**Supplementary Table 1. The 23 signatures collected from public literature**

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| Signature namåe | PMID | Title | Signature description | Method |
| IRS | 35280438 | An Immunosenescence-Related Gene Signature to Evaluate the Prognosis, Immunotherapeutic Response, and Cisplatin Sensitivity of Bladder Cancer. | EGFR MAPK1 TFRC IRF1 ADIPOR2 GBP2 CTSS THBS1 GBP2 CCN2 PSMD11 SRC KIR2DL4 NOX4 MAP2K1 ELAVL1 | multivariate Cox analysis |
| tGE8 | 31686036 | Clinical efficacy and biomarker analysis of neoadjuvant atezolizumab in operable urothelial carcinoma in the ABACUS trial. | IFNG CXCL9 CD8A GZMA GZMB CXCL10 PRF1 TBX21 | median of Z-score |
| MEMTS | 35769483 | Metastasis Related Epithelial-Mesenchymal Transition Signature Predicts Prognosis and Response to Immunotherapy in Gastric Cancer. | SNAI2 PFN2 NOTCH2 NID2 MEST MATN2 LAMA1 ITGB3 GPX7 FBN2 ECM2 DPYSL3 BDNF | Average mean |
| PRGScore | 35479097 | Pyroptosis-Related Signature Predicts Prognosis and Immunotherapy Efficacy in Muscle-Invasive Bladder Cancer. | GSDMB TNFRSF14 OAS1 HSH2D APOL2 APOL1 HCG4P11 RP1-50J22.4 CD96 RP1-102E24.10 APOBEC3G CYP4F12 ETV7 FBXO6 B3GNT3 APOBEC3D HLA-K OR2I1P EXOC3L4 PSMB10 RP11-291B21.2 HCG4P7 ZNF683 GPR114 TJP3 UBD LGALS9 CGREF1 TMC4 FOXA1 TRGC2 RP11-876N24.3 NPP1 AC092580.4 NRIR UBA7 PSMB8 APOL6 CCDC64B KIR2DL4 FXYD3 HLA-G PEG10 USP30-AS1 PSMB8-AS1 TRBV9 AGR2 AC002331.1 TRGV10 ELF3 RTP4 PRR9 HLA-F PSME2 REC8 CTSS HLA-E | Average mean |
| Angiogenesis | 29867230 | Clinical activity and molecular correlates of response to atezolizumab alone or in combination with bevacizumab versus sunitinib in renal cell carcinoma. | VEGFA KDR ESM1 PECAM1 ANGPTL4 CD34 | Average mean |
| Teffector | 29867230 | Clinical activity and molecular correlates of response to atezolizumab alone or in combination with bevacizumab versus sunitinib in renal cell carcinoma. | CD8A EOMES PRF1 IFNG CD274 | Average mean |
| Myeloid\_inflammatory | 29867230 | Clinical activity and molecular correlates of response to atezolizumab alone or in combination with bevacizumab versus sunitinib in renal cell carcinoma. | IL-6 CXCL1 CXCL2 CXCL3 CXCL8 PTGS2 | Average mean |
| IFNG\_Sig | 29150430 | Interferon-γ Signaling in Melanocytes and Melanoma Cells Regulates Expression of CTLA-4. | CTLA4 STAT1 IRF1 TAP2 GBP2 HLA-DRB5 | Average mean |
| TLS | 31942071 | Tertiary lymphoid structures improve immunotherapy and survival in melanoma. | CCL19 CCL21 CXCL13 CCR7 SELL LAMP3 CXCR4 CD86 BCL6 | Average mean |
| MSKCC | 34421886 | Predictive Value of the TP53/PIK3CA/ATM Mutation Classifier for Patients With Bladder Cancer Responding to Immune Checkpoint Inhibitor Therapy. | TP53 PIK3CA ATM | Weighted mean |
| LMRGPI | 35582412 | Lipid metabolism-related gene prognostic index (LMRGPI) reveals distinct prognosis and treatment patterns for patients with early-stage pulmonary adenocarcinoma. | ANGPTL4 NPAS2 SLCO1B3 ACOXL ALOX15 B3GALNT1 | Weighted mean |
| PRS | 35085103 | A novel pyroptosis-related signature predicts prognosis and response to treatment in breast carcinoma. | NLRC4 IRF3 ANO6 GSDMC TP53 FGF21 IL36B DHX9 FOXO3 IL36G IL18 GJA1 MST1 GZMB GBP1 | Weighted mean |
| Stemnesssignatures | 35681225 | Characterization of stem cell landscape and identification of stemness-relevant prognostic gene signature to aid immunotherapy in colorectal cancer. | COLEC12 EFEMP2 STON1 TCEAL7 C14orf132 | Weighted mean |
| GRIP | 35492358 | A Novel Pyroptotic and Inflammatory Gene Signature Predicts the Prognosis of Cutaneous Melanoma and the Effect of Anticancer Therapies. | EMP3 TLR1 IFNGR2 IL15 CCL8 NLRP6 CCL25 RTP4 | Weighted mean |
| IPS | 32572951 | Systematic identification, development, and validation of prognostic biomarkers involving the tumor-immune microenvironment for glioblastoma. | CD1D PTX3 RAC2 ESM1 MDK TNFSF14 IL2RB OSMR | Weighted mean |
| Tcell\_inflamed\_GEP | 30309915 | Pan-tumor genomic biomarkers for PD-1 checkpoint blockade-based immunotherapy. | CCL5 CD27 CD274 CD276 CD8A CMKLR1 CXCL9 CXCR6 HLA.DQA1 HLA.DRB1 HLA.E IDO1 LAG3 NKG7 PDCD1LG2 PSMB10 STAT1 TIGIT | Weighted mean |
| DDR | 29443960 | TGFβ attenuates tumour response to PD-L1 blockade by contributing to exclusion of T cells. Nature. 2018 Feb 22;554(7693):544-548. doi: 10.1038/nature25501. Epub 2018 Feb 14. PMID: 2944396 | UNG SMUG1 MBD4 OGG1 MUTYH NTHL1 MPG NEIL1 NEIL2 NEIL3 APEX1 APEX2 LIG3 XRCC1 PNKP APLF PARP1 PARP2 PARP3 MGMT ALKBH2 ALKBH3 TDP1 TDP2 MSH2 MSH3 MSH6 MLH1 PMS2 MSH4 MSH5 MLH3 PMS1 XPC RAD23B CETN2 RAD23A XPA DDB1 DDB2 RPA1 RPA2 RPA3 ERCC3 ERCC2 GTF2H1 GTF2H2 GTF2H3 GTF2H4 GTF2H5 CDK7 CCNH MT1 ERCC5 ERCC1 ERCC4 LIG1 ERCC8 ERCC6 UVSSA XAB2 MMS19 RAD51 RAD51B RAD51D DMC1 XRCC2 XRCC3 RAD52 RAD54L RAD54B BRCA1 SHFM1 RAD50 MRE11A NBN RBBP8 MUS81 EME1 EME2 GEN1 FANCA FANCB FANCC BRCA2 FANCD2 FANCE FANCF FANCG FANCI BRIP1 FANCL FANCM PALB2 RAD51C XRCC6 XRCC5 PRKDC LIG4 XRCC4 DCLRE1C NHEJ1 NUDT1 DUT RRM2B POLB POLG POLD1 POLE PC REV3L MAD2L2 POLH POLI POLQ POLK POLL POLM POLN FEN1 FAN1 TREX1 EXO1 APTX ENDOV UBE2A UBE2B RAD18 SHPRH HLTF RNF168 SPRTN RNF8 RNF4 UBE2V2 UBE2N H2AFX CHAF1A SETMAR BLM WRN RECQL4 ATM DCLRE1A DCLRE1B RPA4 PRPF19 RECQL RECQL5 HELQ RDM1 ATR ATRIP MDC1 RAD1 RAD9A HUS1 RAD17 CHEK1 CHEK2 TP53 TP53BP1 RIF1 TOPBP1 CLK2 PER1 | Z-score;PCA |
| CD8Teffector | 29443960 | TGFβ attenuates tumour response to PD-L1 blockade by contributing to exclusion of T cells. | CD8A GZMA GZMB IFNG CXCL9 CXCL10 PRF1 TBX21 | Z-score;PCA |
| CellCycleReg | 29443960 | TGFβ attenuates tumour response to PD-L1 blockade by contributing to exclusion of T cells. | ATM CDKN1A CDKN2A MDM2 TP53 CCND1 RB1 CCNE1 FBXW7 E2F3 | Z-score;PCA |
| PanFTBRs | 29443960 | TGFβ attenuates tumour response to PD-L1 blockade by contributing to exclusion of T cells. | ACTA2 ACTG2 ADAM12 ADAM19 CNN1 COL4A1 CTGF CTPS1 FAM101B FSTL3 HSPB1 IGFBP3 PXDC1 SEMA7A SH3PXD2A TAGLN TGFBI TNS1 TPM1 | Z-score;PCA |
| EMT1 | 29443960 | TGFβ attenuates tumour response to PD-L1 blockade by contributing to exclusion of T cells. | CLDN3 CLDN7 CLDN4 CDH1 VIM TWIST1 ZEB1 ZEB2 | Z-score;PCA |
| EMT2 | 29443960 | TGFβ attenuates tumour response to PD-L1 blockade by contributing to exclusion of T cells. | AXL ROR2 WNT5A LOXL2 TWIST2 TAGLN FAP | Z-score;PCA |
| EMT3 | 29443960 | TGFβ attenuates tumour response to PD-L1 blockade by contributing to exclusion of T cells. | SOX9 TWIST1 FOXF1 ZEB1 ZEB2 GATA6 | Z-score;PCA |