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POLG Antibody (C-term) Blocking Peptide

Synthetic peptide
Catalog # BP14948b

Specification

POLG Antibody (C-term) Blocking Peptide - Product Information

Primary Accession P54098

POLG Antibody (C-term) Blocking Peptide - Additional Information

Gene ID 5428

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

Format
Peptides are lyophilized in a solid powder format. Peptides can be reconstituted in solution using the appropriate buffer as needed.

Storage
Maintain refrigerated at 2-8°C for up to 6 months. For long term storage store at -20°C.

Precautions
This product is for research use only. Not for use in diagnostic or therapeutic procedures.

POLG Antibody (C-term) Blocking Peptide - 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:9558343, PubMed:11477093, PubMed:19837034, PubMed:11897778, PubMed:15917273). 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:9558343,

PubMed:11477093, PubMed:15167897, PubMed:26095671, PubMed:19837034, PubMed:11897778, PubMed:15917273). 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

POLG Antibody (C-term) Blocking Peptide - Protocols

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

- Blocking Peptides

POLG Antibody (C-term) Blocking Peptide - Images

POLG Antibody (C-term) Blocking Peptide - Background

Mitochondrial DNA polymerase is heterotrimeric, consistingof a homodimer of accessory subunits plus a catalytic subunit. Theprotein encoded by this gene is the catalytic subunit ofmitochondrial DNA polymerase. The encoded protein contains apolyglutamine tract near its N-terminus that may be polymorphic.Defects in this gene are a cause of progressive externalophthalmoplegia with mitochondrial DNA deletions 1 (PEOA1), sensoryataxic neuropathy dysarthria and ophthalmoparesis (SANDO),Alpers-Huttenlocher syndrome (AHS), and mitochondrialneurogastrointestinal encephalopathy syndrome (MNGIE). Twotranscript variants encoding the same protein have been found forthis gene.

POLG Antibody (C-term) Blocking Peptide - 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)