10320 Camino Santa Fe, Suite G
San Diego, CA 92121
Tel: 858.875.1900 Fax: 858.875.1999

MRE11 Antibody

Catalog # ASC11039

Product Information

Application	WB, IF, E, IHC-P
Primary Accession	P49959
Other Accession	EAW66932, 119587336
Reactivity	Human, Mouse, Rat
Host	Rabbit
Clonality	Polyclonal
Isotype	IgG
Calculated MW	80593
Concentration (mg/ml)	1 mg/mL
Conjugate	Unconjugated
Application Notes	MRE11 antibody can be used for detection of MRE11 by Western blot at 1 - 2 g/mL. Antibody can also be used for immunohistochemistry starting at 5 g/mL. For immunofluorescence start at 20 g/mL.

Additional Information

Gene ID	4361
Other Names	Double-strand break repair protein MRE11A, Meiotic recombination 11 homolog 1, MRE11 homolog 1, Meiotic recombination 11 homolog A, MRE11 homolog A, MRE11A, HNGS1, MRE11
Target/Specificity	MRE11A;
Reconstitution & Storage	MRE11 antibody can be stored at 4℃ for three months and -20℃, stable for up to one year. As with all antibodies care should be taken to avoid repeated freeze thaw cycles. Antibodies should not be exposed to prolonged high temperatures.
Precautions	MRE11 Antibody is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

Name	MRE11 {ECO:0000303|PubMed:8530104, ECO:0000312|HGNC:HGNC:7230}
Function	Core component of the MRN complex, which plays a central role in double-strand break (DSB) repair, DNA recombination, maintenance of telomere integrity and meiosis (PubMed:11741547, PubMed:14657032, PubMed:22078559, PubMed:23080121, PubMed:24316220, PubMed:26240375, PubMed:27889449, PubMed:28867292, PubMed:29670289, PubMed:30464262, PubMed:30612738, PubMed:31353207, PubMed:37696958, PubMed:38128537, PubMed:9590181, PubMed:9651580, PubMed:9705271). The MRN complex is involved in the

repair of DNA double-strand breaks (DSBs) via homologous recombination (HR), an error-free mechanism which primarily occurs during S and G2 phases (PubMed:24316220, PubMed:28867292, PubMed:31353207, PubMed:38128537). The complex (1) mediates the end resection of damaged DNA, which generates proper single-stranded DNA, a key initial steps in HR, and is (2) required for the recruitment of other repair factors and efficient activation of ATM and ATR upon DNA damage (PubMed:24316220, PubMed:27889449, PubMed:28867292, PubMed:36050397, PubMed:38128537). Within the MRN complex, MRE11 possesses both single-strand endonuclease activity and double-strand- specific 3'-5' exonuclease activity (PubMed:11741547, PubMed:22078559, PubMed:24316220, PubMed:26240375, PubMed:27889449, PubMed:29670289, PubMed:31353207, PubMed:36563124, PubMed:9590181, PubMed:9651580, PubMed:9705271). After DSBs, MRE11 is loaded onto DSBs sites and cleaves DNA by cooperating with RBBP8/CtIP to initiate end resection (PubMed:27814491, PubMed:27889449, PubMed:30787182). MRE11 first endonucleolytically cleaves the 5' strand at DNA DSB ends to prevent non-homologous end joining (NHEJ) and licence HR (PubMed:24316220). It then generates a single-stranded DNA gap via 3' to 5' exonucleolytic degradation to create entry sites for EXO1- and DNA2-mediated 5' to 3' long-range resection, which is required for single-strand invasion and recombination (PubMed:24316220, PubMed:28867292). RBBP8/CtIP specifically promotes the endonuclease activity of MRE11 to clear protein-DNA adducts and generate clean double-strand break ends (PubMed:27814491, PubMed:27889449, PubMed:30787182). MRE11 endonuclease activity is also enhanced by AGER/RAGE (By similarity). The MRN complex is also required for DNA damage signaling via activation of the ATM and ATR kinases: the nuclease activity of MRE11 is not required to activate ATM and ATR (PubMed:14657032, PubMed:15064416, PubMed:15790808, PubMed:16622404). The MRN complex is also required for the processing of R-loops (PubMed:31537797). The MRN complex is involved in the activation of the cGAS-STING pathway induced by DNA damage during tumorigenesis: the MRN complex acts by displacing CGAS from nucleosome sequestration, thereby activating it (By similarity). In telomeres the MRN complex may modulate t-loop formation (PubMed:10888888).

Cellular Location

Nucleus. Chromosome. Chromosome, telomere Note=Localizes to DNA double-strand breaks (DSBs)

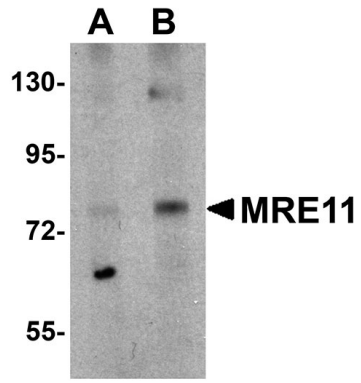
Background

MRE11 Antibody: MRE11 is involved in the repair of DNA double strand breaks as part of a complex that includes the Rad50 and NBS1 protein and is thought to act in the same pathway as the A-T mutated (ATM) protein. By itself, the protein has 3' to 5' exonuclease activity and endonuclease activity. The protein forms a complex with the RAD50 homolog; this complex is required for non-homologous joining of DNA ends and possesses increased single-stranded DNA endonuclease and 3' to 5' exonuclease activities. In conjunction with a DNA ligase, this protein promotes the joining of noncomplementary ends in vitro using short homologies near the ends of the DNA fragments. Mutations in this protein result in a novel ataxia telangiectasia-like disorder (ATLD). Unlike the ATM protein, MRE11 is necessary proper mammalian development.

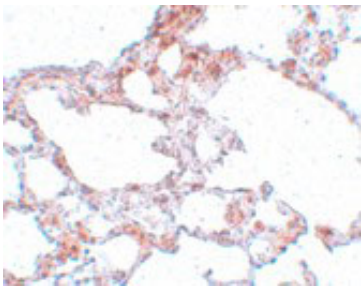
References

Stewart GS, Maser RS, Stankovic T, et al. The DNA double-strand break repair gene hMRE11 is mutated in individuals with an ataxia telangiectasia-like disorder. Cell1999; 99:577-87.
Buis J, Wu Y, Deng Y, et al. Mre11 nuclease activity has essential roles in DNA repair and genomic stability distinct from ATM activation. Cell2008; 135:85-96.

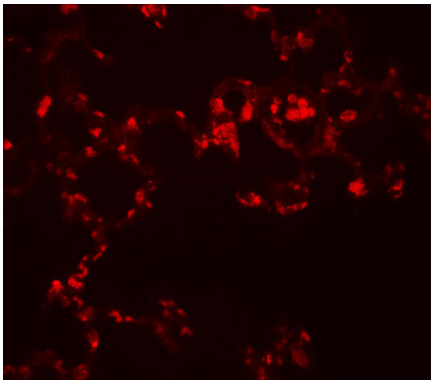
Images



Western blot analysis of MRE11 in rat lung tissue lysate with MRE11 antibody at (A) 1 and (B) 2 µg/mL.



Immunohistochemistry of MRE11 in rat lung tissue with MRE11 antibody at 5 µg/mL.



Immunofluorescence of MRE11 in rat lung tissue with MRE11 antibody at 20 µg/mL.