**Table S4. Pathway analysis: Affected genes identified within each patient**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Total # objectsa** | **# Genomic events** |   |   | **RNAseq expressionb** |   |   |
| **Pancreatic cancer maps** | **Patient 1 #events** | **Genes** | **Patient 1 Pvalue** | **Patient 2 #events** | **Patient 2 Pvalue** | **Genes** | **Patient 3 #events** | **Patient 3 Pvalue** | **Genes** | **Patient 2 #genes** | **Patient 2 Pvalue** | **Genes** | **Patient 3 #genes** | **Patient 3 Pvalue** | **Genes** |
| **1** | **K-RAS signaling in pancreatic cancer** | 43 | 18 | *CASP9, AKT2, RALBP1, BAX, CHUK, DYRK1B, GSK3A, HNF1A, MAP2K2, MAP2K3, MAP3K1, MYC, PLAU, PTEN, TIAM1, TP53, KRAS, RALGDS* | 2.64E-03 | 2 | 4.44E-02 | RALBP1, KRAS | 1 | 1.61E-01 | KRAS | 6 | 5.53E-02 | *RAC1, AKT3, CASP9, GSK3B, TP53, SLC2A1* | 5 | 4.01E-01 | *RAC1, CASP9, SLC2A1, KRAS, AKT2* |
| **2** | **Tumor-stroma interactions in pancreatic cancer** | 29 | 7 | *BSG, FN1, POSTN, STK36, SUFU, TGFB1, THBS2* | 4.97E-01 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 4 | 5.19E-01 | *FGFR1, COL1A1, IGF1, POSTN* | 9 | 2.96E-03 | *ITGB1, FGFR1, ITGA2, FGF2, POSTN, FN1, PTCH1, IGF1, HGF* |
| **3** | **Inhibition of tumor suppressive pathways in pancreatic cancer** | 20 | 10 | *TP73, BAX, CDKN2A, CDKN2B, LRDD, MDM2, RB1, TP53I3, BRCA2, TP53* | 3.58E-03 | 0 | 1.00E+00 |   | 1 | 7.97E-02 | TP73 | 3 | 3.32E-01 | *BRCA2, TP53, CDKN2B* | 1 | 9.26E-01 | *CDKN2B* |
| **4** | **Plasminogen activators signaling in pancreatic cancer** | 33 | 7 | *HRAS, MAP2K2, PLAU, PLAUR, SOS1, SOS2, TGFB1* | 8.65E-01 | 0 | 1.00E+00 |   | 1 | 1.00E+00 | RXRA | 3 | 6.74E-01 | *PPARG, SHC1, PLAUR* | 5 | 1.47E-02 | *PLAT, PPARG, HGF, FOSL1, PLG* |
| **5** | **Inhibition of apoptosis in pancreatic cancer** | 63 | 19 | *CSNK2A1, CASP9, GNAI2, SFN, AKT2, ALOX12,APAF1, BAX, CHUK,IL6ST, JAK2, PER1, PIK3CD, PIK3R1, PIK3R2, PTEN, YWHAE, TP53, KRAS* | 2.45E-01 | 1 | 3.67E-01 | KRAS | 1 | 2.04E-01 | KRAS | 12 | 1.74E-02 | *EGF, AKT3, CSNK2A1, YWHAQ, CASP9, YWHAB, ERBB2, TP53, IGF1, GNAI2, PTGES, SFN* | 10 | 3.36E-01 | *CASP9, YWHAQ, CSNK2A1, YWHAB, KRAS, IL6R, IGF1, AKT2, BCL2L1, SFN* |
| **6** | **FGF signaling in pancreatic cancer** | 53 | 20 | *SDC1, AKT2, CHUK, CTNNA3, CTNNB1, FGFR2, FRS2, GPC1, HRAS, MAP2K2, NFKB2, PIK3CD, PIK3R1, PIK3R2, PLAU, REL, SOS1, SOS2, TGFB1, GAB1* | 2.58E-02 | 1 | 3.08E-01 | FGF10 | 0 | 1.00E+00 |   | 4 | 4.64E-01 | *FGFR1, AKT3, SDC1, SHC1* | 6 | 2.77E-01 | *CDH1, FGFR1, FGF2, PLAT, SDC1, AKT2* |
| **7** | **Resistance of pancreatic cancer cells to death receptor signaling** | 30 | 11 | *CASP9, CASP3, TNFRSF10D, APAF1, BAX, BID, CFLAR, TNFRSF10A, TNFRSF10B, TNFRSF10C, TNFSF10* | 2.87E-02 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 3 | 3.98E-01 | *CASP9, CASP3, BIRC3* | 6 | 7.75E-02 | *CASP9, TNFRSF10D, CASP8, BCL2L1, BIRC3, BIRC5* |
| **8** | **HGF signaling in pancreatic cancer** | 33 | 12 | *HGFAC, HRAS, MAP2K2, MYC, PIK3CD, PIK3R1, PIK3R2, PLAU, SOS1, SOS2, TP53, GAB1* | 4.50E-02 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 2 | 7.71E-01 | *TP53, SHC1* | 1 | 6.46E-01 | *HGF* |
| **9** | Role of cell adhesion molecules in progression of pancreatic cancer | 54 | 18 | *COL4A4, CASP3, PTK2, FN1, COL4A3, CTNNA3, CTNNB1, HRAS, LAMA1, MAP2K2, MYC, SOS1, SOS2, ST8SIA4, TCF7, TCF7L2, KRAS, NCAM1* | 1.47E-01 | 2 | 3.02E-01 | LAMC1, KRAS | 1 | 1.64E-01 | KRAS | 6 | 4.44E-01 | *COL4A4, JUP, COL1A1, COL4A1, CASP3, SHC1* | 10 | 6.68E-02 | *COL4A4, ITGB1, CDH1, PTK2, ITGA2, FN1, COL4A1, KRAS, ITGA3, ITGB3* |
| **10** | Activation of TGF-beta signaling in pancreatic cancer | 28 | 6 | *ICAM1, MAP2K4, SOS1, SOS2, TGFB1, KRAS* | 7.96E-01 | 1 | 1.93E-01 | KRAS | 1 | 1.02E-01 | KRAS | 2 | 7.53E-01 | *CLDN4, SHC1* | 3 | 3.82E-01 | *DAB2, PDGFA, KRAS* |
| **11** | Suppression of TGF-beta signaling in pancreatic cancer | 32 | 9 | *CDKN2B, GADD45B, MAP2K3, MAP3K4, MYC, PLAU, SKI, TGFB1, KRAS* | 2.22E-01 | 1 | 2.06E-01 | KRAS | 1 | 1.09E-01 | KRAS | 2 | 7.88E-01 | *BGN, CDKN2B* | 5 | 2.38E-01 | *SMAD6, BGN, ETS1, KRAS, CDKN2B* |
| **12** | Hedgehog signaling in pancreatic cancer | 33 | 7 | *IGF2, IHH, MAP2K2, STK36, SUFU, TGFB1, KRAS* | 6.53E-01 | 1 | 2.25E-01 | KRAS | 1 | 1.19E-01 | KRAS | 2 | 8.32E-01 | *CTSB, IGF2* | 6 | 1.56E-01 | *CDH1, IGF2, CTSB, PTCH1, KRAS, BCL2L1* |
| **13** | Role of stellate cells in progression of pancreatic cancer | 65 | 15 | *COL3A1, POSTN, PTK2, FN1, AKT2, CHUK, CTGF, HRAS, MAP2K2, PIK3CD, PIK3R1, PIK3R2, SOS1, SOS2, TGFB1* | 6.81E-01 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 7 | 2.18E-01 | *AKT3, CCL2, COL1A1, COL3A1, CXCL2, SHC1, POSTN* | 12 | 1.46E-01 | *ITGB1, PTK2, PDGFA, FGF2, POSTN, FN1, ITGB3, AKT2, CXCL2, FGB, FGG, FGA* |
| **14** | Neuropeptide signaling in pancreatic cancer | 47 | 12 | *PLCB1, PRKCE, AVP, CCKBR, CHUK, GNA11, MAP2K2, MYC, NFKB2, NTS, PRKCH, REL* | 3.56E-01 | 0 | 1.00E+00 |   | 1 | 1.78E-01 | ITPR2 | 4 | 7.15E-01 | *PLCB1, CCL2, ITPR3, AGT* | 6 | 5.08E-01 | *ITPR1, PRKCE, AVPR1A, ITPR3, HGF, AGT* |
| **15** | IGF-1 signaling in pancreatic cancer | 39 | 12 | *PTK2, HRAS, IRS1, JAK2, MAP2K2, NUAK1, PIK3CD, PIK3R1, PIK3R2, PRKCZ, SOS1, SOS2* | 2.04E-01 | 1 | 2.49E-01 | PRKAA1 | 0 | 1.00E+00 |   | 3 | 4.66E-01 | *ATM, IGF1, SHC1* | 3 | 6.14E-01 | *PIK3R3, PTK2, IGF1* |
| **16** | Role of metalloproteases and heparanase in progression of pancreatic cancer | 35 | 9 | *COL4A4, OCLN, BSG, COL4A3, HRAS, MAP2K2, SOS1, SOS2, KDR* | 6.87E-01 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 6 | 2.09E-01 | *COL4A4, OCLN, SERPINA1, COL4A1, SHC1, MMP7* | 5 | 3.32E-01 | *COL4A4, TJP1, COL4A1, MMP7, SERPINA1* |
| **17** | EGFR family signaling in pancreatic cancer | 84 | 23 | *ERBB4, NFKBIB, AKT2, CCNE1, CHUK, HRAS, JAK2, MAP2K2, MAP2K4, MAP2K7, MAP3K10, MYC, NFKB2, PIK3CD, PIK3R1, PIK3R2, PLAU, RB1, REL, RHOA, SOS1, SOS2, VAV1* | 2.27E-01 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 6 | 6.16E-01 | *ERBB4, EGF, RAC1, AKT3, ERBB2, SHC1* | 9 | 3.82E-01 | *RAC1, ATF2, ERBB4, PAK1, CDK2, NFKBIB, AKT2, BCL2L1, BIRC5* |
| **18** | Regulation of VEGF signaling in pancreatic cancer | 30 | 7 | *FLT1, HRAS, MAP2K2, NRP2, SOS1, SOS2, KDR* | 6.36E-01 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 2 | 7.53E-01 | *NRP2, SHC1* | 2 | 3.82E-01 | *FIGF, VEGFC* |
| **19** | Inflammatory mechanisms of pancreatic cancerogenesis | 76 | 18 | *GNAI2, IRF1, IFNGR2, CCL20, CCR6, CEBPG, CHUK, FOSB, FOSL2, ICAM1, IL6ST, JAK2, JUNB, JUND, NFKB2, PLAU, REL, TNFRSF1B* | 8.28E-01 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 5 | 7.94E-01 | *EGF, CCL2, CXCR4, GNAI2, AGT* | 9 | 8.08E-01 | *ATF2, IFNGR1, IRF1, IFNGR2, IL32, IL6R, BCL2L1, FOSL1, AGT* |
| **20** | Metabolism in pancreatic cancer cells | 19 | 8 | *SLC2A2, GLUD1, GPX1, RPE, SLC2A4, SLC2A5, TALDO1, TKT* | 9.93E-01 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 4 | 8.90E-01 | *SLC2A2, RPIA, SLC2A3, SLC2A1* | 3 | 9.86E-01 | *SLC2A2, SLC2A3, SLC2A1* |
| **21** | Mechanism of gemcitabine action in pancreatic cancer | 25 | 8 | *DCTD, POLE, POLE2, RRM1, RRM2B, XRCC5, POLA1, TP53* | 9.99E-01 | 0 | 1.00E+00 |   | 0 | 1.00E+00 |   | 2 | 9.95E-01 | *POLA1, TP53* | 0 | 1.00E+00 |  |
| **Top 5 overall GeneGo maps** |  |  |  | 0.00E+00 |  | 0.00E+00 |  |  | 0.00E+00 |  |  | 0.00E+00 |  |  | 0.00E+00 |  |
| **22** | K-RAS signaling in pancreatic cancer (see above) |   |   |  | 3.27E-06 |   | 1.90E-02 |   |   | 9.24E-02 |   |   | 3.60E-03 |  |   | 7.95E-02 |  |
| **23** | Ligand-independent activation of androgen receptor | 91 | 31 | *AKT2, CTNNB1, FGFR2, FRS2, FZD10, FZD3, FZD5, FZD6, FZD7, HRAS, IRS1, JAK2, KLK3, MAP2K2, MDM2, MYC, NCOA1, PIK3CD, PIK3R1, PIK3R2, PPP2CA, PPP2R2A, PPP2R2C, PPP2R5E, PTEN, SOS1, SOS2, TCF7, TCF7L2, KRAS, GAB1* | 5.27E-05 | 1 | 2.85E-01 | KRAS | 1 | 1.41E-01 | KRAS | 9 | 5.94E-04 | *PRLR, EGF, FGFR1, AKT3, PPP2R3A, GSK3B, ERBB2, IGF1, SHC1* | 11 | 2.41E-03 | *PIK3R3, FGFR1, SRD5A1, FGF2, KRAS, IGFBP3, IGF1, AKT2, AR, BCL2L1, ABL1* |
| **24** | Transport\_Macropinocytosis regulation by growth factors | 67 | 22 | *AKT2, CDC42, PLCB1, ACTB, ARPC2, ARPC3, CTBP1, DSTN, HRAS, IRS1, JAK2, MAPK7, PDE3B, PFN1, PIK3R1, PRKAB1, SOS1, SOS2, TIAM1, VAV1, WASF2, KRAS* | 3.35E-04 | 2 | 3.70E-02 | PRKAA1, KRAS | 1 | 1.30E-01 | KRAS | 8 | 7.43E-02 | *EGF, RAC1, AKT3, PLCB1, SHC1, CDC42, ARPC1B, WIPF1* | 9 | 1.04E-02 | *RAC1, PAK1, LEPR, WIPF1, KRAS, AKT2, HGF, CDC42, ARPC1B* |
| **25** | Inhibition of apoptosis in pancreatic cancer (see above) |   |   |  | 5.17E-03 |   | 2.42E-01 |   |   | 1.18E-01 |   |   | 3.97E-04 |  |   | 4.04E-02 |  |
| **26** | Development\_FGF-family signaling | 52 | 16 | *AKT2, FGF8, FGFR2, FGFR3, FRS2, HRAS, HSPG2, MAP2K2, PIK3CD, PIK3R1, PIK3R2, PRKCD, PRKCE, PTPN11, SOS1, SOS2, GAB1* | 1.86E-03 | 1 | 2.23E-01 | FGF10 | 2 | 5.68E-03 | FGFR3, ITPR2 | 6 | 8.21E-02 | *RAC1, FGFR1, AKT3, ITPR3, SHC1* | 8 | 2.48E-02 | *RAC1, ITPR1, PIK3R3, FGFR1, FGF2, PRKCE, ITPR3, AKT2* |