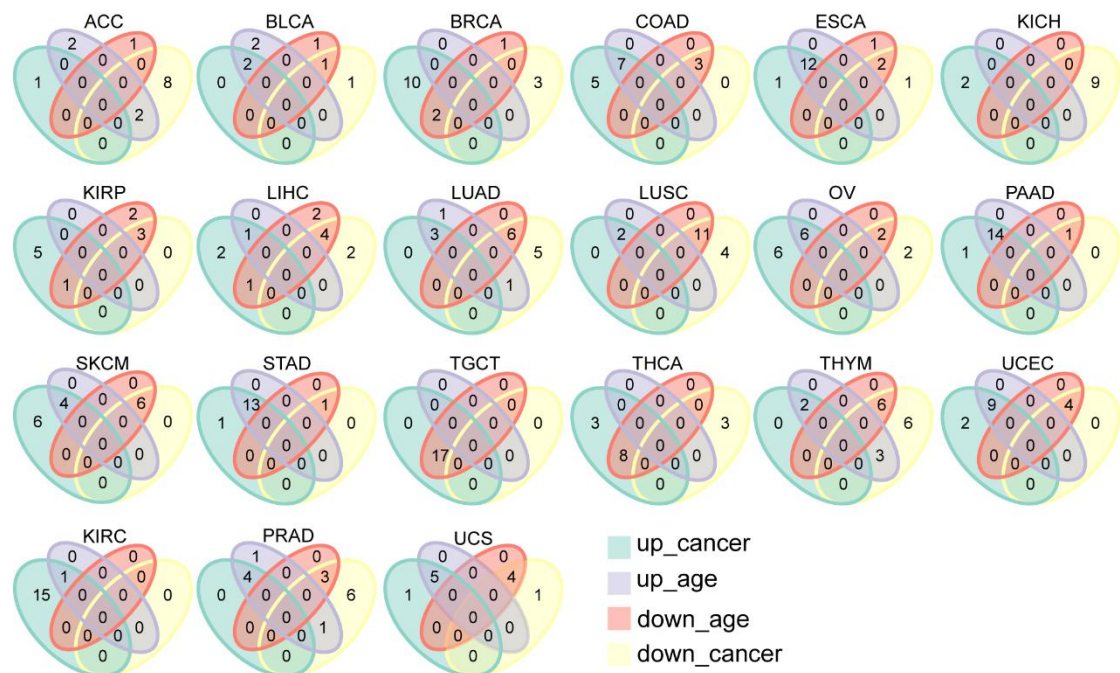
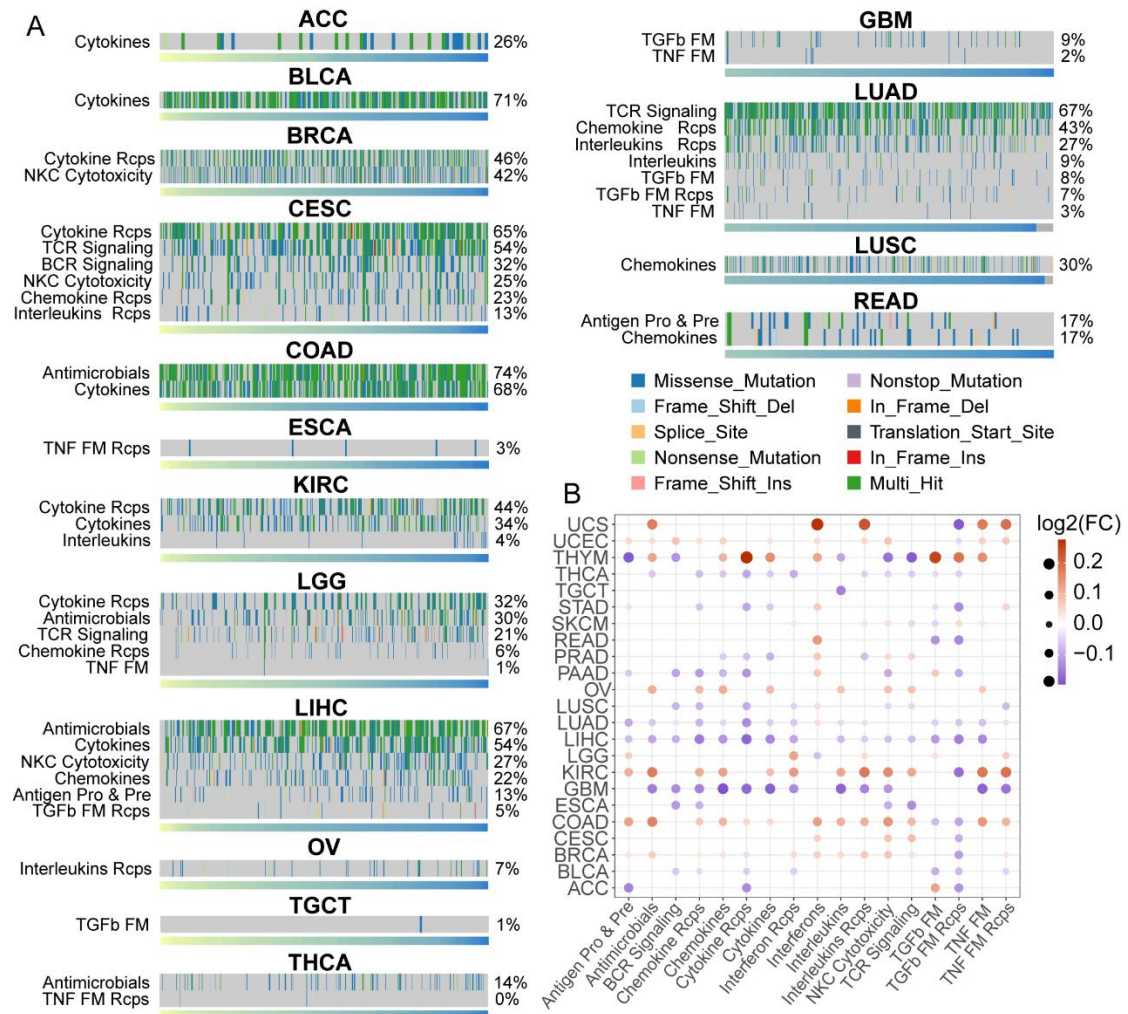


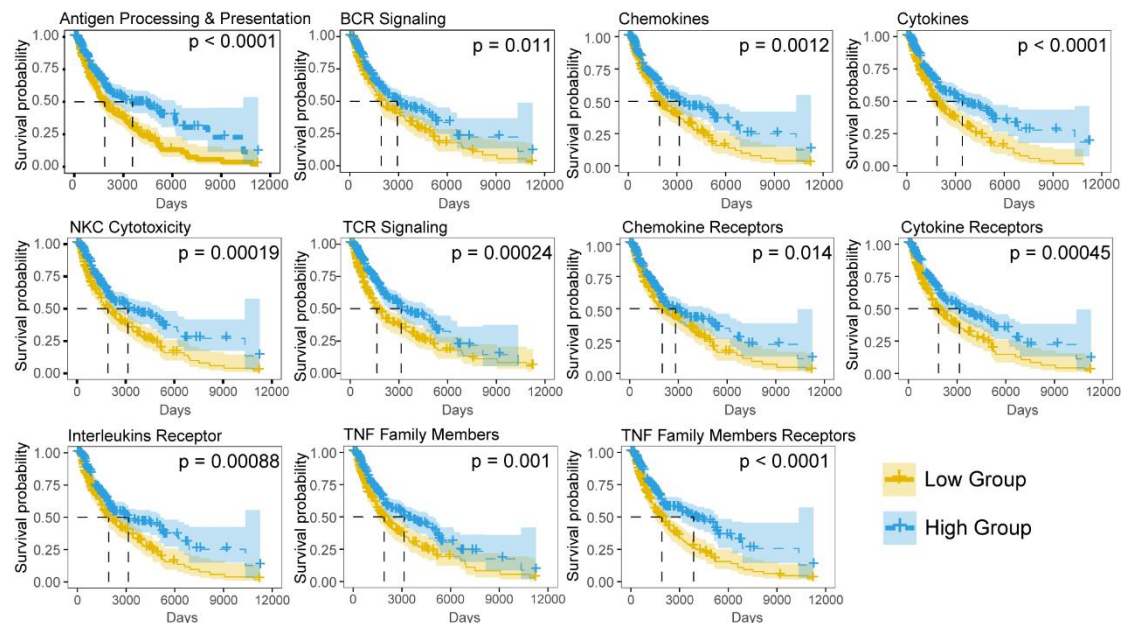
Supplementary Figure S1. Normalized IRP scores across 25 cancer types.



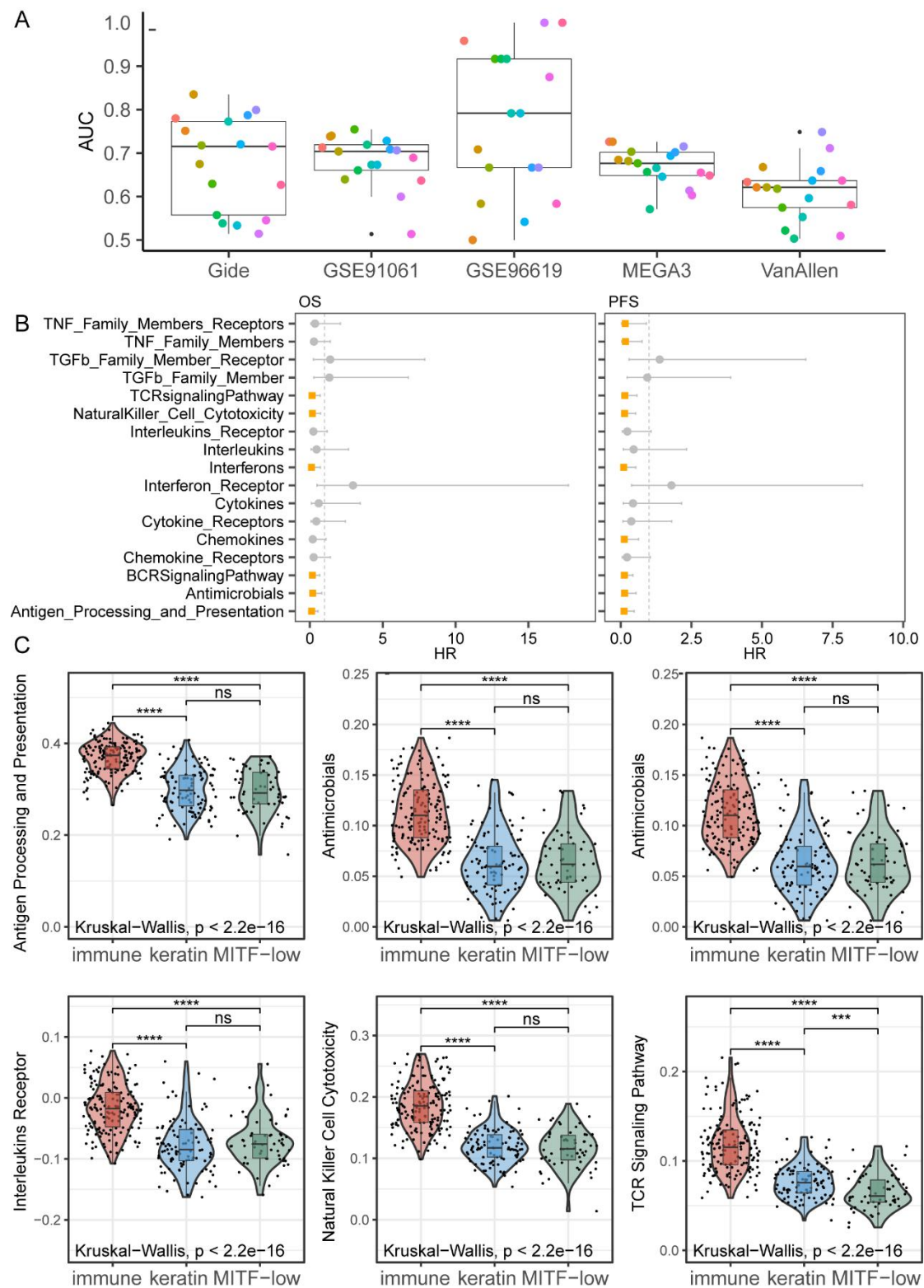
Supplementary Figure S2. Venn diagrams showing the overlap between dysregulated tumor- and age- IRPs.



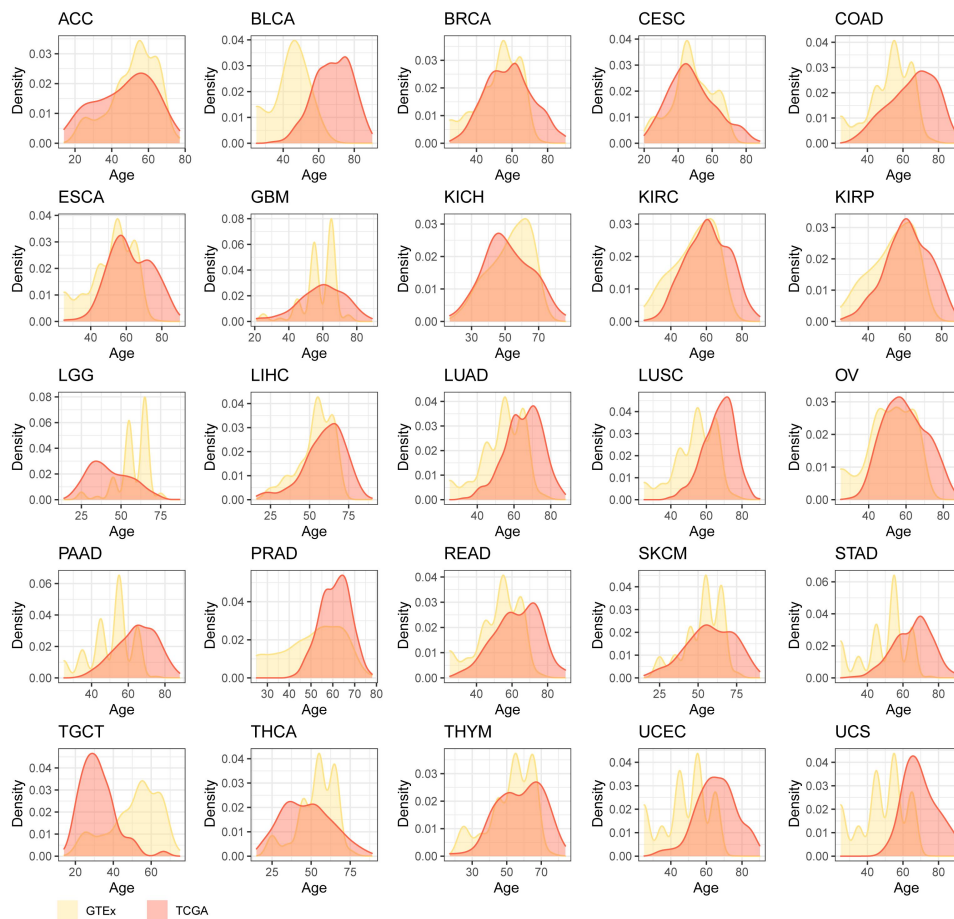
Supplementary Figure S3. A Oncoplot of IRPs in different cancers. **B** Dotplot of associations between IRP scores and mutations in IRPs across various cancers.



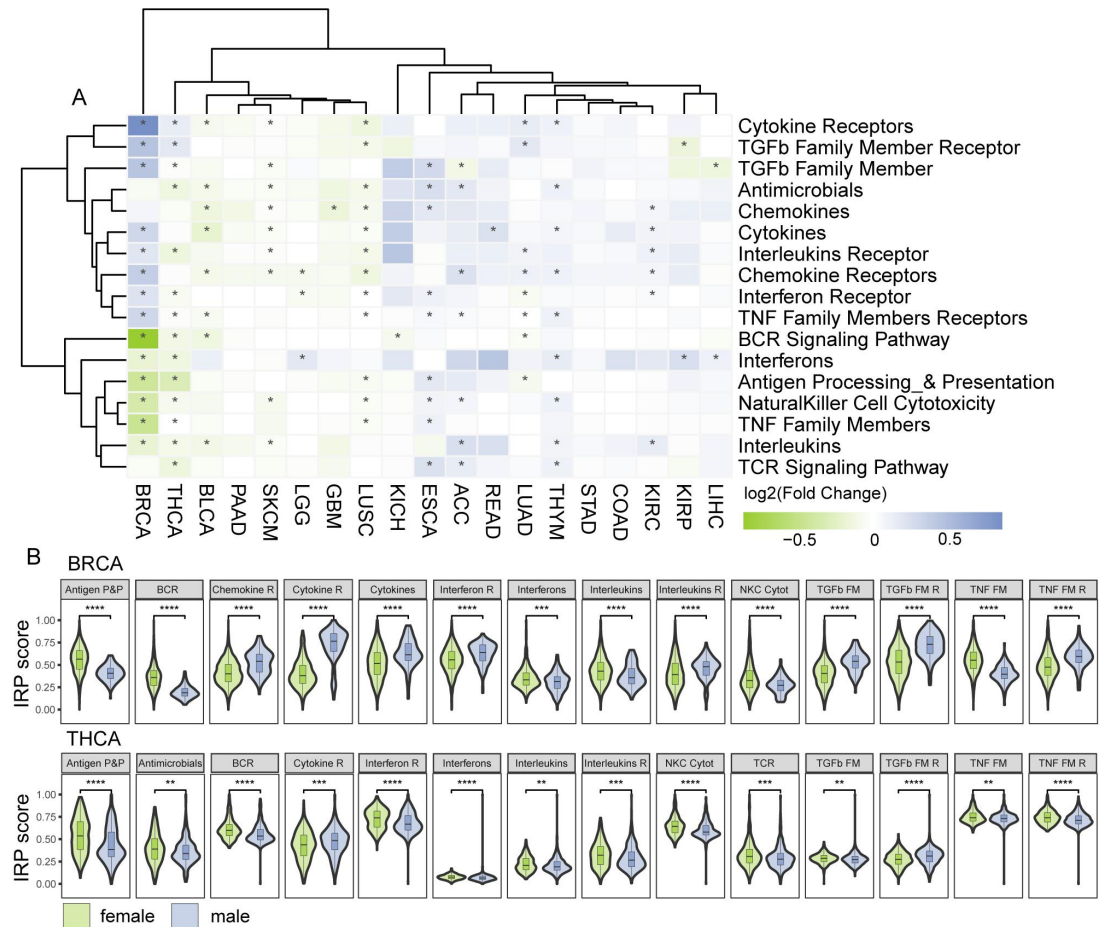
Supplementary Figure S4. KM curves of IRPs in SKCM.



Supplementary Figure S5. **A** Boxplots of the area under the ROC curve (AUCs) in 5 cohorts. **B** Forest plot showing the results of Univariate Cox regression of OS and PFS in Gide cohort. Rectangle dots represent hazard ratio (HR) and the error bars show the 95% confidence intervals of the HR. Orange denotes statistically significant. **C** IRP scores among three SKCM phenotype.



Supplementary Figure S6. Age distribution of samples from TCGA and GTEx samples.



Supplementary Figure S7. Gender-related differences of IRPs. A Heatmap showing IRP expression level dysregulated in different gender groups across 19 cancer types (Only cancer patients with more than one gender). '*' denotes a significant dysregulation. B Boxplot showing the IRP differences between males and females in BRCA and THCA (wilcox.test $p < 0.05$).