

# SHMT1 Antibody (N-term)

Affinity Purified Rabbit Polyclonal Antibody (Pab)  
Catalog # AP14423a

## Product Information

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<b>Application</b>	WB, IHC-P, E
<b>Primary Accession</b>	<a href="#">P34896</a>
<b>Other Accession</b>	<a href="#">Q5E9P9</a> , <a href="#">NP_004160.3</a> , <a href="#">NP_683718.1</a>
<b>Reactivity</b>	Human
<b>Predicted</b>	Bovine
<b>Host</b>	Rabbit
<b>Clonality</b>	Polyclonal
<b>Isotype</b>	Rabbit IgG
<b>Clone Names</b>	RB34397
<b>Calculated MW</b>	53083
<b>Antigen Region</b>	19-47

## Additional Information

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<b>Gene ID</b>	6470
<b>Other Names</b>	Serine hydroxymethyltransferase, cytosolic, SHMT, Glycine hydroxymethyltransferase, Serine methylase, SHMT1
<b>Target/Specificity</b>	This SHMT1 antibody is generated from rabbits immunized with a KLH conjugated synthetic peptide between 19-47 amino acids from the N-terminal region of human SHMT1.
<b>Dilution</b>	WB~~1:1000 IHC-P~~1:100~500 E~~Use at an assay dependent concentration.
<b>Format</b>	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.
<b>Storage</b>	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.
<b>Precautions</b>	SHMT1 Antibody (N-term) is for research use only and not for use in diagnostic or therapeutic procedures.

## Protein Information

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<b>Name</b>	SHMT1 ( <a href="#">HGNC:10850</a> )
<b>Function</b>	Pyridoxal phosphate (PLP)-dependent enzyme that catalyzes the reversible conversion of serine and tetrahydrofolate (THF) to glycine and 5,10-methylene

THF, serving as a critical component of the folate cycle and facilitating one-carbon biosynthetic reactions essential for methionine, purine, and pyrimidine synthesis (PubMed:[24698160](#), PubMed:[30035852](#), PubMed:[38996576](#)). While its central activity involves serine cleavage, the detailed catalytic mechanisms remain under study, including both retro-aldol cleavage of the PLP-serine C(alpha)-C(beta) bond followed by formaldehyde condensation with THF, and alternative nucleophilic displacement mechanisms of the C(alpha) atom of PLP-serine aldimine involving THF's N5 atom (By similarity). Also catalyzes the cleavage of various 3-hydroxy amino acids, such as L-allo-threonine, L- threonine and 3-phenylserine, forming glycine and the corresponding aldehyde through a retro-aldol process; additionally, it catalyzes the formation of 5-formyltetrahydrofolate from 5,10-methenyltetrahydrofolate (PubMed:[38615009](#)). Also functions as a hydroxytrimethyllysine aldolase (HTMLA) catalyzing the second step of the carnitine biosynthesis pathway and exhibits substrate preference with the erythro (S,S) configuration, and more efficiency with L-allo- threonine (PubMed:[38615009](#)). In the nucleus, first functions as a lamin-binding scaffold protein that is essential for assembling the de novo thymidylate synthesis complex by co-localizing DHFR and TYMS with the nuclear lamina and anchoring the complex to DNA replication sites (PubMed:[22235121](#)). Subsequently, provides one-carbon substrates, specifically (6R)-5,10-methylene-5,6,7,8-tetrahydrofolate, in situ for de novo dTMP synthesis to sustain DNA replication and repair during cell proliferation (PubMed:[30035852](#)). Importantly, possesses RNA- binding capability, forming complexes that selectively regulate SHMT2 mRNA translation and dynamically modulate cytosolic and mitochondrial serine and glycine concentrations, thus influencing cellular metabolic status (PubMed:[38996576](#)).

### Cellular Location

Cytoplasm. Nucleus. Note=Nuclear translocation is RAN- dependent and is independent from both the oligomerization state and the catalytic activity (PubMed:[30035852](#)). In the cytoplasm, SHMT1 degradation is facilitated by 'Lys-48'-linked ubiquitination, whereas in the nucleus, 'Lys-63'-linked ubiquitination prevents degradation (PubMed:[22194612](#)). Predominantly sumoylated and localized to the nucleus in S phase cells and remains in the nucleus during the G2/M phase of the cell cycle (PubMed:[17446168](#)). Sumoylation occurs at the nuclear pore and is linked to nuclear import (PubMed:[17446168](#)). As a component of the de novo thymidylate synthesis complex, localizes specifically to replication forks during DNA synthesis (PubMed:[22235121](#)).

## Background

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This gene encodes the cellular form of serine hydroxymethyltransferase, a pyridoxal phosphate-containing enzyme that catalyzes the reversible conversion of serine and tetrahydrofolate to glycine and 5,10-methylene tetrahydrofolate. This reaction provides one carbon units for synthesis of methionine, thymidylate, and purines in the cytoplasm. This gene is located within the Smith-Magenis syndrome region on chromosome 17. Alternative splicing of this gene results in 2 transcript variants encoding 2 different isoforms. Additional transcript variants have been described, but their biological validity has not been determined.

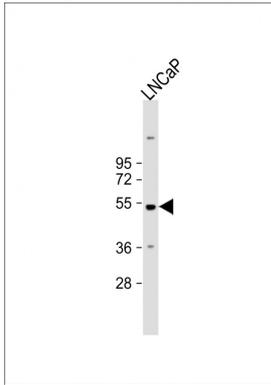
## References

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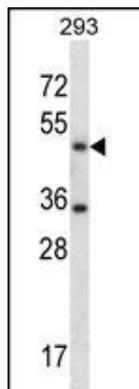
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Summers, C.M., et al. *Birth Defects Res. Part A Clin. Mol. Teratol.* 88(8):679-688(2010)  
Vijayakrishnan, J., et al. *Haematologica* 95(8):1405-1414(2010)  
Levine, A.J., et al. *Cancer Epidemiol. Biomarkers Prev.* 19(7):1812-1821(2010)  
Jugessur, A., et al. *PLoS ONE* 5 (7), E11493 (2010) :

## Images

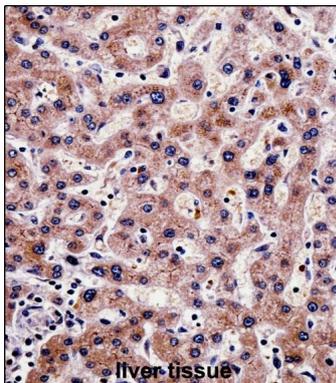
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Anti-SHMT1 Antibody (N-term) at 1:1000 dilution + LNCaP whole cell lysates/proteins at 20 µg per lane. Secondary Goat Anti-Rabbit IgG, (H+L), Peroxidase conjugated at 1/10000 dilution. Predicted band size : 53 kDa Blocking/Dilution buffer: 5% NFDM/TBST.



SHMT1 Antibody (N-term) (Cat. #AP14423a) western blot analysis in 293 cell line lysates (35ug/lane). This demonstrates the SHMT1 antibody detected the SHMT1 protein (arrow).



SHMT1 Antibody (N-term) (AP14423a) immunohistochemistry analysis in formalin fixed and paraffin embedded human liver tissue followed by peroxidase conjugation of the secondary antibody and DAB staining. This data demonstrates the use of SHMT1 Antibody (N-term) for immunohistochemistry. Clinical relevance has not been evaluated.

## Citations

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- [cMyc-mediated activation of serine biosynthesis pathway is critical for cancer progression under nutrient deprivation conditions.](#)

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