

Supplementary Information for

Xie et al. **Dimerization of MORC2 through its C-terminal coiled-coil domain enhances chromatin dynamics and promotes DNA repair**

The Supplementary Information includes

1. Supplementary Figures S1-S3
2. Supplementary Figure legends
3. Supplementary Tables S1-S4

Supplementary Figure Legends

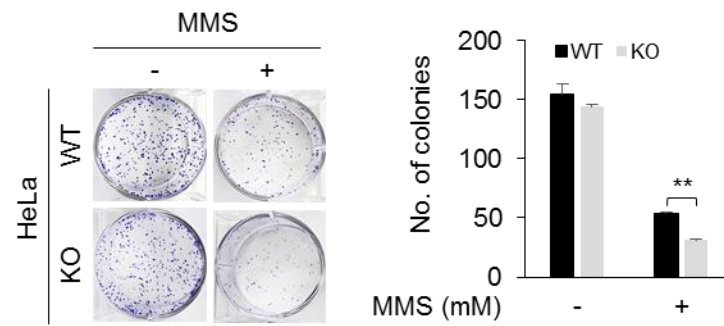


Figure S1. Knockout of MORC2 enhanced cellular sensitivity to MMS

WT and MORC2 KO HeLa cells were treated with or without 0.2 mM MMS and subjected to clonogenic survival assays. The representative images of survival clones are shown in left panel and the corresponding quantitative results are shown in right panel. **, $p < 0.01$.

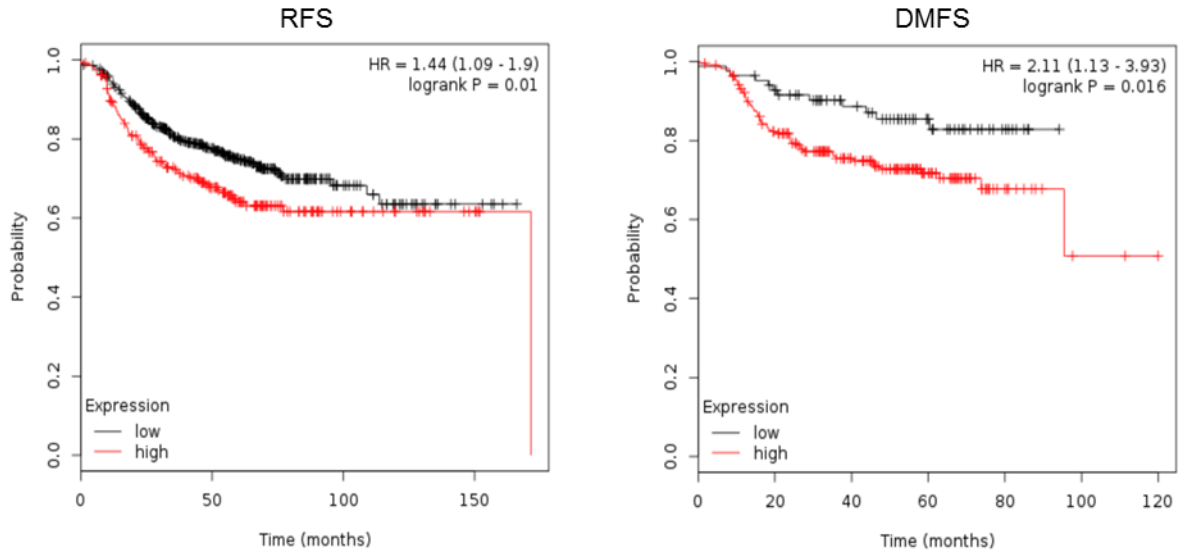


Figure S2. The expression levels of MORC2 are negatively associated with RFS and DMFS of breast cancer patients who received chemotherapy.

Kaplan-Meier curves for recurrence-free survival (RFS) (left) and distant metastasis-free survival (DMFS) (right) of breast cancer patients who received chemotherapy.

Species	Accession	Sequence	Position
Human	NP_001290185.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	994
Sheep	XP_011968148.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	999
Cow	XP_015331066.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	1000
Troglodyte	XP_016794460.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	994
Orangutan	XP_024095432.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	994
Monkey	XP_015005504.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	994
hamster	XP_016824078.1	SAMNSEELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSEKKLRETEEKL	890
Pig	XP_005670910.1	SAMNSEELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	995
Deer	XP_020727311.1	SAMNSDELISFPLKEYFRQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	1004
Goat	XP_017916461.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	1000
Buffalo	XP_025123123.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	1000
Fish	JAR35272.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	1966
Cattle	XP_019832793.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	1000
Polecat	XP_004766471.1	SAMNSDELISFPLKEYFKQYEVGLQNLCHSYQSRADSRAKASEESLRTSERKKLRETEEKL	995
*****:*****:*****:*****:*****:*****:*****:*****:*****:*****			
Human	NP_001290185.1	QKLRTNIVALLQKVQEDIDINTDDELDAYIEDLITKGD	1032
Sheep	XP_011968148.1	QKLRTNIVALLQ---KDLIDINTDDELDAYIEDLITKGD	1034
Cow	XP_015331066.1	QKLRTNIVALLQ---KDLIDINTDDELDAYIEDLITKGD	1035
Troglodyte	XP_016794460.1	QKLRTNIVALLQKVQEDIDINTDDELDAYIEDLITKGD	1032
Orangutan	XP_024095432.1	QKLRTNIVALLQKVQEDIDINTDDELDAYIEDLITKGD	1032
Monkey	XP_015005504.1	QKLRTNIVALLQKVQEDIDINTDDELDAYIEDLITKGD	1032
hamster	XP_016824078.1	QKLRTNIVALLQKVQEDIDINTDDELDAYIEDLITKGD	928
Pig	XP_005670910.1	QKLRTNIVALLQKVQEDIDINTDDELDAYIEDLITKGD	1033
Deer	XP_020727311.1	QKLRTNIVALLQ---KDLIDINTDDELDAYIEDLITKGD	1039
Goat	XP_017916461.1	QKLRTNIVALLQ---KDLIDINTDDELDAYIEDLITKGD	1035
Buffalo	XP_025123123.1	QKLRTNIVALLQ---KDLIDINTDDELDAYIEDLITKGD	1035
Fish	JAR35272.1	QKLRTNIVALLQKVQEDIDINTDDELDAYIEDLITKGD	2004
Cattle	XP_019832793.1	QKLRTNIVALLQ---KDLIDINTDDELDAYIEDLITKGD	1035
Polecat	XP_004766471.1	QKLRTNIVALLQKVQEDIDINTDDELDAYIEDLITKGD	1033
*****:*****:*****:*****:*****:*****:*****:*****:*****:*****			

Figure S3. The C-terminal 82 amino acid sequence of MORC2 is highly conserved among multiple species.

Supplementary Tables

Tables S1. Primers used for molecular cloning of expression vectors

Genes	Primers	Sequences
Flag-MORC2	Forward	ACCTCCATAGAAGATCTAGAGCCGCCACCATGATG GCTTTCACAAATTACAGCAGT
	Reverse	GATCCATTTAAATTCGAATTCTTACTTATCGTCGTC ATCCTTGTAATCGTCCCCCTTGGTGATGAGGTCCT
HA-MORC2	Forward	ACCTCCATAGAAGATCTAGAGCCGCCACCATGATG GCTTTCACAAATTACAGCAGT
	Reverse	GATCCATTTAAATTCGAATTCTTAAGCGTAATCTGG AACATCGTATGGGTAGTCCCCCTTGGTGATGAGGT CCT
HA-MORC2 Δ C82	Forward	ACCTCCATAGAAGATCTAGAGCCGCCACCATGATG GCTTTCACAAATTACAGCAGT
	Reverse	GATCCATTTAAATTCGAATTCTTAAGCGTAATCTGG AACATCGTATGGGTACTTCAGAGGAAAAGATATTA GCTCA

Tables S2. Information of expression vectors used in this study

Plasmids	Sources	Vectors
Flag-MORC2	Self-cloned	pCDH-CMV-MCS-EF1-Puro
HA-MORC2	Self-cloned	pCDH-CMV-MCS-EF1-Puro/ pCDH-CMV-MCS-EF1-coGFP
HA-MORC2 Δ C82	Self-cloned	pCDH-CMV-MCS-EF1-Puro/ pCDH-CMV-MCS-EF1-coGFP
Lenti-CAS9	Addgene	LentiCas9-Blast
Lenti-guide	Addgene	LentiGuide-Puro

Table S3. sgRNAs targeting for MORC2 used in this study

Genes	Primers	Sequences
sgRNA #1	Sense	CACCGAGTAGACTCAGGTGTTGCT
	Anti-sense	AAACAGCGAACACCTGAGTCTACTC
sgRNA #2	Sense	CACCGCCTCATGAAACGTGCGAGAC
	Anti-sense	AAACGTCTCGCACGTTTCATGAGGC

Tables S4. Information for primary antibodies used in this study

Antibodies	Vendors	Cat#	Species	WB	IHC	IP	IF
MORC2	Bethyl	A300-149	Rabbit monoclonal	√		√	
MORC2	Novus	NBP1-89295	Rabbit polyclonal		√		√
Flag	Sigma	F3165	Mouse monoclonal	√	√	√	√
HA	CST	3724S	Rabbit monoclonal	√	√	√	√
H2A	CST	12349	Rabbit monoclonal	√	√	√	√
H2B	CST	12364	Rabbit monoclonal	√			
H3	CST	4499	Rabbit monoclonal	√			
H4	Abcam	ab177840	Rabbit monoclonal	√	√	√	√
γH2AX	CST	9718	Rabbit monoclonal	√			
NPM1	Bethyl	A302-402A-1	Rabbit polyclonal	√		√	
hnRNPM1	Abcam	ab177957	Rabbit monoclonal	√	√		√
EGFR pY1068	CST	3777	Rabbit monoclonal	√			
HIF1α	Abcam	ab51608	Rabbit monoclonal	√	√	√	√
Actin	Sata Cruz Biotech	sc-47778	Mouse monoclonal	√	√	√	√
Vinculin	Sigma	V9131	Mouse monoclonal	√			
RAD51	Abcam	ab133534	Rabbit monoclonal	√	√	√	√
53BP1	Abcam	ab175933	Rabbit monoclonal	√	√		√
BRAC1	Abcam	sc-6954	Mouse monoclonal	√		√	√