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Mutational characterization of colorectal cancer from Korean patients with targeted sequencing

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**Supplementary Table S1.** List of genes covered by the targeted sequencing

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ABL1, ABL2, ACVR1B, ADGRA2, AKT1, AKT2, AKT3, ALK, ALOX12B, AMER1, APC, APCDD1, APOBEC3A, APOBEC3B, AR, ARAF, ARFRP1, ARID1A, ARID1B, ARID2, ASXL1, ATM, ATR, ATRX, AURKA, AURKB, AXIN1, AXL, B2M, BACH1, BAP1, BARD1, BCL2, BCL2A1, BCL2L1, BCL2L2, BCL6, BCOR, BCORL1, BCR, BLM, BRAF, BRCA1, BRCA2, BRD2, BRD3, BRD4, BRIP1, BTG1, BTK, CARD11, CASP8, CBFB, CBL, CCND1, CCND2, CCND3, CCNE1, CD79A, CD79B, CDC42, CDC73, CDH1, CDH2, CDH20, CDH5, CDK12, CDK4, CDK6, CDK8, CDKN2A, CDKN2B, CDKN2C, CDX2, CEBPA, CHD1, CHD2, CHD4, CHEK1, CHEK2, CHUK, CIC, CRBN, CREBBP, CRKL, CRLF2, CSF1R, CTCF, CTNNA1, CTNNB1, CUL4A, CUL4B, CYLD, CYP17A1, DAXX, DDR2, DIS3, DNMT1, DNMT3A, DOCK2, DOT1L, EGFR, ELMO1, EMSY, EP300, EPHA3, EPHA5, EPHA6, EPHA7, EPHB1, EPHB4, EPHB6, ERBB2, ERBB3, ERBB4, ERCC2, ERG, ESR1, ETV1, ETV4, ETV5, ETV6, EWSR1, EYA2, EZH2, FAM46C, FANCA, FANCC, FANCD2, FANCE, FANCF, FANCG, FANCI, FANCL, FANCM, FAT3, FBXW7, FGF10, FGF12, FGF14, FGF19, FGF23, FGF3, FGF4, FGF6, FGF7, FGFR1, FGFR2, FGFR3, FGFR4, FLT1, FLT3, FLT4, FOXA1, FOXL2, FUBP1, GATA1, GATA2, GATA3, GID4, GNA11, GNA13, GNAQ, GNAS, GRIN2A, GSK3B, GUCY1A2, H3F3A, HGF, HIST1H3B, HNF1A, HOXA3, HRAS, HSP90AA1, IDH1, IDH2, IGF1, IGF1R, IGF2R, IKBKE, IKZF1, IL7R, INHBA, INPP4B, INSR, IRF4, IRS2, ITK, JAK1, JAK2, JAK3, JUN, KAT6A, KDM5A, KDM5C, KDM6A, KDR, KEAP1, KIT, KLF4, KLHL6, KRAS, LMO1, LRP1B, LRP6, LTK, MAML1, MAP2K1, MAP2K2, MAP2K4, MAP3K1, MAP3K13, MCL1, MDM2, MDM4, MED12, MEF2B, MEN1, MET, MITF, MLH1, MPL, MRE11A, MSH2, MSH6, MTOR, MUTYH, MYC, MYCL, MYCN, MYD88, NCOA3, NCOR1, NF1, NF2, NFE2L2, NKFBIA, NKX2-1, NKX3-1, NOTCH1,

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NOTCH2, NOTCH3, NOTCH4, NPM1, NRAS, NSD1, NTRK1, NTRK2, NTRK3, NUP93, NUTM1, PAK3, PAK7, PALB2, PARP1, PARP2, PARP3, PARP4, PAX5, PBRM1, PDGFRA, PDGFRB, PDK1, PGR, PHF6, PHLPP2, PIK3C3, PIK3CA, PIK3CG, PIK3R1, PIK3R2, PKHD1, PLCG1, PMS2, PNRC1, PPP2R1A, PRDM1, PRKAR1A, PRKDC, PRPF40B, PRSS8, PTCH1, PTCH2, PTEN, PTPN11, PTPRD, RAB35, RAC1, RAC2, RAD50, RAD51, RAD51B, RAD51C, RAD51D, RAD52, RAD54L, RAF1, RARA, RB1, REL, RET, RICTOR, RNF43, ROBO1, ROBO2, ROS1, RPA1, RPTOR, RUNX1, RUNX1T1, SEMA3A, SEMA3E, SETBP1, SETD2, SF3A1, SF3B1, SH2B3, SKP2, SLIT2, SMAD2, SMAD3, SMAD4, SMARCA1, SMARCA4, SMARCB1, SMARCD1, SMO, SOCS1, SOX10, SOX2, SOX9, SPEN, SPOP, SRC, SRSF1, SRSF2, SRSF7, STAG2, STAT3, STAT4, STK11, SUFU, SYK, TBX22, TBX3, TERT, TET2, TGFBR2, TIPARP, TMPRSS2, TNFAIP3, TNFRSF14, TNKS, TNKS2, TOP1, TP53, TRAF7, TRRAP, TSC1, TSC2, TSHR, U2AF1, U2AF2, USP9X, VHL, WHSC1L1, WISP3, WT1, WWP1, XBP1, XPO1, XRCC3, ZNF217, ZNF703, ZRSR2

**Supplementary Table S2.** Genes that show significantly different mutation frequencies by each clinical information criteria from tumors of the 172 Korean patients with colorectal cancer. Genes in boldface presentation are the common genes that also showed significantly different mutation frequencies from the Caucasian patients of the TCGA colorectal cancer data set.

| Genes | Categorization by clinical variable | | p-value |
|---|---|---|---|
| | Left-sided (N=125) | Right-sided (N=47) | |
| **APC** | **97, 77.6%** | **27, 57.4%** | **0.013** |
| **APCDD1** | **0, 0.0%** | **3, 6.4%** | **0.019** |
| ATRX | 4, 3.2% | 8, 17.0% | 0.004 |
| CASP5 | 0, 0.0% | 3, 6.4% | 0.019 |
| CTNNB1 | 4, 3.2% | 6, 12.8% | 0.026 |
| DDX27 | 0, 0.0% | 3, 6.4% | 0.019 |
| FBXW7 | 25, 20.0% | 3, 6.4% | 0.036 |
| **HNF1A** | **2, 1.6%** | **4, 8.5%** | **0.048** |
| **INSR** | **4, 3.2%** | **6, 12.8%** | **0.026** |
| **JAK1** | **2, 1.6%** | **4, 8.5%** | **0.048** |
| MCHR2 | 0, 0.0% | 3, 6.4% | 0.019 |
| NSD1 | 6, 4.8% | 8, 17.0% | 0.023 |
| NSD3 | 1, 0.8% | 4, 8.5% | 0.020 |
| PIK3C3 | 0, 0.0% | 3, 6.4% | 0.019 |
| PRKDC | 19, 15.2% | 16, 34.0% | 0.010 |
| RAF1 | 0, 0.0% | 3, 6.4% | 0.019 |

|  |  |  |  |
|---|---|---|---|
| RB1 | 1, 0.8% | 4, 8.5% | 0.020 |
| RPA1 | 4, 3.2% | 6, 12.8% | 0.026 |
| SLC16A4 | 0, 0.0% | 3, 6.4% | 0.019 |
| TMEM97 | 0, 0.0% | 3, 6.4% | 0.019 |
| TP53 | 100, 80.0% | 26, 55.3% | 0.002 |
| TTC3 | 0, 0.0% | 3, 6.4% | 0.019 |
|  | ages under 50 (N=157) | ages 50 or older (N=15) |  |
| ALOX12B | 3, 1.9% | 3, 20.0% | 0.009 |
| ASXL1 | 9, 5.7% | 5, 33.3% | 0.003 |
| FANCE | 0, 0.0% | 2, 13.3% | 0.007 |
| FANCI | 13, 8.3% | 5, 33.3% | 0.011 |
| GID4 | 2, 1.3% | 2, 13.3% | 0.039 |
| IGF2R | 13, 8.3% | 4, 26.7% | 0.045 |
| ITK | 2, 1.3% | 2, 13.3% | 0.039 |
| NOTCH1 | 15, 9.6% | 6, 40.0% | 0.004 |
| PALB2 | 8, 5.1% | 4, 26.7% | 0.012 |
| PIK3R2 | 2, 1.3% | 2, 13.3% | 0.039 |
| RB1 | 2, 1.3% | 3, 20.0% | 0.005 |
|  | CA19-9 level ≥ 25 (N=35) | CA19-9 level < 25 (N=137) |  |
| ARID1B | 0, 0.0% | 18, 13.1% | 0.026 |
| CHEK1 | 3, 8.6% | 0, 0.0% | 0.008 |
| ETV5 | 3, 8.6% | 1, 0.7% | 0.027 |

| | | | |
|---|---|---|---|
| KRAS | 23, 65.7% | 54, 39.4% | 0.007 |
| PRKDC | 2, 5.7% | 33, 24.1% | 0.017 |
| PTEN | 3, 8.6% | 1, 0.7% | 0.027 |
| | CEA level ≥ 5 (N=53) | CEA level < 5 (N=119) | |
| CASP5 | 3, 5.7% | 0, 0.0% | 0.028 |
| EP300 | 11, 20.8% | 11, 9.2% | 0.048 |
| EPHB4 | 7, 13.2% | 2, 1.7% | 0.004 |
| KDM6A | 5, 9.4% | 2, 1.7% | 0.029 |
| KRAS | 31, 58.5% | 46, 38.7% | 0.020 |
| MSH3 | 4, 7.6% | 1, 0.8% | 0.032 |
| NUTM1 | 8, 15.1% | 5, 4.2% | 0.024 |
| RAD51D | 3, 5.7% | 0, 0.0% | 0.028 |
| RNF43 | 7, 13.2% | 4, 3.4% | 0.036 |
| SMAD3 | 5, 9.4% | 0, 0.0% | 0.002 |
| SMARCA1 | 4, 7.6% | 1, 0.8% | 0.032 |
| SOX2 | 3, 5.7% | 0, 0.0% | 0.028 |
| | Low T stage(T1, T2) (N=46) | High T stage(T3, T4) (N=126) | |
| ALOX12B | 4, 8.7% | 2, 1.6% | 0.045 |
| BRAF | 0, 0.0% | 15, 11.9% | 0.012 |
| INHBA | 4, 8.7% | 2, 1.6% | 0.045 |
| LRP1B | 8, 17.4% | 43, 34.1% | 0.038 |
| MAP3K13 | 6, 13.0% | 3, 2.4% | 0.012 |

|  |  |  |  |
|---|---|---|---|
| NF2 | 4, 8.7% | 0, 0.0% | 0.005 |
| SEMA3E | 5, 10.9% | 2, 1.6% | 0.015 |
| TP53 | 26, 56.5% | 100, 79.4% | 0.006 |
| XRCC3 | 3, 6.5% | 0, 0.0% | 0.018 |
|  | Without metastasis (N=144) | With metastasis (N=28) |  |
| BRAF | 9, 6.2% | 6, 21.4% | 0.019 |
| EPHA6 | 7, 4.9% | 5, 17.9% | 0.028 |
| GOT1L1 | 0, 0.0% | 2, 7.1% | 0.026 |
| IKZF1 | 1, 0.7% | 3, 10.7% | 0.014 |
| SMARCA1 | 2, 1.4% | 3, 10.7% | 0.031 |
|  | Without regional lymph node metastasis (N=93) | With regional lymph node metastasis (N=79) |  |
| **ACVR1B** | **9, 9.7%** | **1, 1.3%** | **0.022** |
| ACVR2A | 7, 7.5% | 0, 0.0% | 0.016 |
| APC | 61, 65.6% | 63, 79.8% | 0.042 |
| ARID1A | 19, 20.4% | 6, 7.6% | 0.018 |
| ATRX | 10, 10.8% | 2, 2.5% | 0.039 |
| EPHB4 | 8, 8.6% | 1, 1.3% | 0.040 |
| ETV4 | 0, 0.0% | 7, 8.9% | 0.004 |
| FOXL2 | 0, 0.0% | 4, 5.1% | 0.043 |
| MAP3K13 | 9, 9.7% | 0, 0.0% | 0.004 |
| PIK3CA | 20, 21.5% | 4, 5.1% | 0.002 |
| **PIK3CG** | **7, 7.5%** | **0, 0.0%** | **0.016** |

|  | Microsatellite stable<br>(N=165) | Microsatellite instability<br>(N=7) |  |
|---|---|---|---|
| ACVR2A | 1, 0.6% | 6, 85.7% | 0.000 |
| ADD3 | 0, 0.0% | 2, 28.6% | 0.001 |
| ADGRA2 | 5, 3.0% | 3, 42.9% | 0.002 |
| ADNP | 1, 0.6% | 2, 28.6% | 0.004 |
| AIM2 | 0, 0.0% | 1, 14.3% | 0.041 |
| AKAP7 | 0, 0.0% | 1, 14.3% | 0.041 |
| ALOX12B | 3, 1.8% | 3, 42.9% | 0.001 |
| ANO10 | 0, 0.0% | 1, 14.3% | 0.041 |
| APC | 122, 73.9% | 2, 28.6% | 0.019 |
| ARID1A | 21, 12.7% | 4, 57.1% | 0.009 |
| ARID1B | 14, 8.5% | 4, 57.1% | 0.002 |
| ARID2 | 10, 6.1% | 4, 57.1% | 0.001 |
| ASH1L | 0, 0.0% | 1, 14.3% | 0.041 |
| ASTE1 | 3, 1.8% | 4, 57.1% | 0.000 |
| ATM | 18, 10.9% | 4, 57.1% | 0.006 |
| ATR | 7, 4.2% | 2, 28.6% | 0.045 |
| ATRX | 9, 5.4% | 3, 42.9% | 0.008 |
| AXIN1 | 0, 0.0% | 2, 28.6% | 0.001 |
| B2M | 3, 1.8% | 2, 28.6% | 0.013 |
| BACH1 | 4, 2.4% | 2, 28.6% | 0.020 |
| BAX | 1, 0.6% | 3, 42.9% | 0.000 |
| BCL2L1 | 0, 0.0% | 1, 14.3% | 0.041 |
| BCL2L2 | 0, 0.0% | 1, 14.3% | 0.041 |

|  |  |  |  |
|---|---|---|---|
| BCL6 | 2, 1.2% | 3, 42.9% | 0.000 |
| BCORL1 | 5, 3.0% | 2, 28.6% | 0.027 |
| BMPR2 | 0, 0.0% | 3, 42.9% | 0.000 |
| BORCS8 | 3, 1.8% | 2, 28.6% | 0.013 |
| CARD11 | 15, 9.1% | 5, 71.4% | 0.000 |
| CASP5 | 0, 0.0% | 3, 42.9% | 0.000 |
| CASP8 | 4, 2.4% | 2, 28.6% | 0.020 |
| CCDC168 | 0, 0.0% | 1, 14.3% | 0.041 |
| CCDC43 | 0, 0.0% | 1, 14.3% | 0.041 |
| CD3G | 0, 0.0% | 1, 14.3% | 0.041 |
| CHD4 | 9, 5.4% | 3, 42.9% | 0.008 |
| CLOCK | 0, 0.0% | 2, 28.6% | 0.001 |
| COBLL1 | 0, 0.0% | 2, 28.6% | 0.001 |
| CTCF | 2, 1.2% | 2, 28.6% | 0.008 |
| CTNNA1 | 3, 1.8% | 2, 28.6% | 0.013 |
| CYHR1 | 2, 1.2% | 3, 42.9% | 0.000 |
| DDX27 | 1, 0.6% | 2, 28.6% | 0.004 |
| DOCK3 | 0, 0.0% | 3, 42.9% | 0.000 |
| EGFR | 7, 4.2% | 2, 28.6% | 0.045 |
| EIF2B3 | 1, 0.6% | 2, 28.6% | 0.004 |
| EMSY | 5, 3.0% | 2, 28.6% | 0.027 |
| EP300 | 19, 11.5% | 3, 42.9% | 0.046 |
| EPHA5 | 13, 7.9% | 5, 71.4% | 0.000 |
| EPHB1 | 11, 6.7% | 3, 42.9% | 0.013 |
| EPHB4 | 5, 3.0% | 4, 57.1% | 0.000 |

| | | | |
|---|---|---|---|
| EPHB6 | 15, 9.1% | 3, 42.9% | 0.026 |
| ETV6 | 3, 1.8% | 2, 28.6% | 0.013 |
| FANCL | 3, 1.8% | 2, 28.6% | 0.013 |
| FETUB | 0, 0.0% | 2, 28.6% | 0.001 |
| FGF14 | 2, 1.2% | 2, 28.6% | 0.008 |
| FGF4 | 0, 0.0% | 1, 14.3% | 0.041 |
| FGF6 | 0, 0.0% | 1, 14.3% | 0.041 |
| GBP3 | 1, 0.6% | 2, 28.6% | 0.004 |
| GRK4 | 0, 0.0% | 1, 14.3% | 0.041 |
| HNF1A | 4, 2.4% | 2, 28.6% | 0.020 |
| IGF1 | 0, 0.0% | 1, 14.3% | 0.041 |
| IGF2R | 13, 7.9% | 4, 57.1% | 0.002 |
| IKBKE | 6, 3.6% | 2, 28.6% | 0.035 |
| IKZF1 | 2, 1.2% | 2, 28.6% | 0.008 |
| IL7R | 4, 2.4% | 2, 28.6% | 0.020 |
| IRF4 | 0, 0.0% | 1, 14.3% | 0.041 |
| JAK1 | 4, 2.4% | 2, 28.6% | 0.020 |
| JAK3 | 4, 2.4% | 2, 28.6% | 0.020 |
| JPH4 | 0, 0.0% | 1, 14.3% | 0.041 |
| KCNMA1 | 0, 0.0% | 4, 57.1% | 0.000 |
| KDM5C | 1, 0.6% | 3, 42.9% | 0.000 |
| KDM6A | 5, 3.0% | 2, 28.6% | 0.027 |
| KIT | 10, 6.1% | 3, 42.9% | 0.010 |
| LARP4B | 0, 0.0% | 1, 14.3% | 0.041 |
| LMAN1 | 0, 0.0% | 3, 42.9% | 0.000 |

| | | | |
|---|---|---|---|
| LRP6 | 3, 1.8% | 2, 28.6% | 0.013 |
| LRRIQ3 | 0, 0.0% | 2, 28.6% | 0.001 |
| MAP3K13 | 6, 3.6% | 3, 42.9% | 0.003 |
| MCHR2 | 1, 0.6% | 2, 28.6% | 0.004 |
| MDM2 | 1, 0.6% | 2, 28.6% | 0.004 |
| MED12 | 3, 1.8% | 3, 42.9% | 0.001 |
| MFSD4B | 1, 0.6% | 3, 42.9% | 0.000 |
| MLH1 | 6, 3.6% | 4, 57.1% | 0.000 |
| MRE11 | 1, 0.6% | 2, 28.6% | 0.004 |
| MSH3 | 1, 0.6% | 4, 57.1% | 0.000 |
| MSH6 | 9, 5.4% | 3, 42.9% | 0.008 |
| MYCN | 4, 2.4% | 2, 28.6% | 0.020 |
| NDUFC2 | 1, 0.6% | 2, 28.6% | 0.004 |
| NF1 | 16, 9.7% | 4, 57.1% | 0.004 |
| NOTCH1 | 18, 10.9% | 3, 42.9% | 0.040 |
| NSD1 | 10, 6.1% | 4, 57.1% | 0.001 |
| NSD3 | 2, 1.2% | 3, 42.9% | 0.000 |
| NUP93 | 5, 3.0% | 2, 28.6% | 0.027 |
| OR6C75 | 0, 0.0% | 1, 14.3% | 0.041 |
| PBRM1 | 6, 3.6% | 3, 42.9% | 0.003 |
| PGR | 6, 3.6% | 3, 42.9% | 0.003 |
| PHACTR4 | 0, 0.0% | 1, 14.3% | 0.041 |
| PIK3C3 | 1, 0.6% | 2, 28.6% | 0.004 |
| PIK3CA | 19, 11.5% | 5, 71.4% | 0.001 |
| PRDM2 | 0, 0.0% | 1, 14.3% | 0.041 |

| | | | |
|---|---|---|---|
| PRRG1 | 1, 0.6% | 2, 28.6% | 0.004 |
| PTPRD | 7, 4.2% | 3, 42.9% | 0.004 |
| RAC1 | 0, 0.0% | 1, 14.3% | 0.041 |
| RAD50 | 10, 6.1% | 3, 42.9% | 0.010 |
| RAF1 | 1, 0.6% | 2, 28.6% | 0.004 |
| RB1 | 3, 1.8% | 2, 28.6% | 0.013 |
| RBBP8 | 0, 0.0% | 1, 14.3% | 0.041 |
| RBM27 | 0, 0.0% | 3, 42.9% | 0.000 |
| RBM43 | 0, 0.0% | 1, 14.3% | 0.041 |
| RNF43 | 6, 3.6% | 5, 71.4% | 0.000 |
| ROBO1 | 11, 6.7% | 4, 57.1% | 0.001 |
| ROBO2 | 8, 4.8% | 3, 42.9% | 0.006 |
| RPL22 | 0, 0.0% | 3, 42.9% | 0.000 |
| RUNX1T1 | 5, 3.0% | 2, 28.6% | 0.027 |
| SEC31A | 6, 3.6% | 2, 28.6% | 0.035 |
| SEC63 | 0, 0.0% | 2, 28.6% | 0.001 |
| SETD2 | 7, 4.2% | 3, 42.9% | 0.004 |
| SLC16A4 | 0, 0.0% | 3, 42.9% | 0.000 |
| SLC22A9 | 0, 0.0% | 2, 28.6% | 0.001 |
| SMARCA4 | 4, 2.4% | 5, 71.4% | 0.000 |
| SMC6 | 0, 0.0% | 2, 28.6% | 0.001 |
| SPOUT1 | 0, 0.0% | 1, 14.3% | 0.041 |
| SRPRA | 0, 0.0% | 3, 42.9% | 0.000 |
| TBC1D23 | 0, 0.0% | 1, 14.3% | 0.041 |
| TBX22 | 3, 1.8% | 3, 42.9% | 0.001 |

| | | | |
|---|---|---|---|
| TCERG1 | 0, 0.0% | 1, 14.3% | 0.041 |
| TEAD2 | 0, 0.0% | 2, 28.6% | 0.001 |
| TGFBR2 | 8, 4.8% | 4, 57.1% | 0.000 |
| TM9SF3 | 0, 0.0% | 2, 28.6% | 0.001 |
| TMEM97 | 1, 0.6% | 2, 28.6% | 0.004 |
| TNKS | 8, 4.8% | 6, 85.7% | 0.000 |
| TNKS2 | 6, 3.6% | 3, 42.9% | 0.003 |
| TOP1 | 1, 0.6% | 2, 28.6% | 0.004 |
| TP53 | 124, 75.2% | 2, 28.6% | 0.015 |
| TRRAP | 24, 14.6% | 4, 57.1% | 0.014 |
| TTC3 | 0, 0.0% | 3, 42.9% | 0.000 |
| TTK | 0, 0.0% | 2, 28.6% | 0.001 |
| TVP23A | 0, 0.0% | 2, 28.6% | 0.001 |
| USF3 | 1, 0.6% | 3, 42.9% | 0.000 |
| USP9X | 6, 3.6% | 3, 42.9% | 0.003 |
| VEPH1 | 0, 0.0% | 1, 14.3% | 0.041 |
| VHL | 0, 0.0% | 1, 14.3% | 0.041 |
| WWP1 | 4, 2.4% | 3, 42.9% | 0.001 |
| XPOT | 0, 0.0% | 1, 14.3% | 0.041 |
| ZFR | 0, 0.0% | 1, 14.3% | 0.041 |
| ZNF609 | 0, 0.0% | 1, 14.3% | 0.041 |
| ZNF703 | 3, 1.8% | 2, 28.6% | 0.013 |

| | Without lymphovascular invasion (N=81) | With lymphovascular invasion (N=91) | |
|---|---|---|---|
| ABL2 | 8, 9.9% | 2, 2.2% | 0.048 |

| | | | |
|---|---|---|---|
| DNMT3A | 4, 4.9% | 0, 0.0% | 0.047 |
| INSR | 1, 1.2% | 9, 9.9% | 0.020 |
| MAP3K13 | 8, 9.9% | 1, 1.1% | 0.014 |
| MED12 | 0, 0.0% | 6, 6.6% | 0.030 |
| NF2 | 4, 4.9% | 0, 0.0% | 0.047 |
| NTRK2 | 4, 4.9% | 0, 0.0% | 0.047 |
| PALB2 | 2, 2.5% | 10, 11.0% | 0.036 |
| TP53 | 51, 63.0% | 75, 82.4% | 0.006 |

| | Without diabetes mellitus (N=134) | With diabetes mellitus (N=38) | |
|---|---|---|---|
| ADD3 | 0, 0.0% | 2, 5.3% | 0.048 |
| ARID1B | 10, 7.5% | 8, 21.0% | 0.031 |
| ASTE1 | 3, 2.2% | 4, 10.5% | 0.043 |
| BRD4 | 5, 3.7% | 5, 13.2% | 0.044 |
| CTCF | 1, 0.8% | 3, 7.9% | 0.034 |
| CYHR1 | 1, 0.8% | 4, 10.5% | 0.009 |
| DDX27 | 0, 0.0% | 3, 7.9% | 0.010 |
| ELOA | 0, 0.0% | 2, 5.3% | 0.048 |
| EPHB4 | 4, 3.0% | 5, 13.2% | 0.026 |
| FGF19 | 0, 0.0% | 2, 5.3% | 0.048 |
| GRIN2A | 13, 9.7% | 9, 23.7% | 0.030 |
| H3F3A | 0, 0.0% | 2, 5.3% | 0.048 |
| HRAS | 1, 0.8% | 3, 7.9% | 0.034 |
| KDM5C | 1, 0.8% | 3, 7.9% | 0.034 |
| LRP1B | 46, 34.3% | 5, 13.2% | 0.015 |

| | | | |
|---|---|---|---|
| MBD4 | 0, 0.0% | 2, 5.3% | 0.048 |
| MRE11 | 0, 0.0% | 3, 7.9% | 0.010 |
| NDUFC2 | 0, 0.0% | 3, 7.9% | 0.010 |
| SETD2 | 5, 3.7% | 5, 13.2% | 0.044 |
| SRPRA | 0, 0.0% | 3, 7.9% | 0.010 |
| SUFU | 0, 0.0% | 2, 5.3% | 0.048 |
| TEAD2 | 0, 0.0% | 2, 5.3% | 0.048 |
| TM9SF3 | 0, 0.0% | 2, 5.3% | 0.048 |
| TNKS2 | 2, 1.5% | 7, 18.4% | 0.000 |
| TTK | 0, 0.0% | 2, 5.3% | 0.048 |
| USF3 | 1, 0.8% | 3, 7.9% | 0.034 |

| | BMI ≥ 25 (N=45) | BMI < 25 (N=127) | |
|---|---|---|---|
| ELMO1 | 4, 8.9% | 2, 1.6% | 0.041 |
| GNAQ | 3, 6.7% | 0, 0.0% | 0.017 |
| IRS2 | 4, 8.9% | 2, 1.6% | 0.041 |
| JAK2 | 3, 6.7% | 0, 0.0% | 0.017 |
| RAD50 | 7, 15.6% | 6, 4.7% | 0.042 |
| ROS1 | 8, 17.8% | 8, 6.3% | 0.034 |

**Supplementary Table S3.** Genes that show significantly different mutation frequencies by each clinical information criteria from tumors of the Caucasian patients of the TCGA colorectal cancer data set. Genes in boldface presentation are the common genes that also showed significantly different mutation frequencies from tumors of the 172 Korean patients with colorectal cancer.

| Genes | Categorization by clinical variable | | p-value |
|---|---|---|---|
| | Left-sided (N=70) | Right-sided (N=97) | |
| **APC** | **59, 84.3%** | **59, 60.8%** | **0.001** |
| TRRAP | 2, 2.9% | 18, 18.6% | 0.002 |
| PIK3CG | 0, 0.0% | 13, 13.4% | 0.001 |
| **APCDD1** | **0, 0.0%** | **6, 6.2%** | **0.041** |
| ASXL1 | 3, 4.3% | 14, 14.4% | 0.038 |
| ERBB4 | 4, 5.7% | 17, 17.5% | 0.032 |
| **JAK1** | **0, 0.0%** | **10, 10.3%** | **0.005** |
| ABL2 | 0, 0.0% | 6, 6.2% | 0.041 |
| MSH2 | 0, 0.0% | 9, 9.3% | 0.011 |
| ATR | 1, 1.4% | 9, 9.3% | 0.046 |
| KDR | 0, 0.0% | 6, 6.2% | 0.041 |
| CTNNA1 | 0, 0.0% | 6, 6.2% | 0.041 |
| BRAF | 5, 7.1% | 25, 25.8% | 0.002 |
| WT1 | 1, 1.4% | 12, 12.4% | 0.008 |
| FAT3 | 9, 12.9% | 29, 29.9% | 0.014 |
| FGF23 | 0, 0.0% | 6, 6.2% | 0.041 |

| | | | |
|---|---|---|---|
| ARID2 | 1, 1.4% | 10, 10.3% | 0.026 |
| SH2B3 | 0, 0.0% | 6, 6.2% | 0.041 |
| FANCM | 0, 0.0% | 7, 7.2% | 0.042 |
| BLM | 0, 0.0% | 9, 9.3% | 0.011 |
| NF1 | 0, 0.0% | 16, 16.5% | 0.000 |
| CDK12 | 1, 1.4% | 12, 12.4% | 0.008 |
| RNF43 | 2, 2.9% | 16, 16.5% | 0.005 |
| SOX9 | 4, 5.7% | 17, 17.5% | 0.032 |
| BRD4 | 1, 1.4% | 9, 9.3% | 0.046 |
| ERG | 0, 0.0% | 7, 7.2% | 0.042 |
| BCOR | 0, 0.0% | 15, 15.5% | 0.000 |
| BCORL1 | 1, 1.4% | 13, 13.4% | 0.008 |
| KLHL6 | 1, 1.4% | 10, 10.3% | 0.026 |
| MET | 1, 1.4% | 9, 9.3% | 0.046 |
| MPL | 0, 0.0% | 6, 6.2% | 0.041 |
| PARP1 | 1, 1.4% | 9, 9.3% | 0.046 |
| EPHA7 | 0, 0.0% | 6, 6.2% | 0.041 |
| TNKS | 0, 0.0% | 7, 7.2% | 0.042 |
| WWP1 | 1, 1.4% | 9, 9.3% | 0.046 |
| NKX2-1 | 0, 0.0% | 7, 7.2% | 0.042 |
| CTCF | 1, 1.4% | 9, 9.3% | 0.046 |
| CDH1 | 0, 0.0% | 8, 8.2% | 0.021 |
| FANCA | 0, 0.0% | 13, 13.4% | 0.001 |
| RPTOR | 1, 1.4% | 9, 9.3% | 0.046 |
| AKT2 | 0, 0.0% | 6, 6.2% | 0.041 |

| | | | |
|---|---|---|---|
| CIC | 3, 4.3% | 15, 15.5% | 0.024 |
| ADGRA2 | 0, 0.0% | 7, 7.2% | 0.042 |
| CHD1 | 1, 1.4% | 9, 9.3% | 0.046 |
| ALOX12B | 1, 1.4% | 9, 9.3% | 0.046 |
| IKBKE | 0, 0.0% | 7, 7.2% | 0.042 |
| DNMT3A | 1, 1.4% | 10, 10.3% | 0.026 |
| BAP1 | 0, 0.0% | 6, 6.2% | 0.041 |
| PBRM1 | 1, 1.4% | 10, 10.3% | 0.026 |
| RICTOR | 0, 0.0% | 6, 6.2% | 0.041 |
| DAXX | 0, 0.0% | 8, 8.2% | 0.021 |
| SEMA3E | 1, 1.4% | 9, 9.3% | 0.046 |
| PTCH1 | 1, 1.4% | 14, 14.4% | 0.004 |
| IRS2 | 0, 0.0% | 6, 6.2% | 0.041 |
| ABL1 | 0, 0.0% | 8, 8.2% | 0.021 |
| EWSR1 | 0, 0.0% | 7, 7.2% | 0.042 |
| **INSR** | **0, 0.0%** | **8, 8.2%** | **0.021** |
| SLIT2 | 1, 1.4% | 11, 11.3% | 0.015 |
| **HNF1A** | **0, 0.0%** | **10, 10.3%** | **0.005** |
| | ages under 50 (N=28) | ages 50 or older (N=179) | |
| APC | 15, 53.6% | 132, 73.7% | 0.042 |
| ERBB4 | 0, 0.0% | 25, 14.0% | 0.030 |
| HOXA3 | 4, 14.3% | 7, 3.9% | 0.045 |
| SMAD4 | 0, 0.0% | 27, 15.1% | 0.030 |
| NCOA3 | 3, 10.7% | 3, 1.7% | 0.034 |

| | | | |
|---|---|---|---|
| RAF1 | 3, 10.7% | 3, 1.7% | 0.034 |
| CHD2 | 4, 14.3% | 7, 3.9% | 0.045 |
| CCNE1 | 2, 7.1% | 1, 0.6% | 0.049 |
| | Low T stage(T1, T2) (N=40) | High T stage(T3, T4) (N=167) | |
| ABL1 | 5, 12.5% | 6, 3.6% | 0.040 |
| ARFRP1 | 3, 7.5% | 1, 0.6% | 0.023 |
| | Without regional lymph node metastasis (N=116) | With regional lymph node metastasis (N=91) | |
| TRRAP | 23, 19.8% | 3, 3.3% | 0.000 |
| **PIK3CG** | **14, 12.1%** | **2, 2.2%** | **0.008** |
| GATA3 | 9, 7.8% | 1, 1.1% | 0.045 |
| ASXL1 | 16, 13.8% | 3, 3.3% | 0.013 |
| PDGFRA | 11, 9.5% | 2, 2.2% | 0.042 |
| TBX3 | 13, 11.2% | 2, 2.2% | 0.014 |
| CDK12 | 14, 12.1% | 1, 1.1% | 0.002 |
| BRD4 | 11, 9.5% | 2, 2.2% | 0.042 |
| FOXL2 | 6, 5.2% | 0, 0.0% | 0.036 |
| CSF1R | 9, 7.8% | 1, 1.1% | 0.045 |
| ETV1 | 8, 6.9% | 0, 0.0% | 0.010 |
| FGFR2 | 10, 8.6% | 1, 1.1% | 0.025 |
| ERCC2 | 6, 5.2% | 0, 0.0% | 0.036 |
| **ACVR1B** | **10, 8.6%** | **1, 1.1%** | **0.025** |
| FANCI | 6, 5.2% | 0, 0.0% | 0.036 |

| | | | |
|---|---|---|---|
| PKHD1 | 16, 13.8% | 3, 3.3% | 0.013 |
| CIC | 18, 15.5% | 3, 3.3% | 0.004 |
| EPHA5 | 16, 13.8% | 4, 4.4% | 0.031 |
| ALOX12B | 10, 8.6% | 1, 1.1% | 0.025 |
| BAP1 | 6, 5.2% | 0, 0.0% | 0.036 |
| BCL6 | 7, 6.0% | 0, 0.0% | 0.019 |
| DAXX | 8, 6.9% | 0, 0.0% | 0.010 |
| PTCH1 | 15, 12.9% | 3, 3.3% | 0.023 |
| KDM5A | 9, 7.8% | 1, 1.1% | 0.045 |
| FAM46C | 9, 7.8% | 1, 1.1% | 0.045 |
| EPHA6 | 16, 13.8% | 3, 3.3% | 0.013 |
| GNAQ | 6, 5.2% | 0, 0.0% | 0.036 |
| TNKS2 | 10, 8.6% | 1, 1.1% | 0.025 |
| CDH5 | 8, 6.9% | 0, 0.0% | 0.010 |
| HNF1A | 10, 8.6% | 1, 1.1% | 0.025 |

| | BMI $\geq 25$ (N=113) | BMI < 25 (N=52) | |
|---|---|---|---|
| APCDD1 | 0, 0.0% | 3, 5.8% | 0.030 |
| RAD54L | 1, 0.9% | 4, 7.7% | 0.035 |
| SRSF7 | 0, 0.0% | 3, 5.8% | 0.030 |
| SRC | 1, 0.9% | 4, 7.7% | 0.035 |
| BCORL1 | 4, 3.5% | 8, 15.4% | 0.010 |
| RPTOR | 5, 4.4% | 8, 15.4% | 0.026 |
| PBRM1 | 3, 2.6% | 6, 11.5% | 0.029 |
| NOTCH4 | 3, 2.6% | 8, 15.4% | 0.005 |

| | | | |
|---|---|---|---|
| IRS2 | 1, 0.9% | 4, 7.7% | 0.035 |
| AKT1 | 3, 2.6% | 6, 11.5% | 0.029 |
| GNA11 | 0, 0.0% | 4, 7.7% | 0.009 |
| ITK | 0, 0.0% | 3, 5.8% | 0.030 |
| AXL | 1, 0.9% | 7, 13.5% | 0.001 |
| MEN1 | 0, 0.0% | 4, 7.7% | 0.009 |
| CD79B | 0, 0.0% | 3, 5.8% | 0.030 |