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# POLG Antibody (C-term)

Affinity Purified Rabbit Polyclonal Antibody (Pab)
Catalog # AP14948B

## Product Information

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|---|---|
| **Application** | WB, FC, IF, IHC-P, E |
| **Primary Accession** | P54098 |
| **Other Accession** | Q9QYV8, P54099, NP_001119603.1, NP_002684.1 |
| **Reactivity** | Human, Rat, Mouse |
| **Predicted** | Rat |
| **Host** | Rabbit |
| **Clonality** | Polyclonal |
| **Isotype** | Rabbit IgG |
| **Clone Names** | RB34378 |
| **Calculated MW** | 139562 |
| **Antigen Region** | 1120-1148 |

## Additional Information

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| **Gene ID** | 5428 |
| **Other Names** | DNA polymerase subunit gamma-1, Mitochondrial DNA polymerase catalytic subunit, PolG-alpha, POLG, MDP1, POLG1, POLGA |
| **Target/Specificity** | This POLG antibody is generated from rabbits immunized with a KLH conjugated synthetic peptide between 1120-1148 amino acids from the C-terminal region of human POLG. |
| **Dilution** | WB~~1:500 FC~~1:10~50 IF~~1:10~50 IHC-P~~1:100~500 E~~Use at an assay dependent concentration. |
| **Format** | Purified polyclonal antibody supplied in PBS with 0.09% (W/V) sodium azide. This antibody is purified through a protein A column, followed by peptide affinity purification. |
| **Storage** | Maintain refrigerated at 2-8°C for up to 2 weeks. For long term storage store at -20°C in small aliquots to prevent freeze-thaw cycles. |
| **Precautions** | POLG Antibody (C-term) is for research use only and not for use in diagnostic or therapeutic procedures. |

## Protein Information

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| **Name** | POLG {ECO:0000303\|PubMed:10827171, ECO:0000312\|HGNC:HGNC:9179} |
| **Function** | Catalytic subunit of DNA polymerase gamma solely responsible for |

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| | 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, PubMed:11897778, PubMed:15917273, PubMed:19837034, PubMed: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 mispairs. When a misincorporation occurs, transitions from replication to a pro-nucleolytic editing mode and removes the missincorporated 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/apyrimidinic (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 |

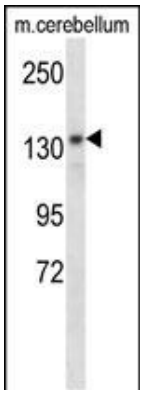
## Background

Mitochondrial DNA polymerase is heterotrimeric, consisting of a homodimer of accessory subunits plus a catalytic subunit. The protein encoded by this gene is the catalytic subunit of mitochondrial DNA polymerase. The encoded protein contains a polyglutamine tract near its N-terminus that may be polymorphic. Defects in this gene are a cause of progressive external ophthalmoplegia with mitochondrial DNA deletions 1 (PEOA1), sensory ataxic neuropathy dysarthria and ophthalmoparesis (SANDO), Alpers-Huttenlocher syndrome (AHS), and mitochondrial neurogastrointestinal encephalopathy syndrome (MNGIE). Two transcript variants encoding the same protein have been found for this gene.

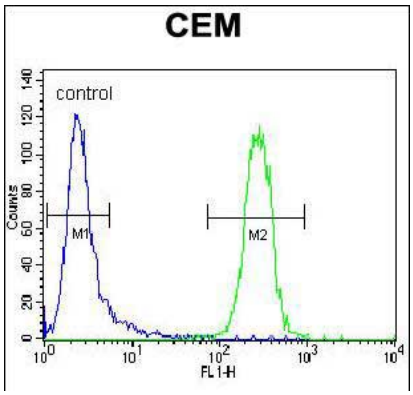
## References


Tong, Z.B., et al. Fertil. Steril. 94(7):2932-2934(2010)
Stewart, J.D., et al. Hepatology 52(5):1791-1796(2010)
Batabyal, D., et al. J. Biol. Chem. 285(44):34191-34201(2010)
Wang, W., et al. Nucleic Acids Res. (2010) In press :
Briggs, F.B., et al. Am. J. Epidemiol. 172(2):217-224(2010)

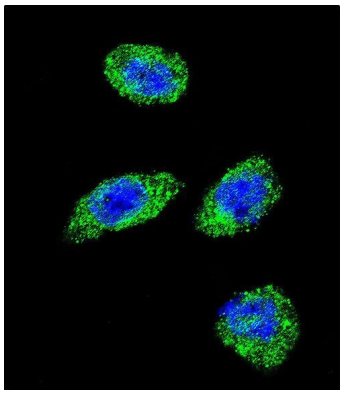
## Images



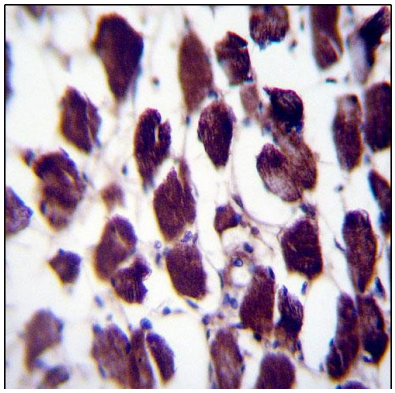

POLG Antibody (C-term) (Cat. #AP14948b) western blot analysis in mouse cerebellum tissue lysates (35ug/lane).This demonstrates the POLG antibody detected the POLG protein (arrow).




POLG Antibody (C-term) (Cat. #AP14948b) flow cytometric analysis of CEM cells (right histogram) compared to a negative control cell (left histogram).FITC-conjugated goat-anti-rabbit secondary antibodies were used for the analysis.



Confocal immunofluorescent analysis of POLG Antibody (C-term)(Cat#AP14948b) with Hela cell followed by Alexa Fluor 488-conjugated goat anti-rabbit lgG (green).DAPI was used to stain the cell nuclear (blue).



POLG Antibody (C-term) (Cat. #AP14948b)immunohistochemistry analysis in formalin fixed and paraffin embedded human skeletal muscle followed by peroxidase conjugation of the secondary antibody and DAB staining.This data demonstrates the use of POLG Antibody (C-term) for immunohistochemistry. Clinical relevance has not been evaluated.