

POLG Antibody
Rabbit Polyclonal Antibody
Catalog # ALS13141

Specification

POLG Antibody - Product Information

Application	IF, WB, IHC
Primary Accession	P54098
Reactivity	Human
Host	Rabbit
Clonality	Polyclonal
Calculated MW	140kDa KDa

POLG Antibody - Additional Information

Gene ID 5428

Other Names

DNA polymerase subunit gamma-1, 2.7.7.7, Mitochondrial DNA polymerase catalytic subunit, PolG-alpha, POLG, MDP1, POLG1, POLGA

Target/Specificity

Human DNA polymerase gamma. Predicted cross-reactivity based on amino acid sequence homology: mouse (91%), rat (91%).

Reconstitution & Storage

Aliquot and store at -20°C. Minimize freezing and thawing.

Precautions

POLG Antibody is for research use only and not for use in diagnostic or therapeutic procedures.

POLG Antibody - Protein Information

Name POLG {ECO:0000303|PubMed:10827171, ECO:0000312|HGNC:HGNC:9179}

Function

Catalytic subunit of DNA polymerase gamma solely responsible for replication of mitochondrial DNA (mtDNA). Replicates both heavy and light strands of the circular mtDNA genome using a single-stranded DNA template, RNA primers and the four deoxyribonucleoside triphosphates as substrates (PubMed: [11477093](http://www.uniprot.org/citations/11477093), PubMed: [11897778](http://www.uniprot.org/citations/11897778), PubMed: [15917273](http://www.uniprot.org/citations/15917273), PubMed: [19837034](http://www.uniprot.org/citations/19837034), PubMed: [9558343](http://www.uniprot.org/citations/9558343)). Has 5' -> 3' polymerase activity. Functionally interacts with TWNK and SSBP1 at the replication fork to form a highly processive replisome, where TWNK unwinds the double-stranded DNA template prior to replication and SSBP1 covers the parental heavy strand to enable continuous replication of the entire mitochondrial genome. A single

nucleotide incorporation cycle includes binding of the incoming nucleotide at the insertion site, a phosphodiester bond formation reaction that extends the 3'-end of the primer DNA, and translocation of the primer terminus to the post- insertion site. After completing replication of a mtDNA strand, mediates 3' -> 5' exonucleolytic degradation at the nick to enable proper ligation (PubMed:11477093, PubMed:11897778, PubMed:15167897, PubMed:15917273, PubMed:19837034, PubMed:26095671, PubMed:9558343). Highly accurate due to high nucleotide selectivity and 3' -> 5' exonucleolytic proofreading. Proficiently corrects base substitutions, single-base additions and deletions in non-repetitive sequences and short repeats, but displays lower proofreading activity when replicating longer homopolymeric stretches. Exerts exonuclease activity toward single-stranded DNA and double-stranded DNA containing 3'- terminal mismatches. When a misincorporation occurs, transitions from replication to a pro-nucleolytic editing mode and removes the misincorporated nucleoside in the exonuclease active site. Proceeds via an SN2 nucleolytic mechanism in which Asp-198 catalyzes phosphodiester bond hydrolysis and Glu-200 stabilizes the leaving group. As a result the primer strand becomes one nucleotide shorter and is positioned in the post-insertion site, ready to resume DNA synthesis (PubMed:10827171, PubMed:11477094, PubMed:11504725, PubMed:37202477). Exerts 5'-deoxyribose phosphate (dRP) lyase activity and mediates repair-associated mtDNA synthesis (gap filling) in base-excision repair pathway. Catalyzes the release of the 5'-terminal 2-deoxyribose-5- phosphate sugar moiety from incised apurinic/aprimidinic (AP) sites to produce a substrate for DNA ligase. The dRP lyase reaction does not require divalent metal ions and likely proceeds via a Schiff base intermediate in a beta-elimination reaction mechanism (PubMed:9770471).

Cellular Location

Mitochondrion. Mitochondrion matrix, mitochondrion nucleoid

Volume

50 µl

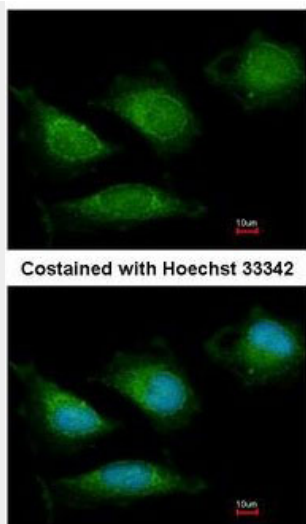
POLG Antibody - Protocols

Provided below are standard protocols that you may find useful for product applications.

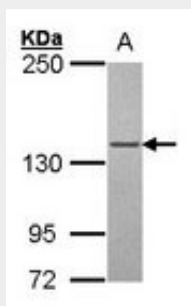
- [Western Blot](#)
- [Blocking Peptides](#)
- [Dot Blot](#)
- [Immunohistochemistry](#)
- [Immunofluorescence](#)
- [Immunoprecipitation](#)
- [Flow Cytometry](#)
- [Cell Culture](#)

POLG Antibody - Images

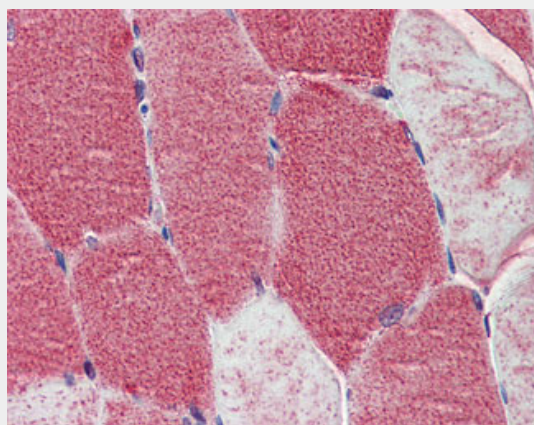




Immunofluorescence of methanol-fixed HeLa, using DNA polymerase gamma antibody at 1:200 dilution.



Sample (30 ug of whole cell lysate). A: 293T. 5% SDS PAGE. POLG antibody diluted at 1:5000.



Anti-POLG antibody IHC of human skeletal muscle.

POLG Antibody - Background

Involved in the replication of mitochondrial DNA. Associates with mitochondrial DNA.

POLG Antibody - References

Ropp P.A., et al. *Genomics* 36:449-458(1996).
 Lecrenier N.L., et al. *Gene* 185:147-152(1997).
 Watanabe T.K., et al. Submitted (MAR-1996) to the EMBL/GenBank/DDBJ databases.

Bogenhagen D.F.,et al.J. Biol. Chem. 283:3665-3675(2008).
Van Goethem G.,et al.Nat. Genet. 28:211-212(2001).