10320 Camino Santa Fe, Suite G
San Diego, CA 92121
Tel: 858.875.1900 Fax: 858.875.1999

BCKDK Antibody (Center)

Purified Rabbit Polyclonal Antibody (Pab)
Catalog # AP7112a

Product Information

Application	WB, IHC-P, E
Primary Accession	O14874
Other Accession	Q00972, O55028
Reactivity	Human
Predicted	Mouse, Rat
Host	Rabbit
Clonality	Polyclonal
Isotype	Rabbit IgG
Clone Names	RB7751
Calculated MW	46360
Antigen Region	120-151

Additional Information

Gene ID	10295
Other Names	[3-methyl-2-oxobutanoate dehydrogenase [lipoamide]] kinase, mitochondrial, Branched-chain alpha-ketoacid dehydrogenase kinase, BCKD-kinase, BCKDHKIN, BCKDK
Target/Specificity	This BCKDK antibody is generated from rabbits immunized with a KLH conjugated synthetic peptide between 120-151 amino acids from the Central region of human BCKDK.
Dilution	WB~~1:1000 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 prepared by Saturated Ammonium Sulfate (SAS) precipitation followed by dialysis against PBS.
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	BCKDK Antibody (Center) is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

Name	BCKDK {ECO:0000303|PubMed:29779826, ECO:0000312|HGNC:HGNC:16902}

Function	Serine/threonine-protein kinase component of macronutrients metabolism. Forms a functional kinase and phosphatase pair with PPM1K, serving as a metabolic regulatory node that coordinates branched-chain amino acids (BCAAs) with glucose and lipid metabolism via two distinct phosphoprotein targets: mitochondrial BCKDHA subunit of the branched- chain alpha-ketoacid dehydrogenase (BCKDH) complex and cytosolic ACLY, a lipogenic enzyme of Krebs cycle (PubMed:24449431, PubMed:29779826, PubMed:37558654). Phosphorylates and inactivates mitochondrial BCKDH complex a multisubunit complex consisting of three multimeric components each involved in different steps of BCAA catabolism: E1 composed of BCKDHA and BCKDHB, E2 core composed of DBT monomers, and E3 composed of DLD monomers. Associates with the E2 component of BCKDH complex and phosphorylates BCKDHA on Ser-337, leading to conformational changes that interrupt substrate channeling between E1 and E2 and inactivates the BCKDH complex (PubMed:29779826, PubMed:37558654). Phosphorylates ACLY on Ser-455 in response to changes in cellular carbohydrate abundance such as occurs during fasting to feeding metabolic transition. Refeeding stimulates MLXIPL/ChREBP transcription factor, leading to increased BCKDK to PPM1K expression ratio, phosphorylation and activation of ACLY that ultimately results in the generation of malonyl-CoA and oxaloacetate immediate substrates of de novo lipogenesis and glucogenesis, respectively (PubMed:29779826). Recognizes phosphosites having SxxE/D canonical motif (PubMed:29779826).
Cellular Location	Mitochondrion matrix {ECO:0000250|UniProtKB:Q00972, ECO:0000305|PubMed:24449431} Note=Detected in the cytosolic compartment of liver cells {ECO:0000250|UniProtKB:Q00972}
Tissue Location	Ubiquitous.

Background

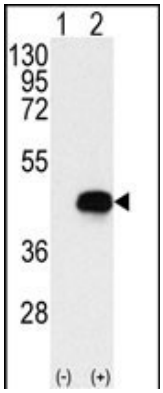
The second major step in the catabolism of the branched-chain amino acids, isoleucine, leucine, and valine, is irreversibly catalyzed by the branched-chain alpha-keto acid dehydrogenase complex (BCKD), an inner-mitochondrial enzyme complex composed of 3 catalytic components: a branched-chain alpha-keto acid decarboxylase (E1), a dihydrolipoyl transacylase (E2), and a dihydrolipoamide dehydrogenase (E3). The complex also contains 2 enzymes that regulated the state of activity of the BCKD complex: a kinase (BCKDK), and a phosphorylase. The ubiquitiously expressed kinase contains 1 histidine kinase domain. Maple syrup urine disease (MSUD) is a pathology secondary to an enzyme defect in the catabolic pathway of leucine, isoleucine, and valine. Accumulation of these amino acids and their corresponding keto acids results in encephalopathy and progressive neurodegeneration in infants not treated for MSUD.

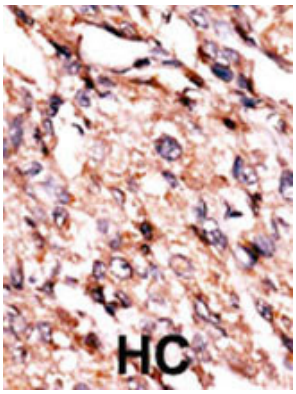
References

Chang, C.F., et al., J. Biol. Chem. 277(18):15865-15873 (2002).
Popov, K.M., et al., J. Biol. Chem. 267(19):13127-13130 (1992).
Zneimer, S.M., et al., Genomics 10(3):740-747 (1991).

Images

Western blot analysis of BCKDK (arrow) using rabbit polyclonal BCKDK Antibody (Center) (Cat.#AP7112a). 293 cell lysates (2 ug/lane) either nontransfected (Lane 1) or transiently transfected with the BCKDK gene (Lane 2) (Origene Technologies).





Formalin-fixed and paraffin-embedded human cancer tissue reacted with the primary antibody, which was peroxidase-conjugated to the secondary antibody, followed by AEC staining. This data demonstrates the use of this antibody for immunohistochemistry; clinical relevance has not been evaluated. BC = breast carcinoma; HC = hepatocarcinoma.