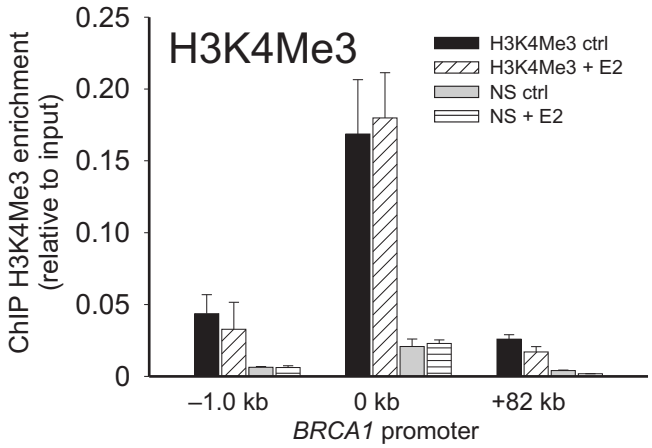

Figure S1. Estrogen promotes entry of MCF-7 into the cell cycle but does not significantly change activation-associated promoter proximal H3K4Me3 marks at the *BRCA1* promoter. ChIP profile of histone H3 lysine 4 trimethylation (H3K4Me3) at the *BRCA1* proximal promoter before and after treatment with estradiol (E2).

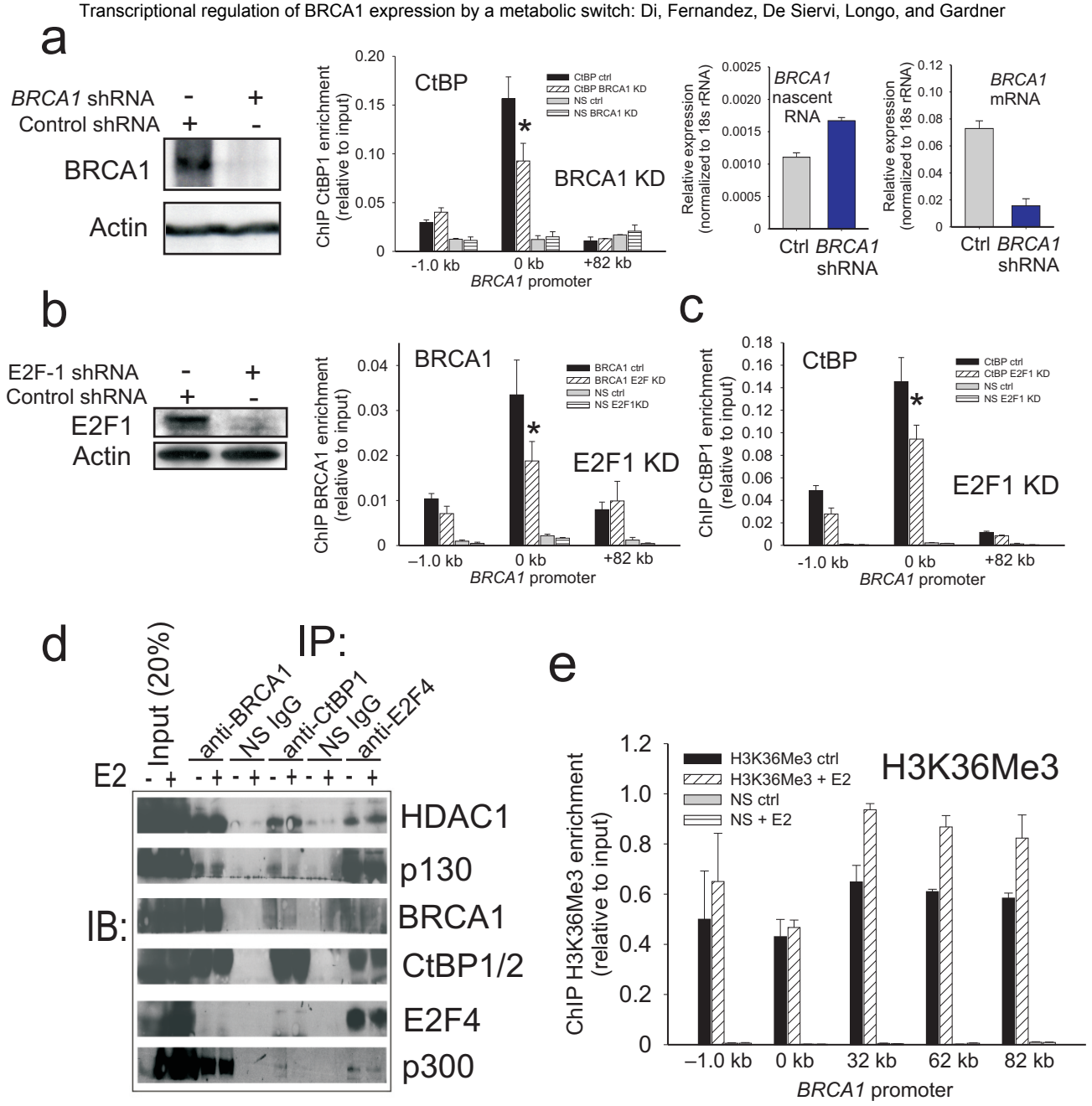

Figure S2. Components of the negative regulatory complex assemble at the *BRCA1* promoter through inter-dependent interactions to repress *BRCA1* transcription. (**a**) (left) Immunoblot showing BRCA1 depletion in HEK293 cells. (center) CtBP ChIP at the *BRCA1* promoter following BRCA1 RNAi depletion. (right) Expression of nascent (unspliced) versus mature (mRNA) message following BRCA1 RNAi depletion. Note that mature *BRCA1* mRNA is repressed while transcription of unspliced RNA is elevated. (**b**) (left panel) Immunoblot demonstrating depletion of E2F1 in HEK293 cells. (Right) BRCA1 ChIP at the *BRCA1* promoter following E2F1 RNAi depletion. (**c**) CtBP ChIP at the *BRCA1* promoter following E2F1 RNAi depletion. (**d**) Immunoprecipitation of HDAC1, p130, BRCA1, CtBP, E2F4 and p300 in nuclear extracts of MCF-7 cells using antibodies against, BRCA1, CtBP and E2F4 in the absence or presence of estradiol (E2). (**e**) ChIP profile of histone H3 lysine 36 trimethylation (H3K36Me3) at the *BRCA1* promoter All error bars indicate standard error of the mean from N=2 biological replicates. Asterisk (*) indicates p-value <0.05.

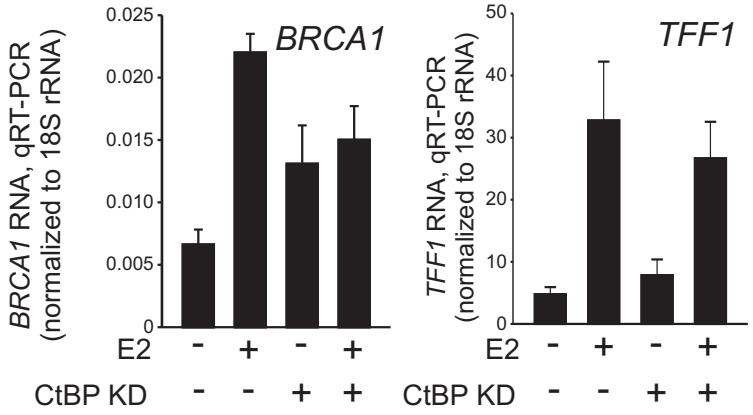

Figure S3. CtBP depletion renders MCF-7 cells estrogen unresponsive. Transfection of siRNA oligos either targeted to CtBP or control sequence were performed. After 24 h, either 95% (v/v) ethanol or 10nM E2 were added to the transfected cells. After another 24 h, cells were harvested for RNA assay. Plotted is the *BRCA1* expression or *TFF1* expression after normalization to 18s rRNA. Error bars represent standard error of the mean from N=2 biological replicates.

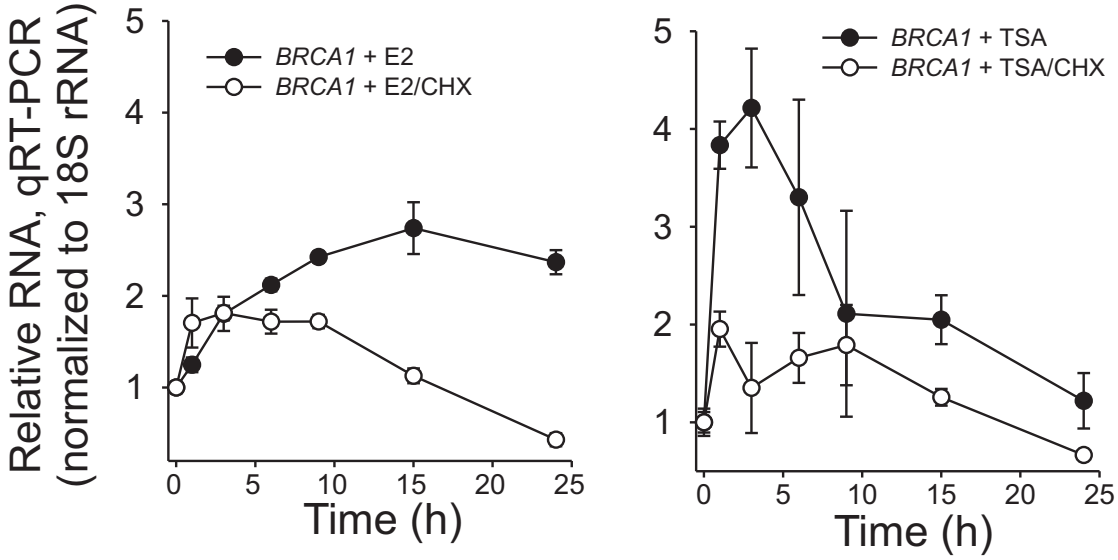

Figure S4. *BRCA1* induction by E2 and TSA requires protein synthesis. MCF-7 cells were treated with E2 (10 nM), E2 (10 nM) + cycloheximide (10 µg ml^{-1}), TSA (500 ng ml^{-1}), TSA (500 ng ml^{-1}) + cycloheximide (10 µg ml^{-1}) for 0, 1, 3, 6, 9, 15, 24 h respectively and the cells were harvested for RNA. The nascent *BRCA1* RNA is shown. Error bars represent standard error of the mean for N=2 independent biological replicates.

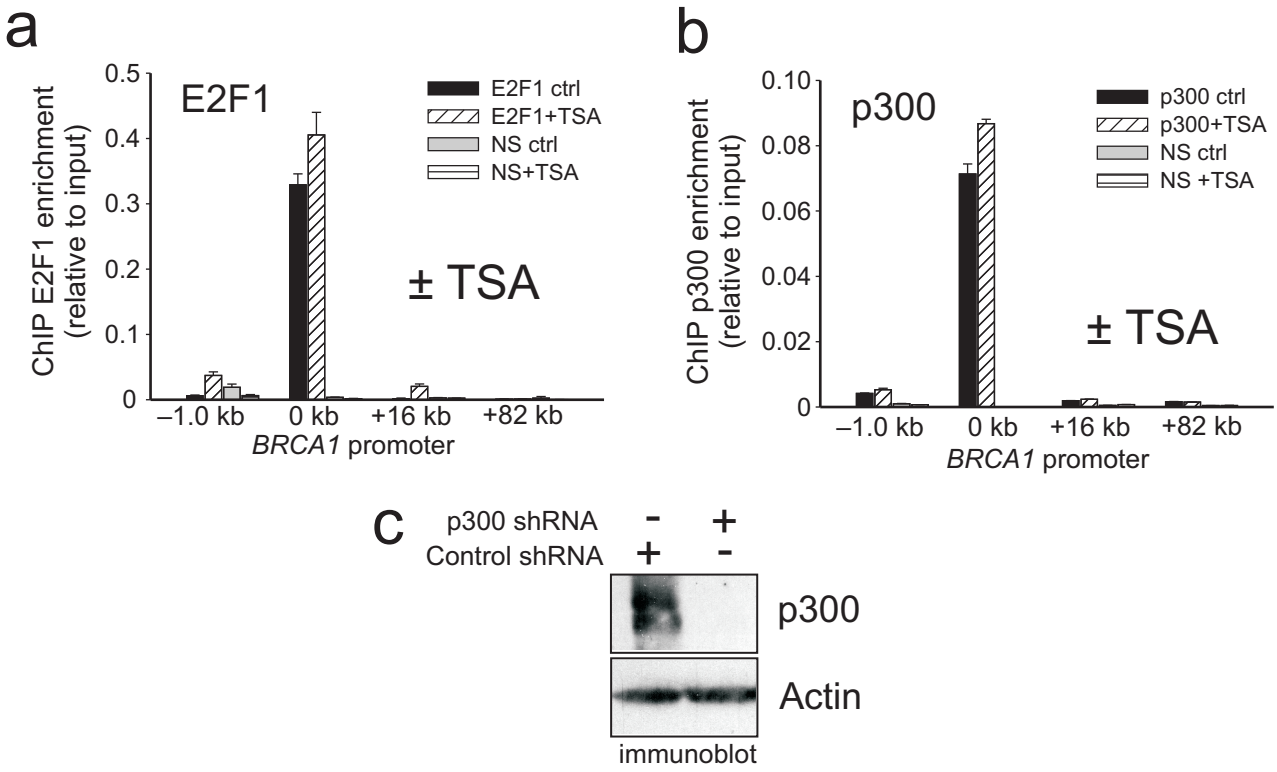

Figure S5. HDAC inhibition shows minimal influence on the assembly of E2F1 and p300 at the *BRCA1* promoter. Shown are the assembly profiles of (**a**) E2F1 and (**b**) p300 at the *BRCA1* promoter before and after HDAC inhibition by TSA. Error bars represent the standard error of the mean from N=2 independent biological replicates. (**c**) Immunoblot showing p300 depletion from HEK293 cells used in **Figure 5d**.

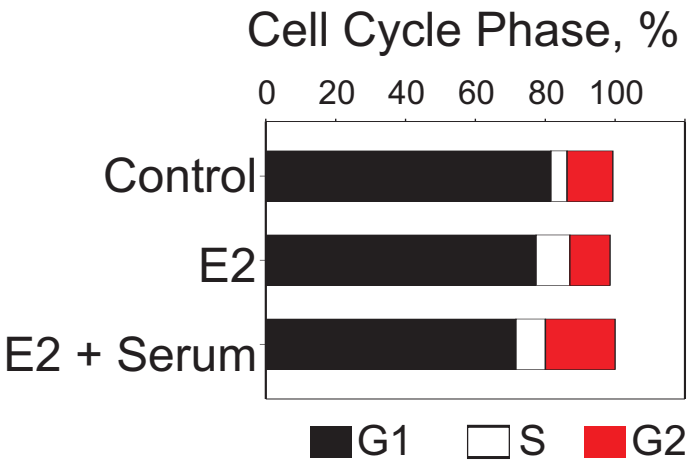

Figure S6. Estrogen stimulates cell cycle progression. Cycle profile from propidium iodide stained MCF-7 cells after serum starvation and treatment with either E2 (10 nM) or E2 plus 10% (v/v) serum for 24 h. Profile shows that E2 alone induces a significant increase in the percentage of cells entering S phase.

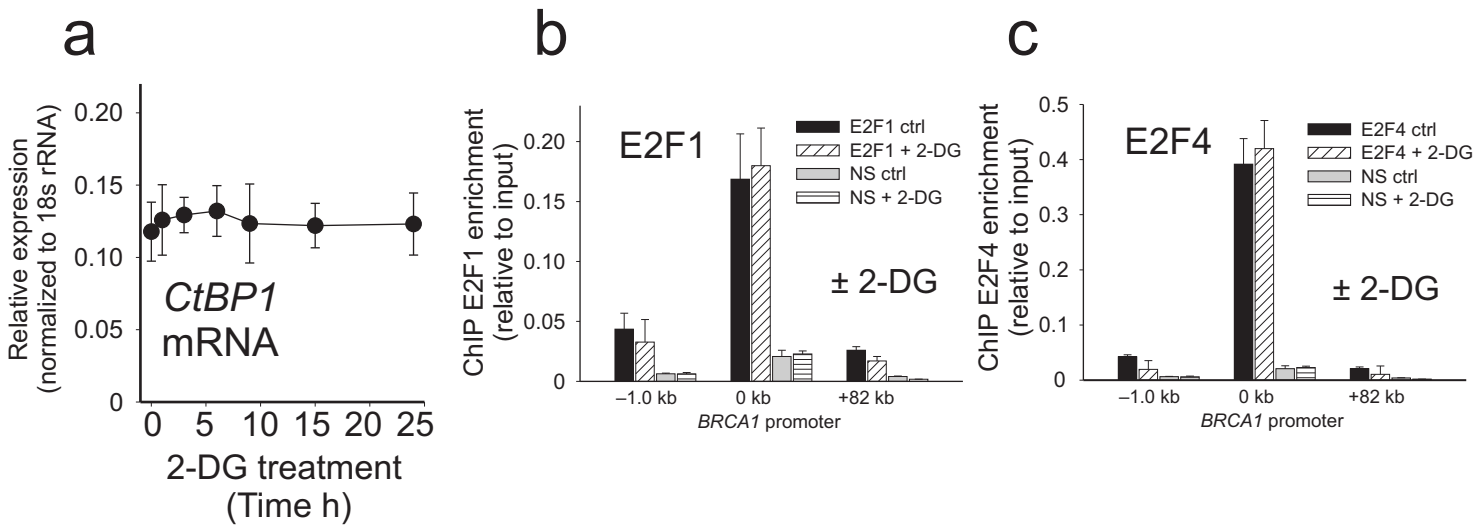

Figure S7. *CtBP1* RNA expression and E2F-1 and E2F-4 assembly at the *BRCA1* promoter remains relatively unchanged in MCF-7 cells following 2-DG treatment. (**a**) mRNA profile of *CtBP1* mRNA expression in MCF-7 cells at 0-24 h following treatment with 2-DG. (**b**) ChIP profile of E2F-1 assembly at the *BRCA1* promoter before and after 3 h treatment with 2-DG. (**c**) ChIP profile of E2F-4 assembly at the *BRCA1* promoter before and after 2-DG treatment. All error bars represent the standard error of the mean from N=2 independent biological measurements.

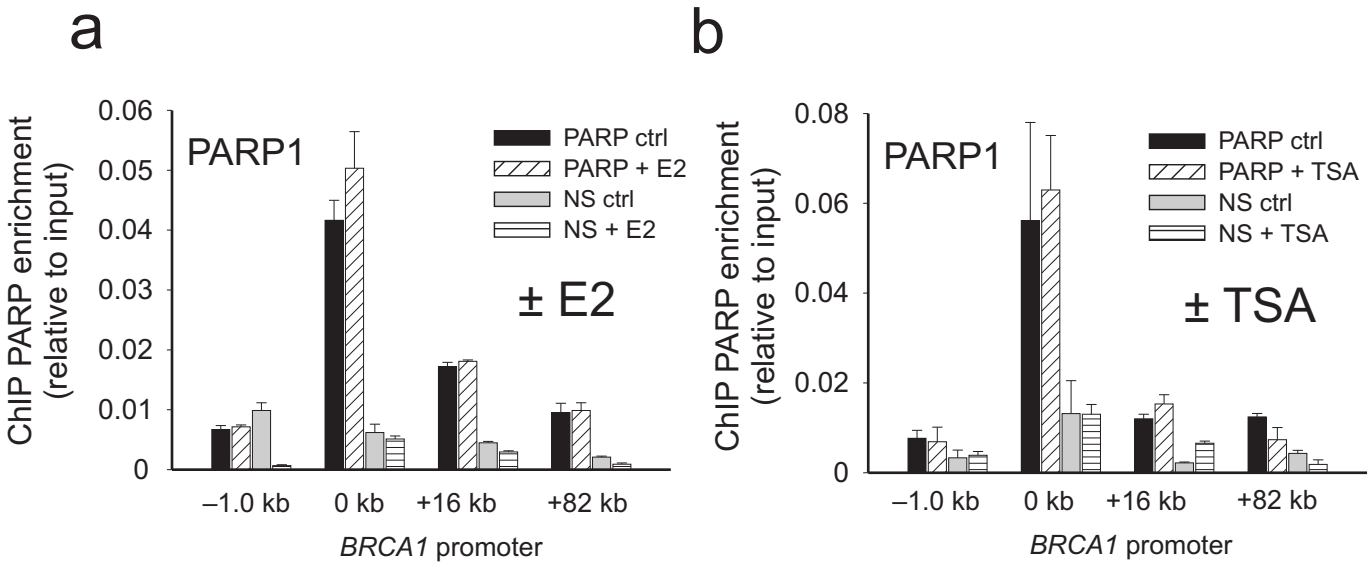

Figure S8. PARP1 is stably associated with the *BRCA1* proximal promoter independent of estrogen (E2) or TSA stimulation. (**a**) ChIP profile of PARP1 assembly at the *BRCA1* promoter before and after estrogen stimulation. (**b**) ChIP profile of PARP1 assembly at the *BRCA1* promoter before and after TSA treatment. All error bars represent standard error of the mean for N=2 biological replicates.

Supplementary Materials and Methods

Lentivirus mediated knockdown of p300, E2F1 and BRCA1 in HEK293 cells.

Briefly, 293LTV (Cell Biolabs, Inc) cells were co-transfected with packaged plasmid (RNAi expression vector), psPAX2 and pMD2G by Lipofectamine 2000 (Invitrogen) following the manufacturer's procedure. After 24 h, viral included medium was harvested and purified by centrifuge and filtration. The medium was used for transduce HEK293 (ATCC CRL-1573) cells after adding 8 μg ml^{-1} polybrene (Sigma). The viral production and cell transduction were repeated 3 times with 24 h interval. Then cells were maintained in regular medium and subjected to selection by 0.5 μg ml^{-1} puromycin for one week. Cells were sorted by FACSAria II(Becton Dickinson) based on the GFP signal and the top 1/3 cells with highest GFP signal were used for downstream experiments.

Immunoprecipitation assay

Cultured MCF-7 cells were trypsinized and harvested. The cell pellets were washed twice with PBS and once with Buffer A (10 mM Hepes (pH7.5), 10 mM KCl, 1.5 mM $MgCl_2$, 4 mM βME). Cells were resuspended in 5 volumes of Buffer A for 10 min and homogenized with 16 strokes of a Teflon pestle driven at 1500 rpm by a hand-held 0.75 hp power drill. The nuclei were isolated by centrifuge at 1000 x g for 10 min and resupended in modified RIPA buffer (50 mM Hepes pH7.5, 5 mM EDTA, 1% (v/v) NP-40, 0.5% (w/v) Deoxycholate and 1% (v/v/) TritonX-100, fresh added proteinase inhibitors). The nuclei were sonicated for 15 min (30 s on and 30 s off) using the

Bioruptor sonicator. The nuclear extracts were collected after 13,000 × g for 30 min at 4 ℃. The equivalent of 5×10^7 cells were used for each immunoprecipitation using 20 µg antibody of control and specific antibody. After rotation at 4℃ overnight, Agarose-Protein A beads (Invitrogen) were added and the samples were rotated for another 4 h. The beads were collected by 500 × g for 1 min and washed at least 3 times with PBS supplemented with 0.05% (v/v) Tween-20. The protein complex binding to the beads were eluted in the presence of SDS and used directly for protein electrophoresis. Standard western blotting was applied to detect the proteins presence in the precipitated samples.

Stable transfection of MCF-7 cells

Exponentially growing MCF-7 cells were co-transfected with the bidirectional reporter plasmid and pcDNA3.1+ (Invitrogen) in the 1:10 ratio using Lipofectamine 2000 (Invitrogen) following the manufacturer's procedure. After 24 h transfection, the cells were selected in 1.0 mg ml^{-1} G418 for 14 d and the surviving cells were used for dual luciferase assay.

List of Primers Used in this Study

18srRNARTF	GCCCGAAGCGTTTACTTTGA
18srRNARTR	TCCATTATTCCTAGCTGCGGTATC
TFF1RTF	TTGTGGTTTTCCTGGTGTCA
TFF1RTR	CCGAGCTCTGGGACTAATCA
BLMRTF	TGTTCTGGCTGAGTGACGTT
BLMRTR	AGTTTGGATCCTGGTTCCGT
H2AZRTF	AACTCCCCAATGCCTAAGGT
H2AZRTR	AGCAAACTCAACTCGGCAAT
MAD3LRTF	CTCGTGGCAATACAGCTTCA
MAD3LRTR	CAGGCTTTCTGGTGCTTAGG
CTBP1RTF	ACGCTGTGCCACATCCTGAACC
CTBP1RTR	AAGAGCACGTTGAAGCCGAAGG
NBR2RTF	TTGATGTGTGCTTCCTGGG
NBR2RTR	GGAGGTCTCCAGTTTCGGTA
BRCAMRNAF	TGTGAAGGCCCTTTCTTCTG
BRCAMRNAR	TCAAGGAACCTGTCTCCACA
BRCANASCENTRNAF	CAGGGAGAAGCCAGAATTGA
BRCANASCENTRNAR	AAACTCTTTCCAGAATGTTGTTAAGTC
BRCACHIP82KBF	GAGAAGTGGAAACAGCAGCC
BRCACHIP82KBR	TCCATCTGCCTCTGTCACTG
BRCACHIP-1KBF	CTTTTCGCCCACTCGGTCCC
BRCACHIP-1KBR	CGGACGGTCTTTGCATTGCC
BRCACHIP0KBF	CGACTGCTTTGGACAATAGGTAGCG
BRCACCHIP-3KBF	GACTCTCTCTCATTTTCTTTGCCTGGG
BRCACCHIP-3KBR	AGCCAGCGAGACCACGAATCC
BRCACCHIP+1KBF	GGATTTCCGAAGCTGACAGA
BRCACCHIP+1KBR	ATGACCAGCCGACGTTTTTA
BRCACCHIP2.7KBF	CCACTGCGTCCAGCCATTCTTGT
BRCACCHIP2.7KBR	CTTGAGAGGCCAAGGGAGGGTAGA
BRCACCHIP10KBF	AGGAGAAACTGGGAAGGCTC
BRCACCHIP10KBR	CACCACACCCGACTGACATA
BRCACCHIP32KBF	CATGGGGCTGCTTTTACTGT
BRCACCHIP32KBR	CTACATGGAGACCCAAAGCC
BRCACCHIP62KBF	CCATTTTCCCAGCATCACCAGC
BRCACCHIP62KBR	GCGGGAGGAAAATGGGTAGTTAGC
BRCACCHIP83KBF	TGGCAGCAACAGGAAATACA
BRCACCHIP83KBR	GTGCAAGGGCAGTGAAGACT
BRCACCHIP84KBF	CATGGGGCTGCTTTTACTGT
BRCACCHIP84KBR	CTACATGGAGACCCAAAGCC
BRCACCHIP85KBF	AGTAGATGCCTGAACCCTCG
BRCACCHIP85KBR	GGAAAATTCCGGAAACCAGT