Supplementary Figures

Figure S1. Associations between *ARID1A* mutations and tumor immune signatures in the MSI-L/MSS subtype of GI cancers. A. The associations between *ARID1A* mutations and tumor immune signatures are significantly weaker in the MSI-L/MSS subtype than in all GI cancers in STAD-2 and COAD. *P***:** Mann-Whitney U test *P* value**. B.** Immune signatures shows significantly higher enrichment levels in *ARID1A*-mutated STAD-1 than in *ARID1A*-wildtype STAD-1 within the MSS subtype (Mann-Whitney U test, $P<0.05$). MSI-L: microsatellite instability low. MSS: microsatellite stable. STAD-1: the gastric cancer genomics dataset from the Asian Cancer Research Group (ACRG) [24]. STAD-2: the gastric cancer genomics dataset from *The Cancer Genome Atlas* (*TCGA*) [25]. COAD: the colon cancer genomics dataset from *TCGA* [26].

Figure S2. Associations between *ARID1A* mutations and overall survival (OS) in individual cancer types in Samstein cohort [31]. Kaplan-Meier survival curves show that *ARID1A* mutations are associated with a better OS in head and neck cancer (log-rank test, $P=0.01$) and are associated with more favorable OS trends in melanoma, lung cancer, breast cancer, esophagogastric cancer, and colorectal cancer (log-rank test, $P<0.25$).

Supplementary Table

Table S1. The gene sets that represent different immune signatures.