 0.0462 | 3/50  | 1.6 | 74 |
| KCTD14   | 0.0462 | 10/50 | 1.7 | 70 |
| TRPV2    | 0.0489 | 11/50 | 1.6 | 70 |
| C1orf62  | 0.0489 | 2/50  | 1.4 | 66 |
| EML1     | 0.0489 | 2/50  | 1.7 | 72 |

**Table S4.** aAbs profile against TAAs with statistical significance ( $p < 0.01$ ) that might distinguish metastatic sCRC ( $n = 12$ ) vs. Non-metastatic sCRC ( $n = 38$ ). None of these TAAs have been identified as positive aAb in healthy donors.

| TAA ID  | $p$ -value (U-Mann-<br>Withney) | N° metastatic<br>sCRC ( $n = 12$ ) with<br>aAb positive | N° No metastatic<br>sCRC ( $n = 38$ ) with<br>aAb positive | Fold change (FC) |                 |
|---------|---------------------------------|---|--|------------------|-----------------|
|         |                                 |   |  | Median<br>FC     | % sCRC ><br>FC1 |
| RPS28   | 0.0193                          | 0/12  | 11/38  | 0.7              | 42              |
| C9orf80 | 0.0327                          | 8/12  | 5/38   | 0.9              | 50              |
| OLR1    | 0.0387                          | 0/12  | 18/38  | 0.6              | 50              |
| FSCN1   | 0.0409                          | 0/12  | 11/38  | 0.8              | 42              |
| DLAT    | 0.0432                          | 0/12  | 5/38   | 0.9              | 50              |
| NUP54   | 0.0481                          | 8/12  | 26/38  | 0.8              | 33              |

**Table S5.** Results from leave-one-out validation when the lasso algorithm selects only one variable.

| Validation round | Protein selected | True positive | True negative | False positive | False negative |
|------------------|------------------|---------------|---------------|----------------|----------------|
| 1                | VTI_2            | 1             | 20            | 8              | 0              |
| 2                | VTI_2            | 0             | 18            | 10             | 1              |
| 3                | VTI_2            | 1             | 20            | 8              | 0              |
| 4                | VTI_2            | 1             | 16            | 12             | 0              |
| 5                | VTI_2            | 1             | 19            | 9              | 0              |
| 6                | GJB2_1           | 1             | 17            | 11             | 0              |
| 7                | VTI_2            | 1             | 18            | 10             | 0              |
| 8                | VTI_2            | 1             | 21            | 7              | 0              |
| 9                | CD151_1          | 1             | 15            | 13             | 0              |
| 10               | VTI_2            | 1             | 19            | 9              | 0              |
| 11               | VTI_2            | 1             | 19            | 9              | 0              |
| 12               | VTI_2            | 1             | 16            | 12             | 0              |

**Table S6.** Identified proteins as potential aAbs biomarker panels in sCRC that appear in <10% of agarose based immunoprecipitation registered experiments in CRAPome.

| User Input | Mapped Gene Symbol | Num of Expt. (found/total) | Ave SC | Max SC |
|------------|--------------------|----------------------------|--------|--------|
| DLAT       | DLAT               | 38/411                     | 6.5    | 24     |
| VTI1B      | VTI1B              | 2/411                      | 1      | 1      |
| P53        | TP53               | 52/411                     | 5.4    | 31     |
| NUP54      | NUP54              | 16/411                     | 2.1    | 7      |
| FSCN1      | FSCN1              | 42/411                     | 2.9    | 25     |
| RPS28      | RPS28              | 182/411                    | 2.5    | 16     |
| INIP       | INIP               | 1/411                      | 1      | 1      |
| OLR1       | OLR1               | 6/411                      | 1.3    | 3      |