

Supplementary Figures

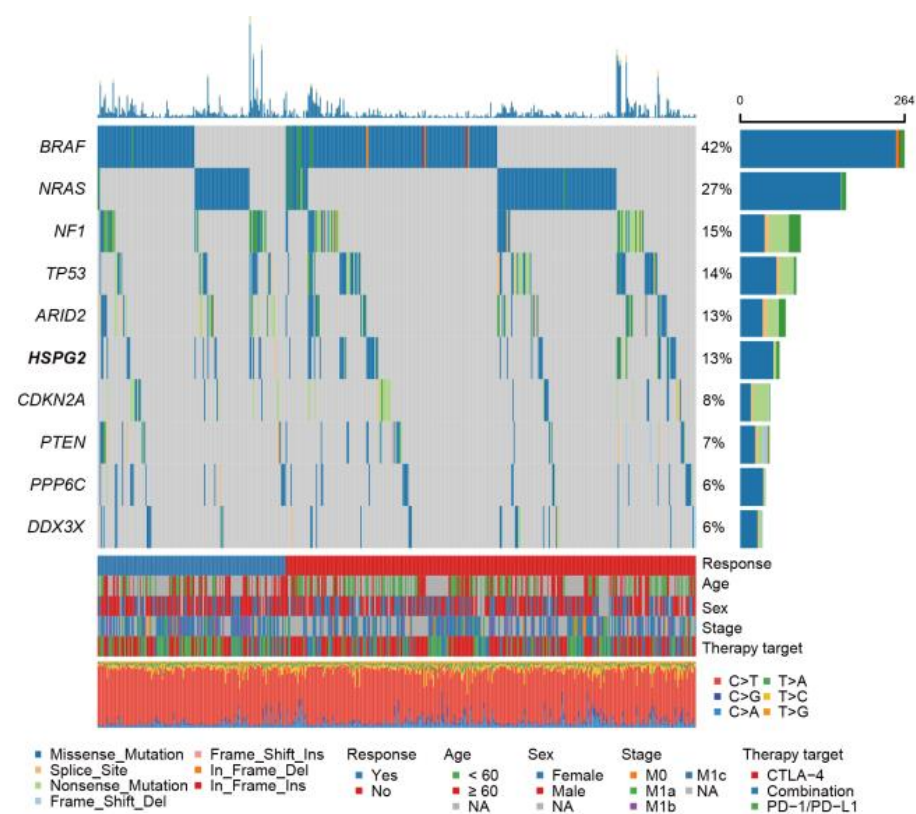


Figure S1. Mutational patterns of *HSPG2* and common melanoma driver genes illustrated with waterfall plot.

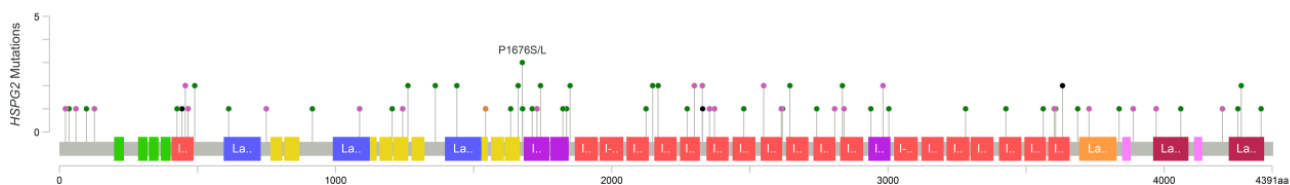


Figure S2. Detailed amino acid changes induced by *HSPG2* mutations in the integrated melanoma cohort.

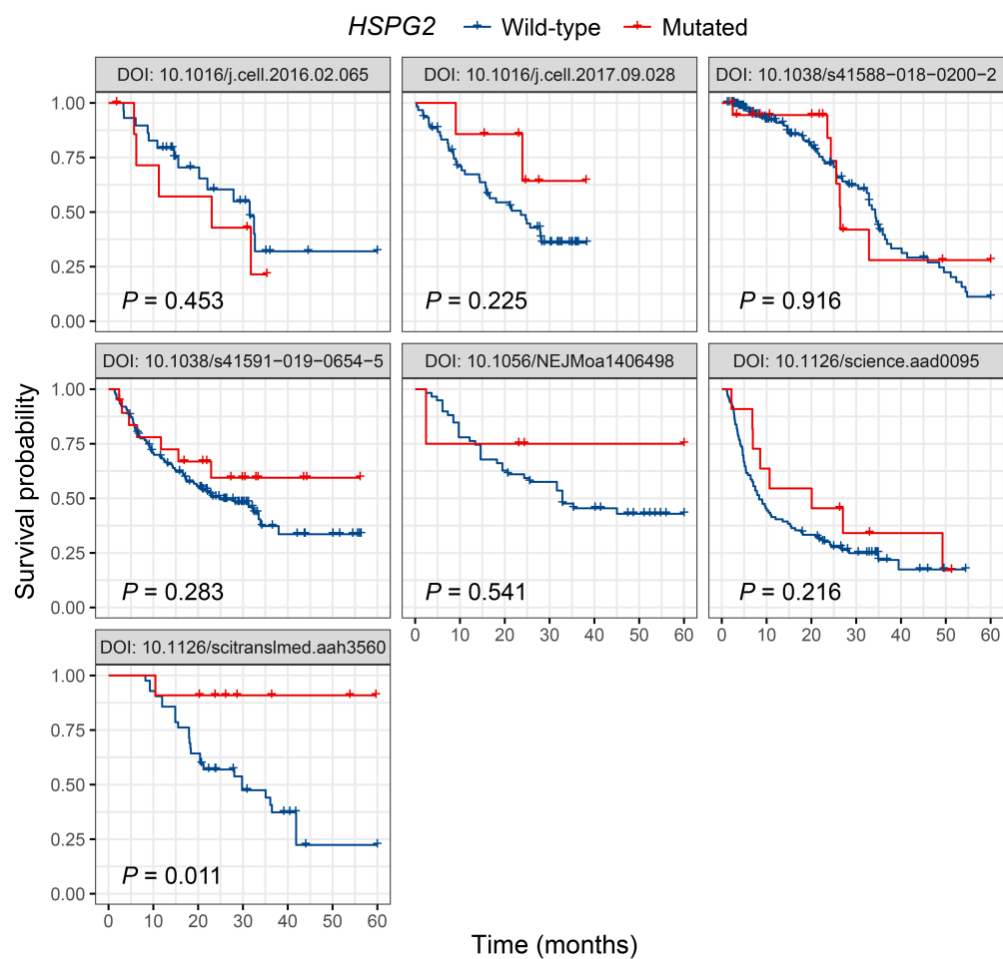


Figure S3. Kaplan-Meier survival analyses of *HSPG2* mutations in individual ICI-treated melanoma cohorts.

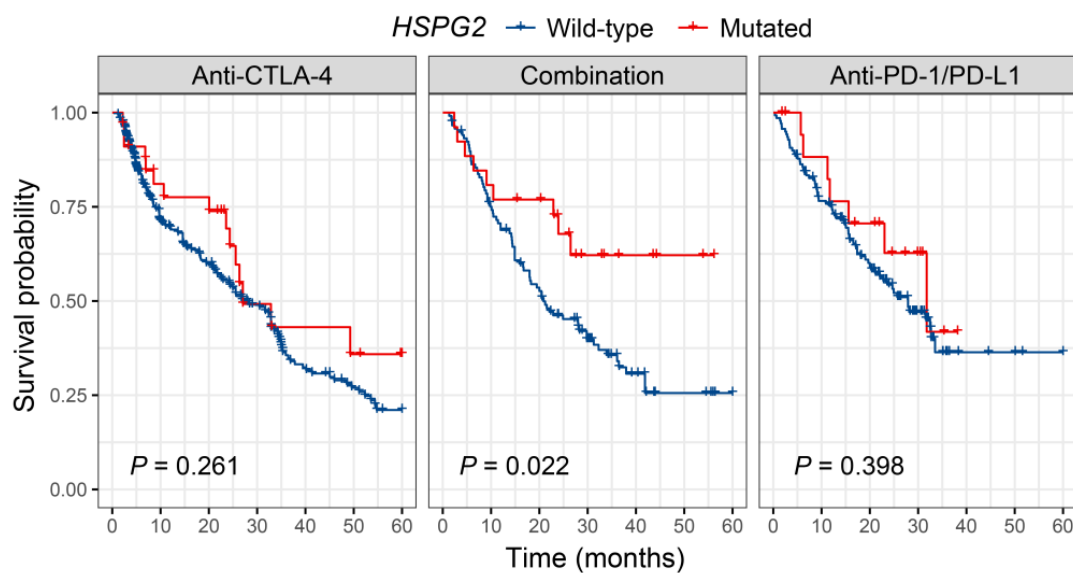


Figure S4. Kaplan-Meier survival analyses of *HSPG2* mutations in distinct ICI treatment types in melanoma.

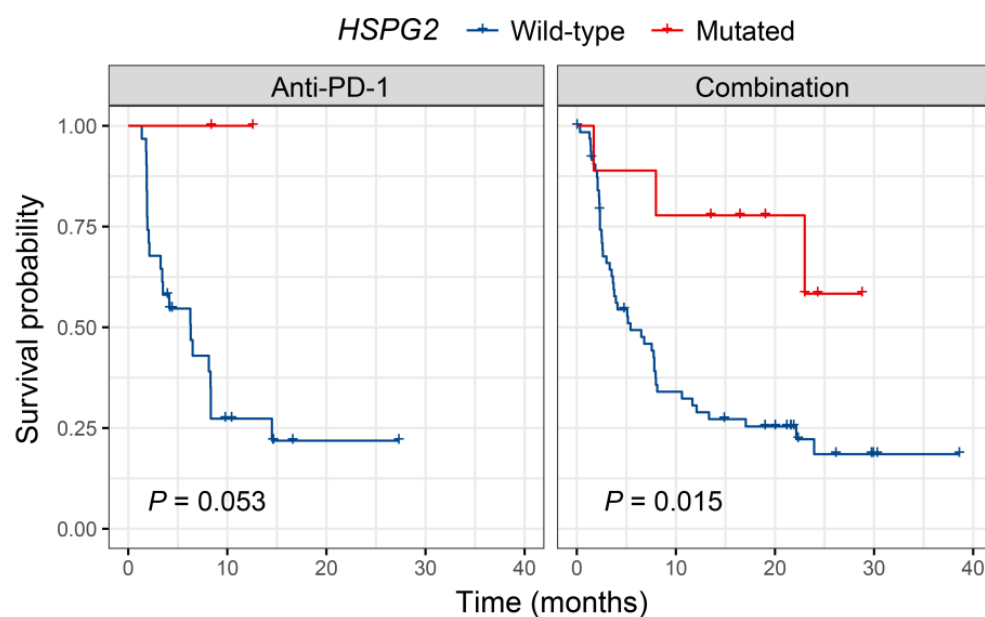


Figure S5. Kaplan-Meier survival analyses of *HSPG2* mutations in individual ICI-treated NSCLC cohorts.

<i>HSPG2</i> mutated pathways	Gene ranks	NES	FDR
HALLMARK_G2M_CHECKPOINT		2.19	8.5e-04
HALLMARK_E2F_TARGETS		2.29	8.5e-04
HALLMARK_MITOTIC_SPINDLE		2.04	8.5e-04
HALLMARK_MYC_TARGETS_V1		1.81	8.5e-04
HALLMARK_INTERFERON_GAMMA_RESPONSE		1.72	8.5e-04
HALLMARK_INTERFERON_ALPHA_RESPONSE		2.07	8.5e-04
HALLMARK_DNA_REPAIR		1.48	1.3e-02
HALLMARK_UNFOLDED_PROTEIN_RESPONSE		1.52	1.3e-02
HALLMARK_MTORC1_SIGNALING		1.42	1.5e-02
HALLMARK_TNFA_SIGNALING_VIA_NFKB		1.41	1.5e-02
HALLMARK_PI3K_AKT_MTOR_SIGNALING		1.51	1.5e-02
HALLMARK_ANDROGEN_RESPONSE		1.46	3.0e-02
HALLMARK_ALLOGRAFT_REJECTION		1.36	3.0e-02
HALLMARK_SPERMATOGENESIS		1.37	5.1e-02
HALLMARK_MYC_TARGETS_V2		1.46	5.4e-02
HALLMARK_CHOLESTEROL_HOMEOSTASIS		1.41	6.8e-02
HALLMARK_PROTEIN_SECRETION		1.36	7.9e-02
HALLMARK_COMPLEMENT		1.25	1.2e-01
HALLMARK_UV_RESPONSE_DN		1.28	1.2e-01
HALLMARK_HYPOXIA		1.25	1.2e-01
HALLMARK_ANGIOGENESIS		-1.89	1.6e-02

Figure S6. Significantly enriched signaling pathways in *HSPG2* mutated subgroups in melanoma. Immune response pathways were highlighted with green.

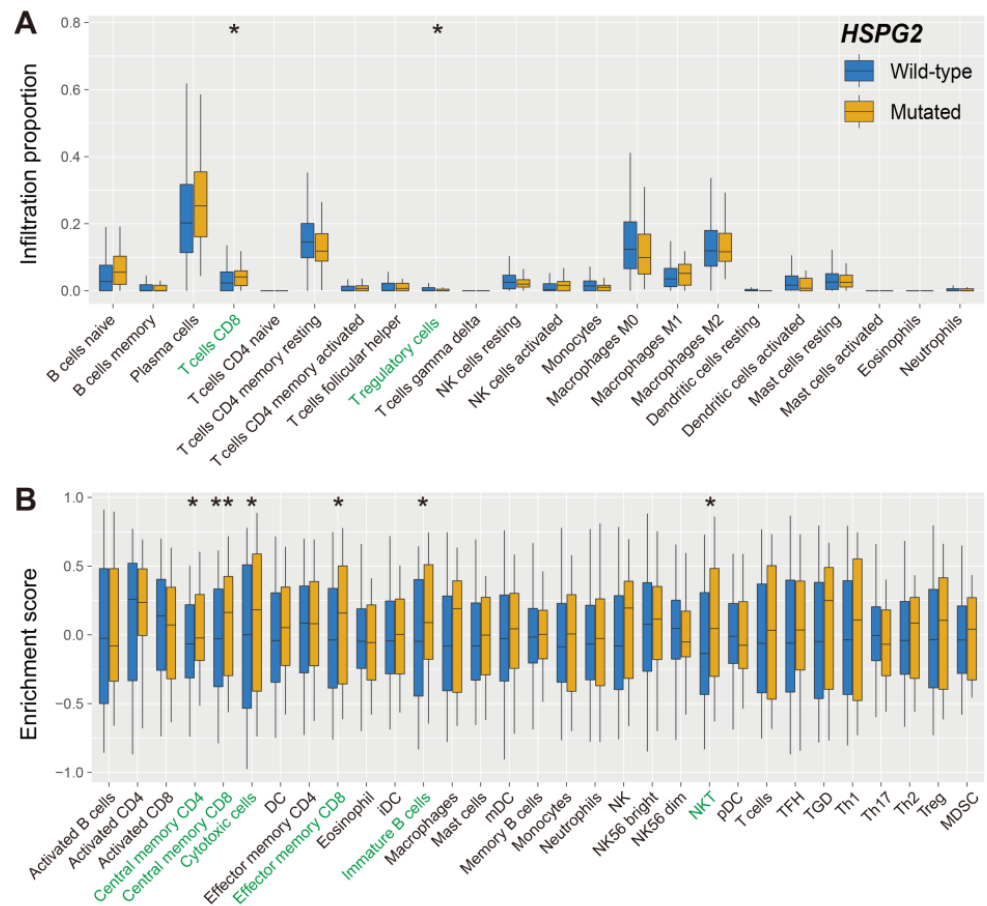


Figure S7. Immune infiltration associated with *HSPG2* mutations in NSCLC. (A) Distinct infiltration of 22 immunocytes of *HSPG2* mutated and wild-type groups evaluated with CIBERSORT algorithm. Immunocytes highlighted with green are significantly differentially infiltrated. (B) Distinct infiltration of 31 immunocytes of *HSPG2* two groups evaluated with Angelo *et al.* method.

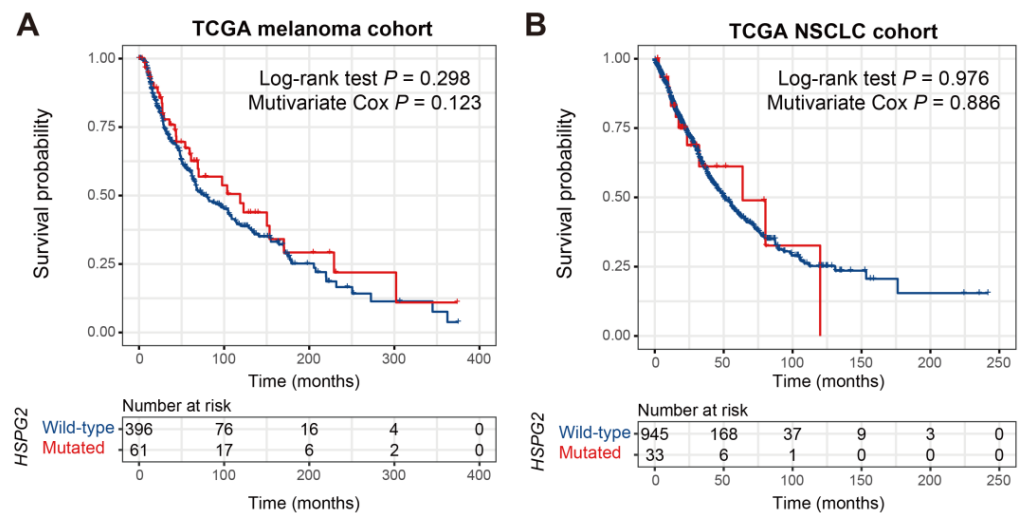


Figure S8. Prognostic capacities of *HSPG2* mutations in (A) melanoma and (B) NSCLC patients derived from the TCGA project.