

## **Description of Additional Supplementary Files**

**Supplementary Data 1:** Clinical characteristics in this study.

**Supplementary Data 2:** Quality control of the WES, WGS and RNA-seq in this study.

**Supplementary Data 3:** The annotation of somatic coding mutations (SNVs and indels) in GISTs.

**Supplementary Data 4:** The results of MutSig2CV in GISTs.

**Supplementary Data 5:** Clinicopathologic classification and *YLPM1* status in GISTs.

**Supplementary Data 6:** Methylated CpG sites within the *YLPM1* promoter region in GISTs.

**Supplementary Data 7:** Decomposition of de novo CNV signatures to reference signatures in GISTs.

**Supplementary Data 8:** Analysis of chromosome arm level CNVs and their correlation with risk.

**Supplementary Data 9:** The results of focal CNVs and the genes selected for correlation analysis between copy number alterations (CN) and gene expression (GE).

**Supplementary Data 10:** Breakpoint information of structural variations (SVs) and a statistical compilation of genes impacted by SVs.

**Supplementary Data 11:** The characteristics of chromothripsis in GIST WGS Cohort.

**Supplementary Data 12:** Gene set enrichment analysis in each molecular subtype using GSEA with Hallmark gene sets obtained from MSigDB.

**Supplementary Data 13:** The list of primer sequences used in this study.

**Supplementary Data 14:** The characteristics of gene fusions in GISTs.