



**Supplementary Figure S1. Optimization and validation of the techniques used.** **A**, Representative example of PTEN immunohistochemistry of ventral prostate of *Pten*<sup>loxP/loxP</sup>;Pb-Cre4 male mice. PTEN negative prostate epithelium (Epi) and PTEN negative stroma are indicated. **B**, Representative examples of PTEN and p53 immunohistochemistry of sections from MCF7 (*PTEN* and *TP53* wild type) and MDA-MB-468 (*PTEN* null and *TP53* mutant) breast cancer cell line-derived xenografts. The PTEN antibody used also recognizes the mouse protein, thus, the PTEN staining observed in MDA-MB-468 *PTEN* null xenograft is in mouse stromal cells. **C**, Representative examples of double-immunohistochemistry and immunoFISH of sections from MDA-MB-468 (*PTEN* null, *TP53* mutant, and *BRCA1* wild type) breast cancer cell line-derived xenografts. Slides were counter-stained with methyl green to visualize nuclei (green). Asterisk marks PTEN negative human breast cancer cells. **D**, Graph correlating the predicted percentage of cells with BRCA1 LOH (based on iFISH) and the true percentage of cells with BRCA1 LOH in sections derived from the indicated % mixtures of cell lines with wild type or mutant BRCA1 cells. **E**, Graph depicting correlation between % BRCA1 LOH defined based on FISH or PCR.