

## Description of Additional Supplementary Files

**Supplementary Data 1.** Exome sequencing results. Columns contain genomic position of mutations, reference and alternate alleles, consequence for protein sequence, gene biotype, and allele frequencies in their respective patients' cancer (af\_tumor) and healthy (af\_normal) exomes. Patients are separated by tab.

**Supplementary Data 2.** Genes with significant (false discovery rate  $<0.001$ ) overexpression in the various cell populations. For DE testing, MAST with library quality and patient as covariates was used.

**Supplementary Data 3.** Results from differential expression test underlying figures 3g, 5b, 5e.

**Supplementary Data 4.** Primers used for targeting genes of interest with MutaSeq.

**Supplementary Data 5.** Maximum likelihood trees obtained from different parameter setting of the PhISCS model. See also methods, section Construction of clonal hierarchies. PhISCS model parameters (gene-specific allelic dropout rates) were sampled using a latin hypercube and the maximum likelihood tree was computed. Zip file contains tree structures from 80 sampling runs as png files, as well as a pdf file displaying the parameter distributions.