

Description of Additional Supplementary Data provided as separate sheets in the Karttunen\_Patel\_et\_al\_Supplementary\_Data\_NCOMMS-22-52907B.xlsx document:

**Supplementary Data 1:** GP5d wild type non-methylated, methylated and GP5d non-methylated p53-KO STARR-seq peaks in MACS2 narrowpeak format, hg38 genome annotation, last column is the assigned cluster for each peak.

**Supplementary Data 2:** HepG2 non-methylated and methylated STARR-seq peaks in MACS2 narrowpeak format, hg38 genome annotation, last column is the assigned cluster for each peak.

**Supplementary Data 3:** RPE1 non-methylated STARR-seq peaks in MACS2 narrowpeak format, hg38 genome annotation, last column is the assigned cluster for each peak.

**Supplementary Data 4:** Results of the STARR-seq peak summit overlap analysis for TEs in GP5d, HepG2 and RPE1.

**Supplementary Data 5:** Full results of the TF motif analysis in all significant common and differentially enriched TE subfamilies in GP5d and HepG2 that overlapped a STARR-seq peak.

**Supplementary Data 6:** Predicted enhancer-gene contacts in GP5d from the ABC model. Subset of predicted contacts with overlapping STARR-seq peak summits and including overlapping TEs.

**Supplementary Data 7:** Read counts, mapping, and peak calling statistics for all STARR-seq datasets.

**Supplementary Data 8:** List of data used (generated in this study as well as publicly available) and annotations in the study, including publications and accessions for GEO/ENCODE.

**Supplementary Data 9:** List of guide-RNAs and primers used in this study.