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#17336

# One-Carbon Metabolism Antibody Sampler Kit



Support: +1-978-867-2388 (U.S.)  
www.cellsignal.com/support

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New 05/18

**For Research Use Only. Not For Use In Diagnostic Procedures.**

Products Included	Product #	Quantity	Mol. Wt.	Isotype/Source
AHCYL1/IRBIT (D3A5G) Rabbit mAb	94248	20 µl	61 kDa	Rabbit IgG
CBS (D8F2P) Rabbit mAb	14782	20 µl	61 kDa	Rabbit IgG
Cystathionine gamma-Lyase (D1N1D) Rabbit mAb	19689	20 µl	44 kDa	Rabbit IgG
MTHFR (D1E4V) Rabbit mAb	25164	20 µl	78 kDa	Rabbit IgG
MTHFD1L (D8T7L) Rabbit mAb	14999	20 µl	106 kDa	Rabbit IgG
MTHFD2 (D8W9U) Rabbit mAb	41377	20 µl	35 kDa	Rabbit IgG
SHMT1 (D3B3J) Rabbit mAb	80715	20 µl	50 kDa	Rabbit IgG
Thymidylate Synthase (D5B3) XP® Rabbit mAb	9045	20 µl	30 kDa	Rabbit IgG
Anti-rabbit IgG, HRP-linked Antibody	7074	100 µl		Goat

See [www.cellsignal.com](http://www.cellsignal.com) for individual component applications, species cross-reactivity, dilutions, and additional application protocols.

**Description:** The One-Carbon Metabolism Antibody Sampler Kit provides an economical means of detecting select components involved in one-carbon metabolism pathway. The kit contains enough primary antibodies to perform at least two western blot experiments per antibody.

**Background:** One-carbon metabolism includes various enzymatic reactions involving the transfer of one-carbon groups mediated by folate cofactor (1). The activated one-carbon groups are used by various metabolic pathways, including purine synthesis, thymidine synthesis, and remethylation of homocysteine to methionine (1). S-adenosylhomocysteine hydrolase-like protein 1 (AHCYL1) is a member of the S-adenosylhomocysteine hydrolase family, which participates in the metabolism of S-adenosyl-L-homocysteine (2). Cystathionine beta-synthase (CBS) is a key enzyme involved in sulfur amino acid metabolism as it catalyzes the formation of cystathionine from serine and homocysteine (3,4). Cystathionine  $\gamma$ -lyase (CGL) is an enzyme in the transsulfuration pathway, a route in the metabolism of sulfur-containing amino acids (5). Methylene tetrahydrofolate reductase (MTHFR), a key enzyme in one-carbon metabolism, catalyzes the conversion of 5,10-methylenetetrahydrofolate to 5-methyltetrahydrofolate (1). 5-methyltetrahydrofolate donates its methyl group for remethylation of homocysteine to methionine (1). Methionine is further converted to S-adenosylmethionine (SAM), a major reactive methyl carrier (1). NADP<sup>+</sup> dependent methylenetetrahydrofolate dehydrogenase 1-like (MTHFD1L) is a mitochondrial enzyme that catalyzes the production of formate from 10-formyl-tetrahydrofolate in one-carbon flow from mitochondria to cytoplasm (6,7). MTHFD2 is a bifunctional methylenetetrahydrofolate dehydrogenase/cyclohydrolase involved in mitochondrial folate metabolism (8). Serine hydroxymethyltransferase 1 (SHMT1) is a cytoplasmic

serine hydroxymethyltransferase (9,10). It catalyzes the conversion of serine to glycine with the transfer of  $\beta$ -carbon from serine to tetrahydrofolate (THF) to form 5, 10-methylene-THF (9, 10). The methylation of deoxyuridine monophosphate (dUMP) to deoxythymidine monophosphate (dTMP) is an essential step in the formation of thymine nucleotides, a process catalyzed by thymidylate synthase (TS or TYMS) (11-13).

#### Background References:

- (1) Ducker, G.S. and Rabinowitz, J.D. (2017) *Cell Metab* 25, 27-42.
- (2) Jeong, W. et al. (2012) *PLoS One* 7, e49204.
- (3) Banerjee, R. and Zou, C.G. (2005) *Arch Biochem Biophys* 433, 144-56.
- (4) Jhee, K.H. and Kruger, W.D. *Antioxid Redox Signal* 7, 813-22.
- (5) Chiku, T. et al. (2009) *J Biol Chem* 284, 11601-12.
- (6) Prasannan, P. et al. (2003) *J Biol Chem* 278, 43178-43187.
- (7) Prasannan, P. and Appling, D.R. (2009) *Arch Biochem Biophys* 481, 86-93.
- (8) Christensen, K.E. and Mackenzie, R.E. (2008) *Vitam Horm* 79, 393-410.
- (9) MacFarlane, A.J. et al. (2008) *J Biol Chem* 283, 25846-53.
- (10) Hebring, S.J. et al. (2012) *J Neurochem* 120, 881-90.
- (11) Johnston, P.G. et al. (1991) *Cancer Res* 51, 6668-76.
- (12) Aschele, C. et al. (2002) *Ann Oncol* 13, 1882-92.
- (13) Jackman, A.L. and Calvert, A.H. (1995) *Ann Oncol* 6, 871-81.

**Storage:** Supplied in 10 mM sodium HEPES (pH 7.5), 150 mM NaCl, 100 µg/ml BSA, 50% glycerol and less than 0.02% sodium azide. Store at -20°C. Do not aliquot the antibody.

**For product specific protocols and a complete listing of recommended companion products please see the product web page at [www.cellsignal.com](http://www.cellsignal.com).**

**Specificity/Sensitivity:** Each antibody in this kit recognizes endogenous levels of its specific target protein. AHCYL1/IRBIT (D3A5G) Rabbit mAb does not cross-react with AHCYL2/IRBIT2 protein. SHMT1 (D3B3J) rabbit mAb does not cross-react with SHMT2 protein.

**Source/Purification:** Monoclonal antibody is produced by immunizing animals with a synthetic peptide corresponding to residues surrounding Glu50 of human AHCYL1/IRBIT protein, Leu220 of human CBS protein, Pro298 of human cystathionine  $\gamma$ -lyase protein, Pro39 of human MTHFR protein, Ala264 of human MTHFD1L protein, Leu340 of human MTHFD2 protein, Glu187 of human SHMT1 protein, and residues near the carboxy terminus of human thymidylate synthase protein.

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**Applications:** W—Western IP—Immunoprecipitation IHC—Immunohistochemistry ChIP—Chromatin Immunoprecipitation IF—Immunofluorescence F—Flow cytometry E-P—ELISA-Peptide **Species Cross-Reactivity:** H—human M—mouse R—rat Hm—hamster Mk—monkey Mi—mink C—chicken Dm—D. melanogaster X—Xenopus Z—zebrafish B—bovine Dg—dog Pg—pig Sc—S. cerevisiae Ce—C. elegans Hr—Horse All—all species expected **Species enclosed in parentheses are predicted to react based on 100% homology.**