Supplementary Tables S3-S8 summarize computed gene overlaps between gene sets associated with high tumor FCh uptake and gene sets from the Broad Institute Molecular Signature Database Hallmarks collection and Chemical and Genetic Perturbations (CGP) v6.2 collection. Overlaps were computed using the “Investigate gene sets” tool provided by the MSigDB web-site (software.broadinstitute.org).

Supplementary Table S3: Significant gene overlaps between HOSHIDA\_LIVER\_CANCER\_SUBCLASS\_S3 (comprised of 265 genes) and Hallmark gene sets.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene Set Name | # Genes in Gene Set (K) | # Genes in Overlap (k) | k/K | FDR q-value |
| HALLMARK\_XENOBIOTIC\_METABOLISM | 200 | 46 | 0.23 | 2.20E-58 |
| HALLMARK\_FATTY\_ACID\_METABOLISM | 158 | 26 | 0.1646 | 1.01E-28 |
| HALLMARK\_COAGULATION | 138 | 22 | 0.1594 | 4.11E-24 |
| HALLMARK\_OXIDATIVE\_PHOSPHORYLATION | 200 | 23 | 0.115 | 5.77E-22 |
| HALLMARK\_ADIPOGENESIS | 200 | 21 | 0.105 | 2.55E-19 |
| HALLMARK\_PEROXISOME | 104 | 13 | 0.125 | 3.89E-13 |
| HALLMARK\_UV\_RESPONSE\_UP | 158 | 14 | 0.0886 | 4.38E-12 |
| HALLMARK\_COMPLEMENT | 200 | 15 | 0.075 | 5.78E-12 |
| HALLMARK\_ESTROGEN\_RESPONSE\_LATE | 200 | 15 | 0.075 | 5.78E-12 |
| HALLMARK\_BILE\_ACID\_METABOLISM | 112 | 12 | 0.1071 | 1.46E-11 |

Supplementary Table S4: Significant gene overlaps between HOSHIDA\_LIVER\_CANCER\_SUBCLASS\_S3 (comprised of 265 genes) and Chemical and CGP collection gene sets.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene Set Name | # Genes in Gene Set (K) | # Genes in Overlap (k) | k/K | FDR q-value |
| HSIAO\_LIVER\_SPECIFIC\_GENES | 244 | 102 | 0.418 | 6.78E-165 |
| FLECHNER\_BIOPSY\_KIDNEY\_TRANSPLANT\_REJECTED\_VS\_OK\_DN | 546 | 69 | 0.1264 | 1.94E-68 |
| CAIRO\_HEPATOBLASTOMA\_DN | 267 | 55 | 0.206 | 4.13E-66 |
| CHIANG\_LIVER\_CANCER\_SUBCLASS\_PROLIFERATION\_DN | 179 | 47 | 0.2626 | 1.34E-61 |
| LEE\_LIVER\_CANCER\_SURVIVAL\_UP | 185 | 45 | 0.2432 | 3.07E-57 |
| CAIRO\_LIVER\_DEVELOPMENT\_DN | 222 | 42 | 0.1892 | 2.92E-48 |
| WOO\_LIVER\_CANCER\_RECURRENCE\_DN | 80 | 31 | 0.3875 | 3.43E-46 |
| MOOTHA\_MITOCHONDRIA | 447 | 48 | 0.1074 | 2.54E-43 |

Supplementary Table S5: Significant gene overlaps between LEE\_LIVER\_CANCER\_SURVIVAL\_UP (comprised of 185 genes) and Hallmark gene sets

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene Set Name | # Genes in Gene Set (K) | # Genes in Overlap (k) | k/K | FDR q-value |
| HALLMARK\_XENOBIOTIC\_METABOLISM | 200 | 23 | 0.115 | 4.70E-25 |
| HALLMARK\_COAGULATION | 138 | 13 | 0.0942 | 4.53E-13 |
| HALLMARK\_BILE\_ACID\_METABOLISM | 112 | 12 | 0.1071 | 6.55E-13 |
| HALLMARK\_FATTY\_ACID\_METABOLISM | 158 | 9 | 0.057 | 2.29E-07 |
| HALLMARK\_REACTIVE\_OXIGEN\_SPECIES\_PATHWAY | 49 | 4 | 0.0816 | 4.67E-04 |
| HALLMARK\_COMPLEMENT | 200 | 6 | 0.03 | 1.41E-03 |
| HALLMARK\_UV\_RESPONSE\_UP | 158 | 5 | 0.0316 | 3.35E-03 |
| HALLMARK\_PEROXISOME | 104 | 4 | 0.0385 | 5.19E-03 |
| HALLMARK\_ADIPOGENESIS | 200 | 5 | 0.025 | 5.19E-03 |
| HALLMARK\_ESTROGEN\_RESPONSE\_EARLY | 200 | 5 | 0.025 | 5.19E-03 |

Supplementary Table S6: Significant gene overlaps between LEE\_LIVER\_CANCER\_SURVIVAL\_UP (comprised of 185 genes) and Chemical and CGP collection gene sets

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene Set Name | # Genes in Gene Set (K) | # Genes in Overlap (k) | k/K | FDR q-value |
| CHIANG\_LIVER\_CANCER\_SUBCLASS\_PROLIFERATION\_DN | 179 | 54 | 0.3017 | 2.67E-84 |
| HSIAO\_LIVER\_SPECIFIC\_GENES | 244 | 46 | 0.1885 | 1.22E-60 |
| HOSHIDA\_LIVER\_CANCER\_SUBCLASS\_S3 | 266 | 45 | 0.1692 | 4.60E-57 |
| KIM\_LIVER\_CANCER\_POOR\_SURVIVAL\_DN | 43 | 21 | 0.4884 | 1.04E-36 |
| WOO\_LIVER\_CANCER\_RECURRENCE\_DN | 80 | 23 | 0.2875 | 6.34E-34 |
| ANDERSEN\_LIVER\_CANCER\_KRT19\_DN | 75 | 22 | 0.2933 | 1.17E-32 |
| CAIRO\_LIVER\_DEVELOPMENT\_DN | 222 | 26 | 0.1171 | 1.03E-27 |
| CHIANG\_LIVER\_CANCER\_SUBCLASS\_CTNNB1\_UP | 176 | 23 | 0.1307 | 1.70E-25 |

Supplementary Table S7: Significant gene overlaps between KIM\_LIVER\_CANCER\_POOR\_SURVIVAL\_DN (comprised of 43 genes) and Hallmark gene sets

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene Set Name | # Genes in Gene Set (K) | # Genes in Overlap (k) | k/K | FDR q-value |
| HALLMARK\_XENOBIOTIC\_METABOLISM | 200 | 9 | 0.045 | 1.16E-11 |
| HALLMARK\_COAGULATION | 138 | 7 | 0.0507 | 1.39E-09 |
| HALLMARK\_COMPLEMENT | 200 | 6 | 0.03 | 5.60E-07 |
| HALLMARK\_BILE\_ACID\_METABOLISM | 112 | 4 | 0.0357 | 4.79E-05 |
| HALLMARK\_PEROXISOME | 104 | 3 | 0.0288 | 1.30E-03 |
| HALLMARK\_FATTY\_ACID\_METABOLISM | 158 | 3 | 0.019 | 3.71E-03 |
| HALLMARK\_PANCREAS\_BETA\_CELLS | 40 | 2 | 0.05 | 4.66E-03 |
| HALLMARK\_ADIPOGENESIS | 200 | 3 | 0.015 | 5.51E-03 |

Supplementary Table S8: Significant gene overlaps between KIM\_LIVER\_CANCER\_POOR\_SURVIVAL\_DN (comprised of 43 genes) and Chemical and CGP collection gene sets

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene Set Name | # Genes in Gene Set (K) | # Genes in Overlap (k) | k/K | FDR q-value |
| LEE\_LIVER\_CANCER\_SURVIVAL\_UP | 185 | 21 | 0.1135 | 2.60E-36 |
| WOO\_LIVER\_CANCER\_RECURRENCE\_DN | 80 | 17 | 0.2125 | 9.28E-34 |
| HSIAO\_LIVER\_SPECIFIC\_GENES | 244 | 18 | 0.0738 | 2.76E-27 |
| HOSHIDA\_LIVER\_CANCER\_SUBCLASS\_S3 | 266 | 17 | 0.0639 | 1.38E-24 |
| CHIANG\_LIVER\_CANCER\_SUBCLASS\_PROLIFERATION\_DN | 179 | 13 | 0.0726 | 5.76E-19 |
| FLECHNER\_BIOPSY\_KIDNEY\_TRANSPLANT\_REJECTED\_VS\_OK\_DN | 546 | 12 | 0.022 | 3.78E-11 |
| CAIRO\_LIVER\_DEVELOPMENT\_DN | 222 | 9 | 0.0405 | 2.55E-10 |
| GRUETZMANN\_PANCREATIC\_CANCER\_DN | 203 | 7 | 0.0345 | 3.02E-07 |