MCF-7 cells: WB for CTCF, ER, FOXA1 and Lamin B
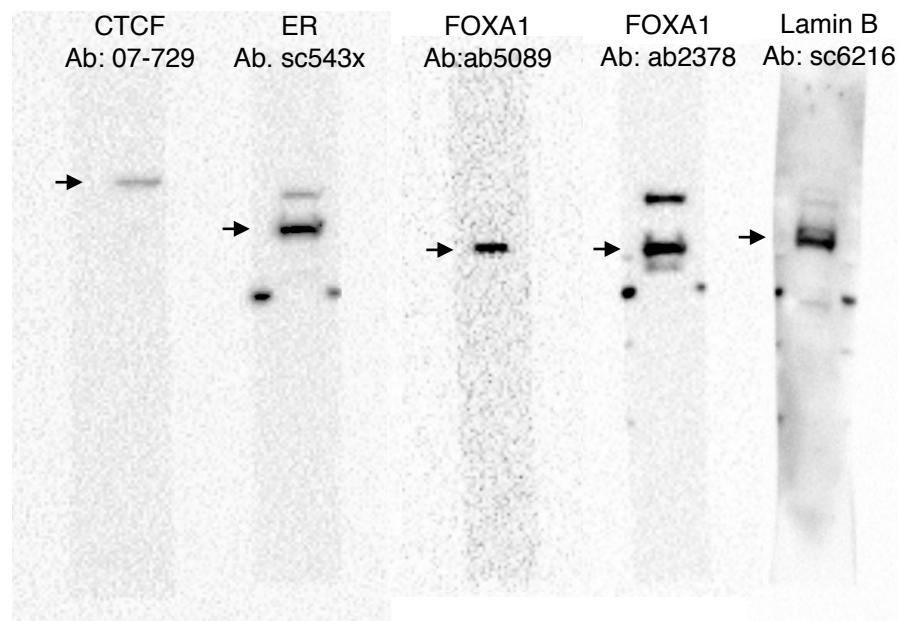
Additional file 2

A Pearson correlation plot of estrogen-regulated CTCF chromatin binding
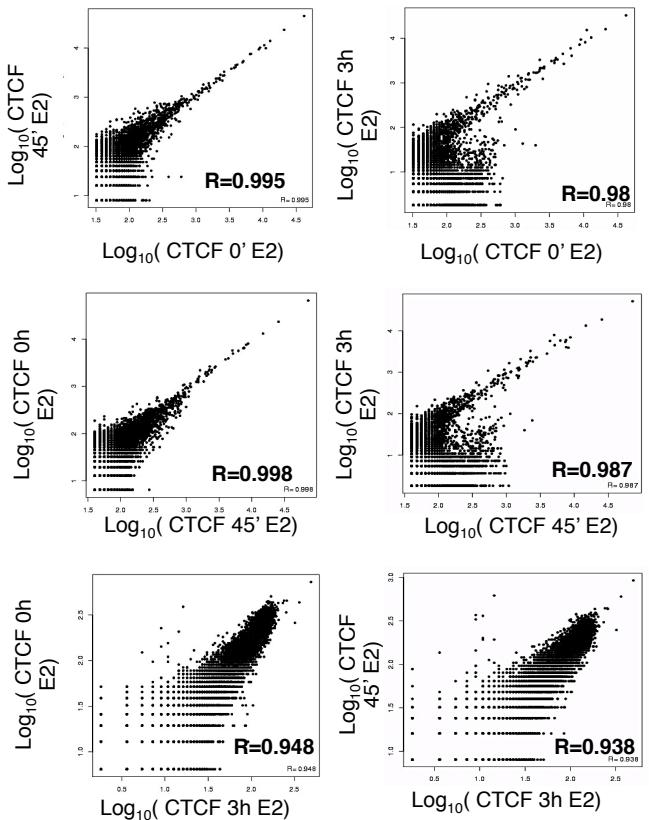
B Re-ChIP at 3h preferred CTCF sites

Re-ChIP:
☐ GATA3-CTCF
■ FOXA1-CTCF
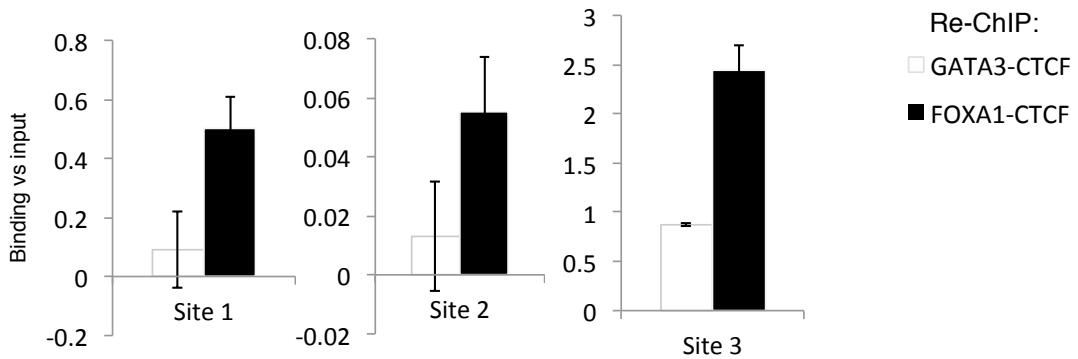
A   Transcription Factor Binding at GRO-seq regions with or without CTCF binding
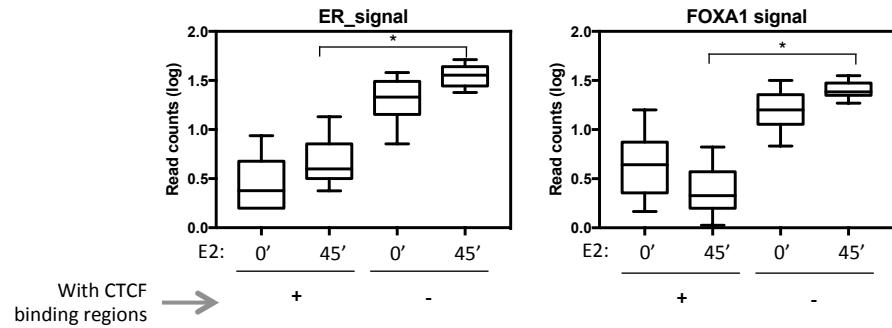
Mann-Whitney (5% FDR two tails): * (p< 10^{-12})

B   Histone modification
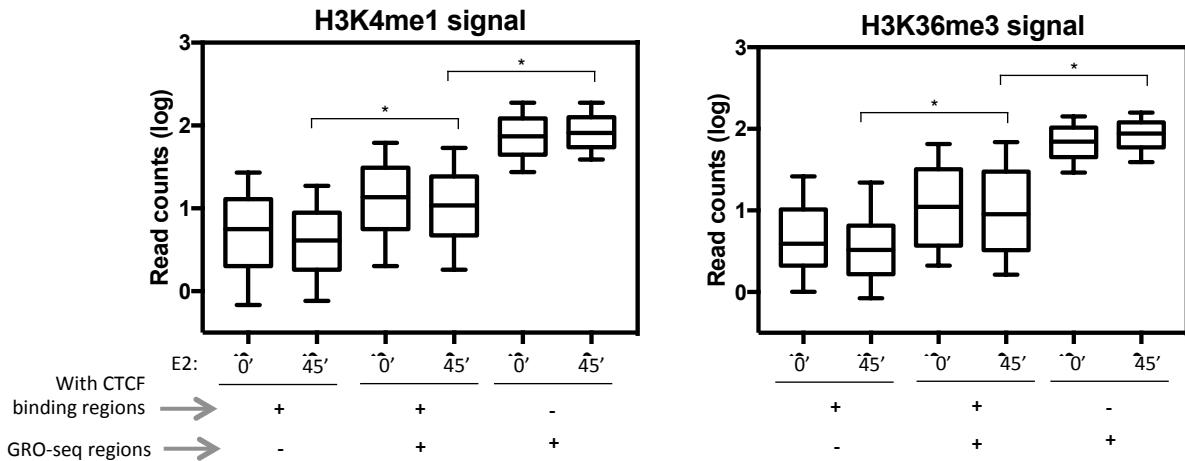
Mann-Whitney (5% FDR two tails): * (p< 10^{-12})

**A** Analysis of CTCF binding distribution within ER-ER loops (ER ChIA-PET from Fullwood et al., 2009)

ER loops without CTCF binding
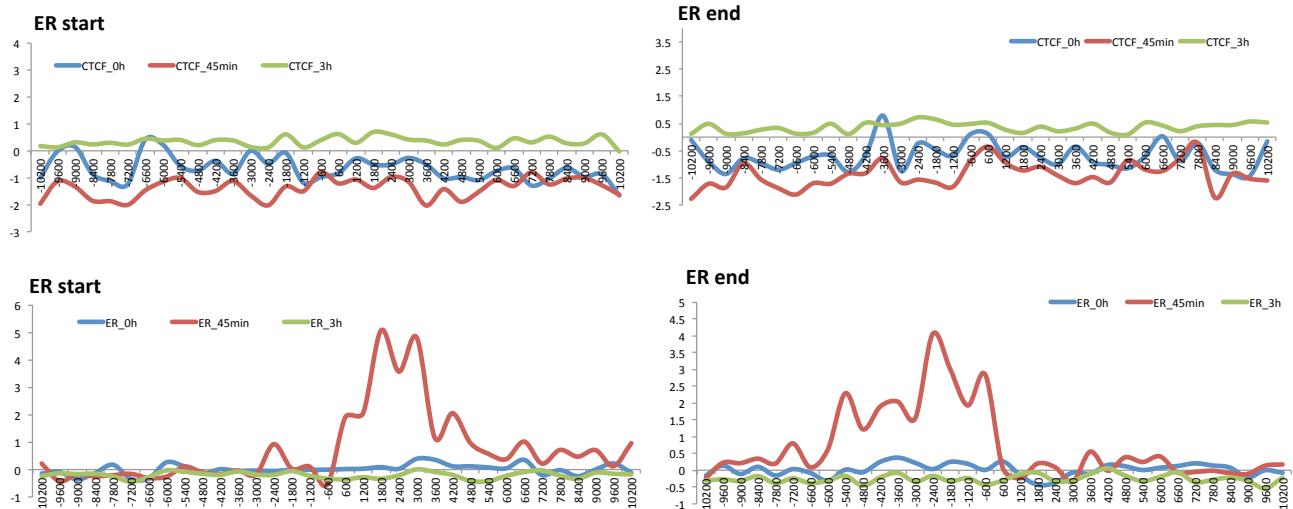

B ER ChIP-PCR at ER loops
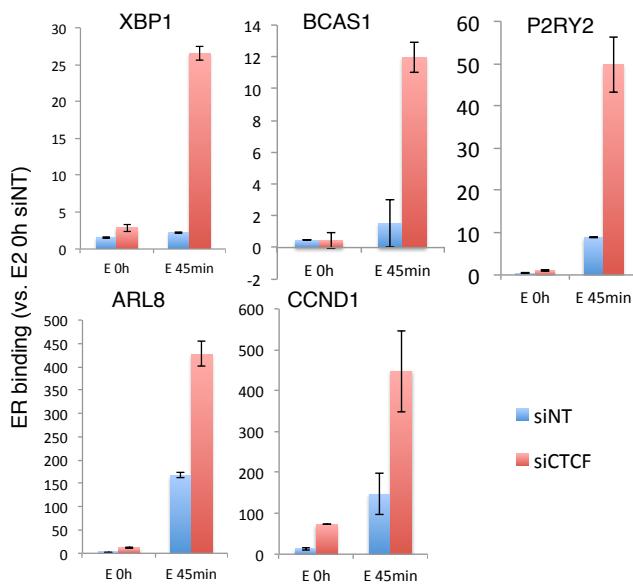
Additional file 5

A List of genes estrogen and CTCF modulated

CTCF repressed genes

ABCA17P	KCNN3	SERPINB9	CRISPLD2	PADI4
ACVR1C	KCNQ1	SH2D3C	CXCL12	PBX4
ADRA2B	KIF26B	SH3TC1	CXXC5	PCNA
ARL8A	KLF13	SLC38A11	DAAM2	PCYOX1L
ASB2	KLHL14	SMOX	DHRS3	PDK4
ASTN2	KRT24	SMTNL2	DLL1	PDLIM2
ATP4A	KRT37	SSTR2	DMRT2	PIP5KL1
B3GNT3	KRT73	ST6GALNAC4	DNMT3B	PIWIL4
B4GALNT3	LHX4	SYT12	E2F2	PKP1
BCAS4	LMAN1L	TANC1	EGFR	PLA2G16
C14orf132	LOC100133669	TBC1D10A	ELF3	PNPLA3
C1orf194	LOC81691	TFF2	ELL	PODXL
C1QTNF1	LOX	TMEM64	EMP2	PPP2R2C
CA8	LPAR1	TMIE	FAM43A	PRKCA
CACNA1I	LRG1	TMPRSS2	FARP1	PRUNE
CD44	LRP4	TNFAIP8L3	FDXR	PSPH
CHEK2	LRTM2	TNS1	FUT4	PTGES
CHST8	MAFB	TNS4	GADD45B	RAB36
CIB2	MAN1C1	TUBA3D	GAL	RAB37
CITED1	MAT1A	VASN	GINS2	RASSF3
CYP26A1	MB	WNT16	GLB1L2	RGS10
CYP46A1	MICAL2	WNT4	GLRB	RGS3
CYP4F3	MYBL1	38231	GPRIN1	RHOD
DPYSL4	MYOT	ABCA3	GPSM1	SCNN1G
DSCAML1	MYRIP	ACOT4	GRIN2C	SERINC2
EDN2	NECAB2	ACSS1	HDAC11	SERPINE2
EFCAB10	NKAIN1	ADARB1	HDDC2	SLBP
ERG	NLRP6	ADORA1	HOXC8	SLC16A3
FADS2	NTN1	ADRB1	HSPA1L	SLC25A42
FAIM3	OSCAR	AHDC1	ICOSLG	SLC29A1
FAM13C	OTOF	AHNAK2	ITGA6	SLC46A2
FAM25A	PADI3	ALS2CL	KBTBD6	SMOC2
FAM46C	PC	ANXA9	KCNMA1	SNX24
FBXO43	PGLYRP2	B4GALNT2	KCTD6	SPRY4
FCGR2B	PLA2G4D	B4GALT1	KHDRBS3	STARD5
FCGR2C	PLXDC1	BACE2	LOC285593	STK32C
FGF19	PLXNA4	BRIP1	LONRF2	TBC1D2
FGFBP2	POM121L9P	C10orf107	LOXL1	TBX2
FLJ12825	POU3F2	C6orf222	LSM11	TRPC6
GABRD	PPIF	CABLES2	LSM2	TSC22D3
GADD45G	PPM1J	CALD1	MCM6	UBE2S
GATA5	PRC1	CCDC88C	MFNG	UBE2T
GATSL3	PREX1	CCR7	MITF	UNC119
GCK	PRSS27	CDC25A	MMP11	UNC5A
GNAT1	PTGS1	CDCA7	MN1	VAV2
GPR20	PTPRH	CDR2L	MYLK	WFS1
GRIK3	REEP1	CGNL1	NANOS1	WNT5B
GRK5	RET	CHPT1	NCOR2	ZMIZ1
GRM4	RHOBTB1	CHST12	NDRG1	ZMYND8
HPN	SCN4B	CLMN	NECAB1	ZNF473
IGSF22	SDC1	CLN8	NPR3	ZNF799
IL17RB	SDK2	COL21A1	NPTX1	
ISOC1	SEMA3G	COTL1	OLFML2A	
KCNG3	SERPINA5	CRELD2	**P2RY2**	

CTCF induced genes

ABCC13	PPM1K	HEG1
ABHD12B	PRR15	HLA-DRB6
ACSL5	QDPR	IER3
ADAMTS9	RASGRP1	IL10RA
AQP3	RBM24	LAMC2
BCL11B	RELB	LARGE
BIRC3	RGS7BP	LGR4
C22orf24	SFXN2	LIMK1
CADM1	SLC16A9	MAP3K5
CAV1	SLC22A23	MED13L
CD36	SLC27A4	MERTK
CDRT1	SLFN5	MID1
CEACAM1	SPTLC3	MTHFD1L
COL27A1	ST3GAL5	MUS81
CREG2	STX11	N4BP3
CTGF	TGM2	NRP2
DTX3L	TNS3	NRXN3
EDN1	UGT8	OPN3
ENPP2	VDR	PDLIM7
EPDR1	WISP2	PFKFB3
ETV6	40238	PIP5K1C
FAT1	ABAT	PLAT
FILIP1L	ABCC3	PLEKHO1
FLRT3	ABCG2	PLOD2
FMO1	ABLIM1	PPARGC1B
FRMD3	ALX4	PRSS23
G6PD	ANXA2	RHBDF2
GBP1	APCDD1	RND3
GBP2	ATXN1	RPL22L1
GMPR	BACE1	RUSC2
HAAO	BOK	SETBP1
HERC5	BTN2A2	SKAP2
HERC6	C4orf19	SLC27A2
HLA-C	CAPG	SORCS2
HLA-DRB1	CHN2	SRF
HLA-DRB5	CHST11	STK10
HOXB4	CYP1A1	TBXAS1
IRF1	DENND5B	TCF7L1
ISG20	DOCK4	TFF1
JPH2	DTNA	TMC5
KLF7	DUSP4	TNFRSF10A
KRT81	DUSP5	TNRC6C
MAP6D1	ETS2	TPST2
ME3	FAT4	TRIM16L
MSRB3	FGFR2	UCA1
NFE2	FLNA	ULK1
NKD2	FOSL2	USP35
NOLC1	FRAS1	VCAN
NTN4	FST	WIPF1
PAPSS2	GALNT2	WWC3
PARP9	GATA6	ZDHHC22
PDLIM3	GPD1L	ZDHHC9
PLEKHF1	GPR56	ZNF462
PML	GRAMD1A	ZYX

B RT-PCR of CTCF repressed genes upon CTCF depletion
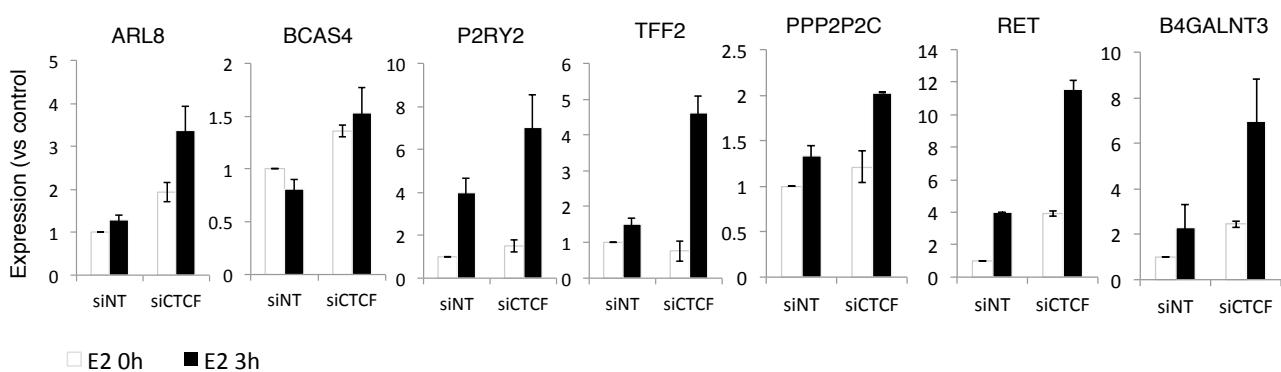
☐ E2 0h   ■ E2 3h

**A** Dose-dependent CTCF and ER protein levels
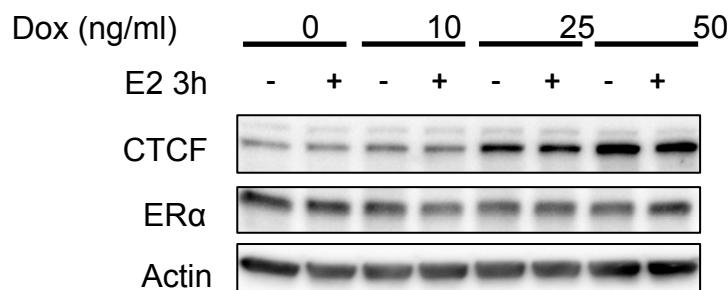
B mRNA expression analysis of E2-induced genes and CTCF repressed
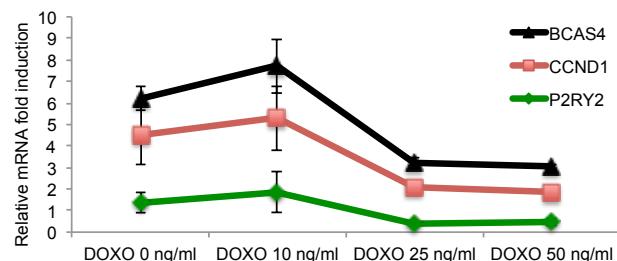

C Metacore Pathway analysis of genes enriched to cell cycle
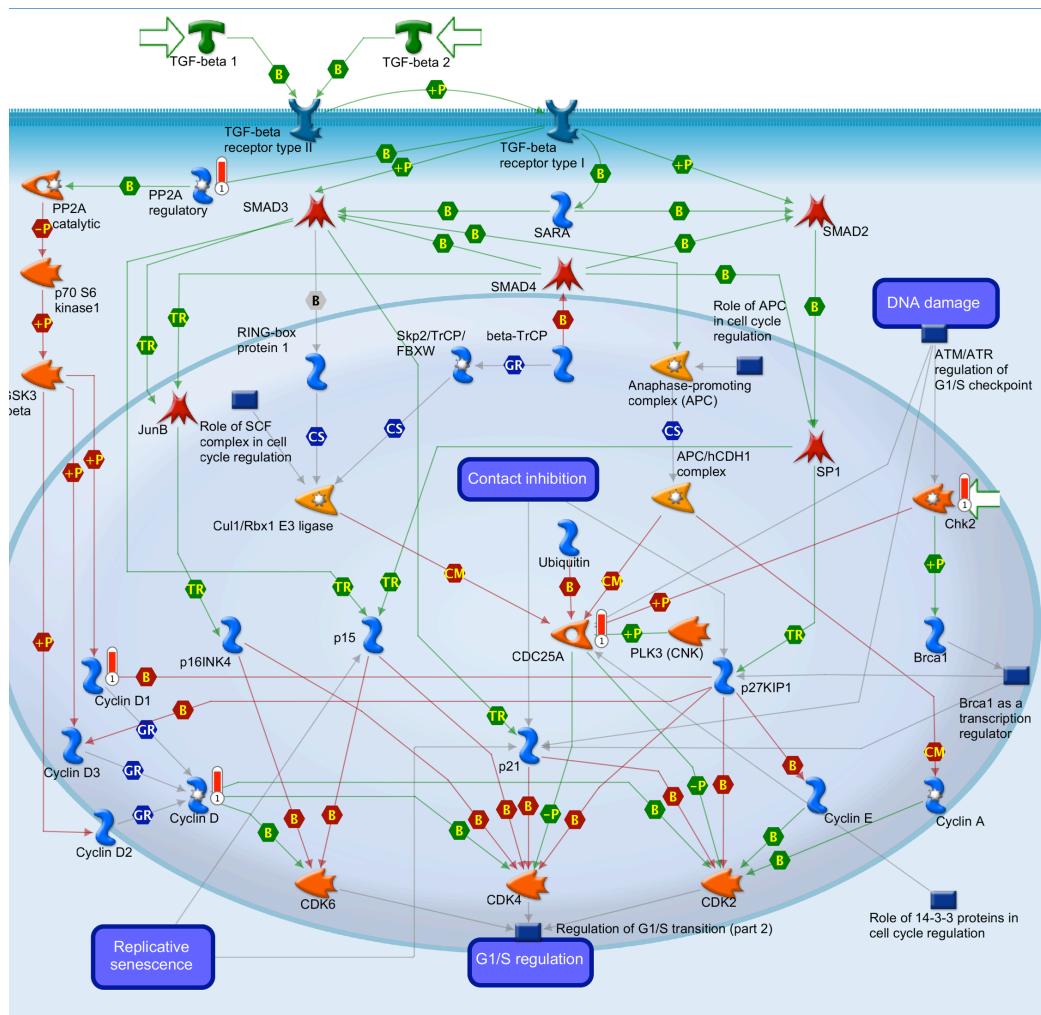
Additional file 7

A CTCF IP and Lamin B blot

E2 45min: - + -

IP Lamin B Blot:

Supernadant Lamin B Blot:

IP: CTCF IgG
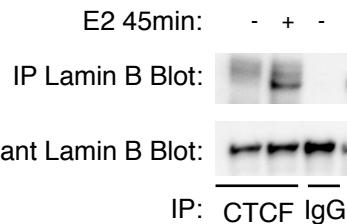
B Analysis of Lamin B binding distribution within ER-ER loops

ER start

CTCF interacting points and stimulated by estrogen at 45min

ER end

CTCF interacting points and stimulated by Estrogen at 45min