Supplementary Materials

Table S1. Primers used in this work

	For generating expression vector	
CTCF	forward	AGA AAG CTT ATG GAA GGT GAT GCA GTC GAA
	reverse	CTG CTC GAG TCA CCG GTC CAT CAT GCT
	For RT-PCR	
CTCF	forward	TGC GAA AGC AGC ATT CCT AT
	reverse	TAG CGC TTG AAG TGC ATG
p53	forward	TAA CAG TTC CTG CAT GGG CGG C
	reverse	AGG ACA GGC ACA AAC ACG CAC C
p21	forward	ACT GTG ATG CGC TAA TGG
	reverse	GAC AGT GAC AGG TCC ACA
Bax	forward	GTA ACA TGG AGC TGC AGA G
	reverse	GAG GCT TGA GGA GTC TCA C
HOXA10	forward	GGG GAC TTC TCT TCC AGT TTC
	reverse	GGG AGA ATT GTG GTG TGC TT
ATG13	forward	GTG ATT GTC CAG GCT CGG
	reverse	TCT CCA CAC ACA TGG ACC
p62	forward	GAT TCG CCG CTT CAG CTT
	reverse	TTC ACG TAG GAC ATG GCC
	For ChIP-PCR	
p53-siteA	forward	CAT TGT TGT ATT CCT GAG TGC C
	reverse	GAG TCC CGC GGT AAT TCT T
p53-siteB	forward	AAG AAT TAC CGC GGG ACT C
	reverse	TCG GTC CAC CTT CCG ATT
	For luciferase assay	
p53	TP53-A-*Kpn*I-F	AGA GGT ACC AAG AAA CCC ACC TGT GCT
	TP53-A-*Hin*dIII-R	AGA AAG CTT GGA GCT TAC CCA ATC CAG G

Figure S1. Experimental time line for CTCF knockdown cells. The 7th day after the transduction and selection was designated as analysis Day 0 (D0). Cell proliferation was measured from Day 0 to Day 8. Characteristic features of apoptosis, cell cycle, and autophagy were examined at Day 2.

Figure S2. Effect of CTCF knockdown on cell proliferation of MCF10A cells. Cell proliferation was monitored by MTT assay in a time course experiment of MCF10A cells for the CTCF knockdown (KD1 and KD2) and control (non-specific [NS] and empty vector [pLKO]) group. Y-axis represents the mean value with standard error of the relative proliferation rate.

Figure S3. Optimization of MCF7-GFP and MCF10A co-culture. (A) mRNA expression of CTCF in parental MCF7 and independent homogenous clones stably expressing MCF7-GFP (MCF7-H1, -H2, and -H3), and hetero pools (MCF7-H-Het). (B) Bright field (BF) and green fluorescent (GFP) images of MCF7-GFP-H3 cells show that all the cells are expressing GFP. (C-D) Growth rate of MCF7-GFP and MCF10A cells in their own standard medium (C) and in optimized experimental medium (D). The optimized medium was used to grow MCF7-GFP/MCF10A for co-culture experiment to guarantee similar growth rate for two different cell lines. (E) FACS analysis of MCF7-GFP cell lines (MCF7-GFP-H1, -H2, -H3, and -Het) to confirm GFP expression. (F) MCF-7-GFP/MCF10A co-culture in optimized experimental media. BF, GFP, and merged images were presented.

Figure S4. CTCF and H3K4me3 ChIP-seq signal in *TP53* locus. Data from the ENCODE project are displayed as custom annotation tracks in the UCSC genome browser. The conserved CTCF binding site (PMID: 24614316) was found within a genomic region containing CpG island where strong binding of CTCF was detected with high ChIP-seq peak.

Figure S5. Effects of siRNA-mediated knockdown of CTCF on cell proliferation in T47D breast cancer cells. The siRNA against human CTCF (on-target plus smart pool) were purchased from Dharmacon (L-02165-00-0005). After siCon or siCTCF transfection for 48 hours, cell proliferation was measured by Cell Counting Kit-8 (CCK-8; Dojindo Laboratories, Kumamoto, Japan) at Day 1 and Day 3. mRNA expression of *CTCF* in CTCF knockdown (siCTCF) and control (siCon) cells was determined by RT-PCR. *p<0.05; **p<0.01; *vs*. siCon, by t-test

Figure S6. Expression and localization of ITGB4 in MCF-7 cells. (A) mRNA expression level of *ITGB4* and *CTCF* in control non-specific (Control-NS) and CTCF-knockdown (CTCF-KD) cells. (B) Confocal microscopy images showing ITGB4 and p53 in Control-NS and CTCF-KD cells. Antibodies against p53 (sc-126; Santa Cruz,), ITGB4 (ab133682; Abcam) and the corresponding secondary antibodies (anti-rabbit IgG Alexa Flour 594 and anti-goat IgG Alexa Flour 488; Invitrogen) were used for detection. Cells were counter stained with DAPI (Invitrogen) and analyzed using a Zeiss LSM700 confocal microscope. Zoomed images of square boxes in c and g are shown in i-l and m-p, respectively. Primer sequences for ITGB4 are as follows: forward; 5'- TGA GCC ACT GGA GAG CC-3', reverse; 5'- TCA TGT CCG TCT GCG GG-3'.

Figure S1

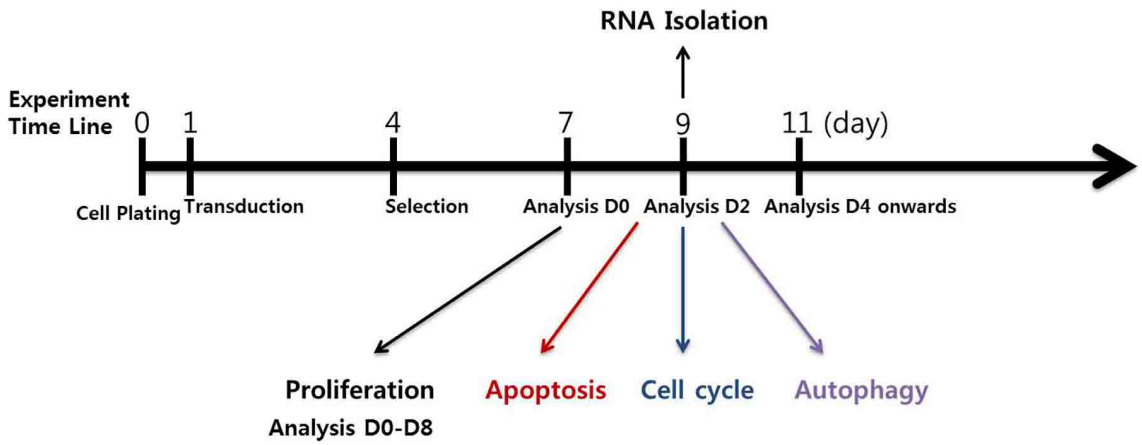

RNA Isolation
Experiment
Time Line
0
1
4
7
9
11 (day)
Cell Plating
Transduction
Selection
Analysis D0
Analysis D2
Analysis D4 onwards
Proliferation
Analysis D0-D8
Apoptosis
Cell cycle
Autophagy

Figure S2

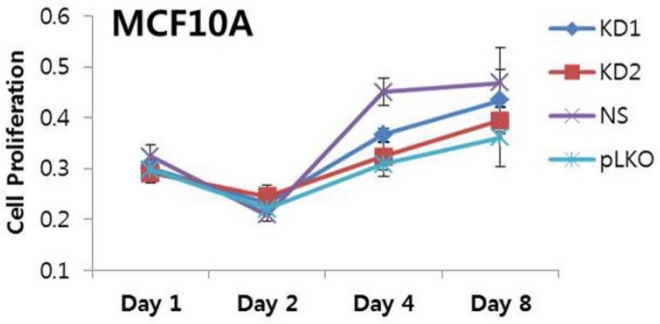

MCF10A
Cell Proliferation
0.6
0.5
0.4
0.3
0.2
0.1
Day 1
Day 2
Day 4
Day 8
KD1
KD2
NS
pLKO

Figure S3

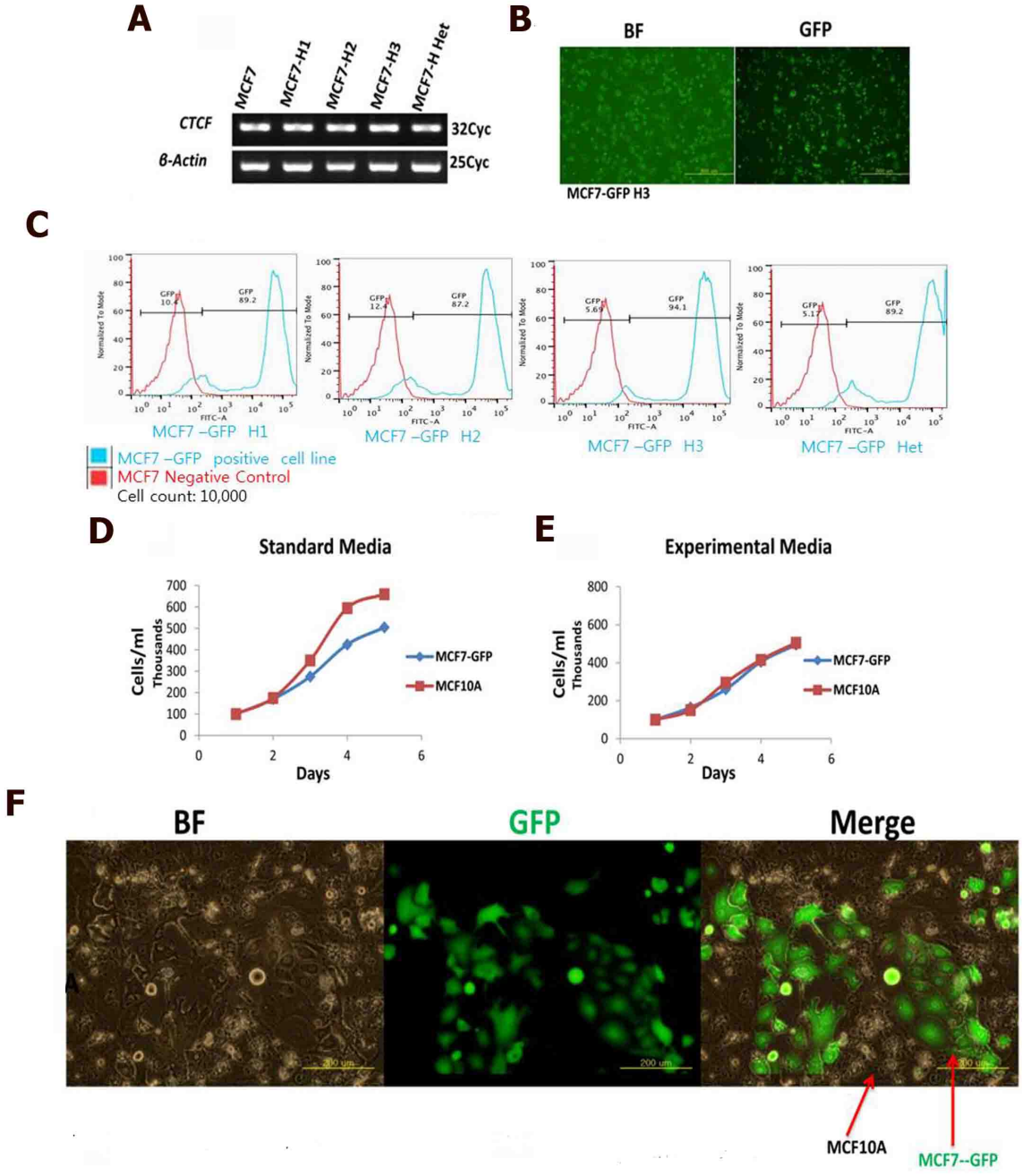
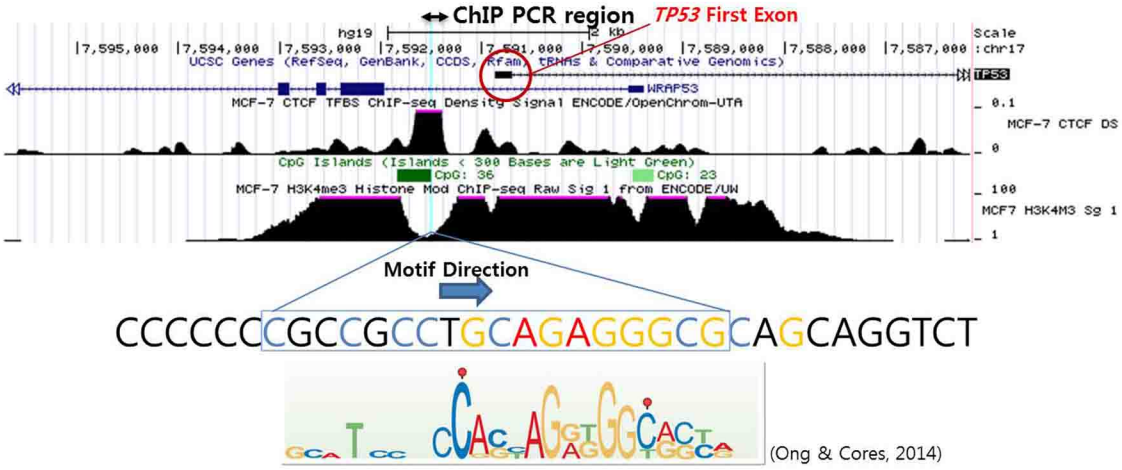

A
MCF7
MCF7-H1
MCF7-H2
MCF7-H3
MCF7-H Het
CTCF
32Cyc
β-Actin
25Cyc
B
BF
GFP
MCF7-GFP H3
C
MCF7 –GFP H1
MCF7 –GFP H2
MCF7 –GFP H3
MCF7 –GFP Het
MCF7 –GFP positive cell line
MCF7 Negative Control
Cell count: 10,000
D
Standard Media
Cells/ml Thousands
Days
MCF7-GFP
MCF10A
E
Experimental Media
Cells/ml Thousands
Days
MCF7-GFP
MCF10A
F
BF
GFP
Merge
MCF10A
MCF7--GFP

Figure S4



(Ong & Cores, 2014)

Figure S5

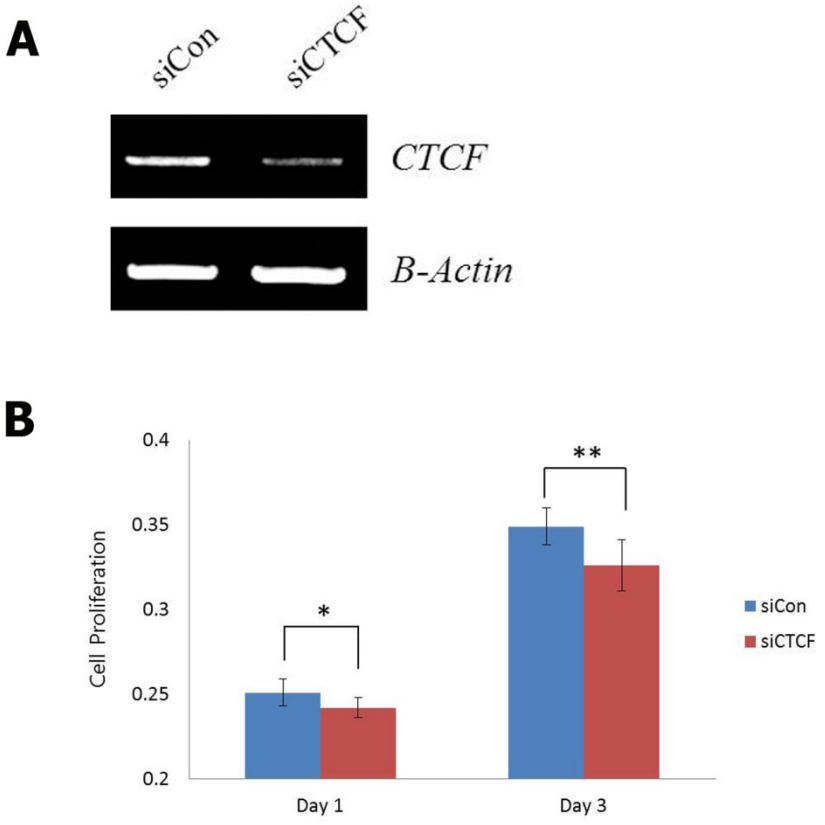
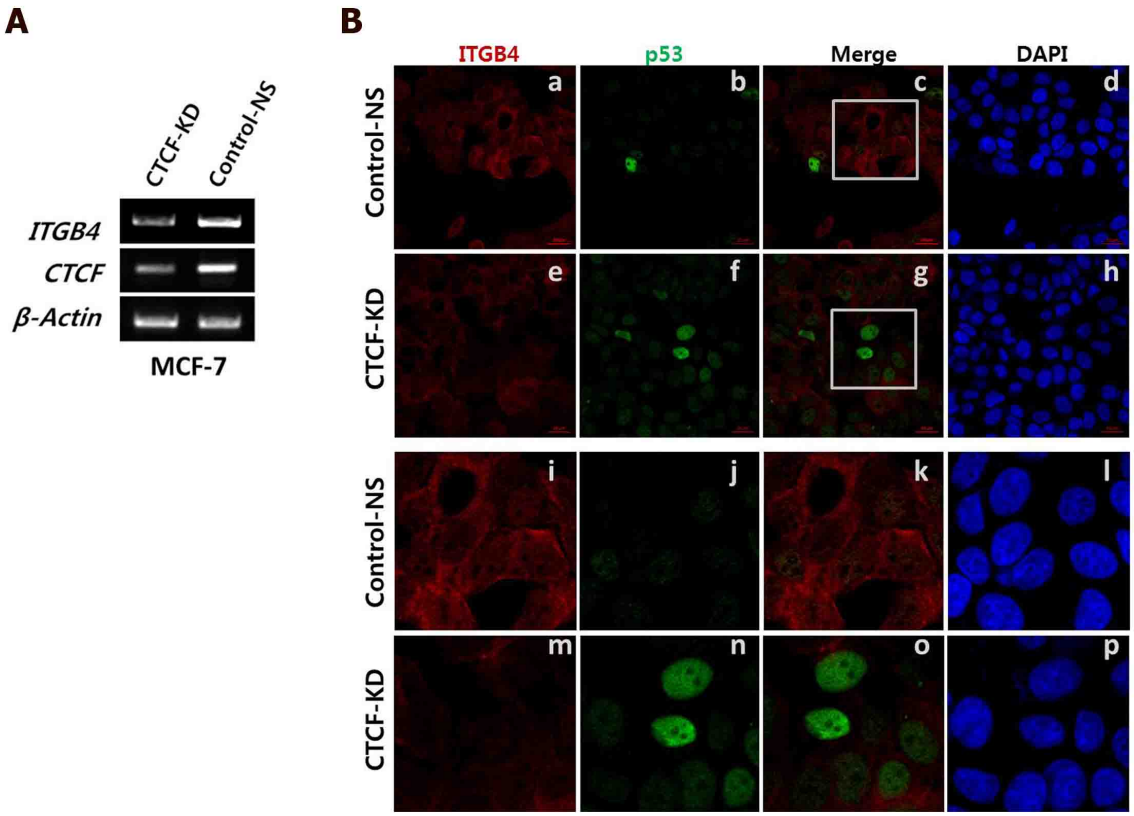

A
siCon
siCTCF
CTCF
B-Actin
B
Cell Proliferation
0.4
0.35
0.3
0.25
0.2
*
**
Day 1
Day 3
siCon
siCTCF

Figure S6


A
CTCF-KD
Control-NS
ITGB4
CTCF
β-Actin
MCF-7
B
ITGB4
p53
Merge
DAPI
Control-NS
CTCF-KD
Control-NS
CTCF-KD
a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p