DATA SHEET

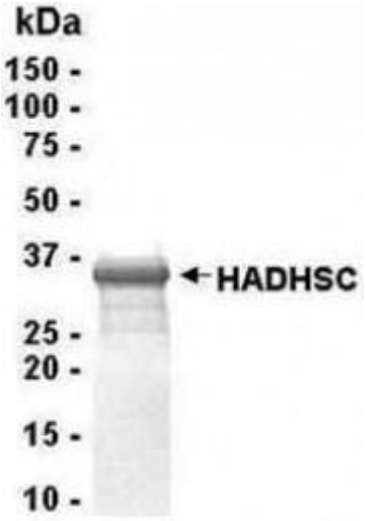
Short Chain 3-Hydroxyacyl-CoA Dehydrogenase, Mitochondrial

Gentaur ID: GWB-95FEA7

Legacy ID: 10-288-22261F

Source: E Coli

Reactivity: human



Fusion: T7 tag at N-terminus. **Function:** Plays an essential role in the mitochondrial beta-oxidation of short chain fatty acids. Exerts it highest activity toward 3-hydroxybutyryl-CoA.

Catalytic Activity: (S)-3-hydroxyacyl-CoA + NAD+ = 3-oxoacyl-CoA + NADH.

Pathway: Fatty acid beta-oxidation cycle; step 3.

Subunit: Homodimer.

Subcellular Location: Mitochondrion; mitochondrial matrix.

Tissue Specificity: Expressed in liver, kidney, pancreas, heart and skeletal muscle.

Disease: Defects in HADHSC are the cause of 3-alpha-hydroxyacyl-CoA dehydrogenase deficiency (HAD deficiency) [MIM:231530]. HAD deficiency is a metabolic disorder with various clinical presentations including hypoglycemia, hepatoencephalopathy, myopathy or cardiomyopathy, and in some cases sudden death.

Disease: Defects in HADHSC are the cause of familial hyperinsulinemic hypoglycemia 4 (HHF4) [MIM:609975]. Inappropriately elevated insulin secretion is the hallmark of persistent hyperinsulinemic hypoglycemia of infancy (PHHI), also denoted congenital hyperinsulinism. PHHI is due to defective negative feedback regulation of insulin secretion by low glucose levels. Unless early and aggressive intervention is undertaken, brain damage from recurrent episodes of hypoglycemia may occur. HHF4 should be easily recognizable by analysis of acylcarnitine species and that this disorder responds well to treatment with diazoxide. It provides the first \"experiment of

nature\" that links impaired fatty acid oxidation to hyperinsulinism and that provides support for the concept that a lipid signaling pathway is implicated in the control of insulin secretion.

Similarity: Belongs to the 3-hydroxyacyl-CoA dehydrogenase family.

Summary: 3-Hydroxyacyl-CoA dehydrogenase (HAD; EC 1.1.1.35) catalyzes the reversible dehydrogenation of 3-hydroxyacyl-CoAs to their corresponding 3-ketoacyl-CoAs with concomitant reduction of NAD to NADH and exerts it highest activity toward 3-hydroxydecanoyl-CoA (He et al., 1989).[supplied by OMIM]. **[1]** Molven,A., Matre,G.E., Duran,M., Wanders,R.J., Rishaug,U., Njolstad,P.R., Jellum,E. and Sovik,O.
Familial hyperinsulinemic hypoglycemia caused by a defect in the SCHAD enzyme of mitochondrial fatty acid oxidation
[2] He,X.Y., Merz,G., Yang,Y.Z., Mehta,P., Schulz,H. and Yang,S.Y., et al.
Characterization and localization of human type10 17beta-hydroxysteroid dehydrogenase
[3] Vredendaal,P.J., van den Berg,I.E., Malingre,H.E., Stroobants,A.K., Olde Weghuis,D.E. and Berger,R.
Human short-chain L-3-hydroxyacyl-CoA dehydrogenase: cloning and characterization of the coding sequence
[4] , Vredendaal P.J.C.M., van den Berg I.E.T., Malingre H.E.M., Stroobants A.K., Oldeweghuis D.E.M., Berger R.
Human short-chain L-3-hydroxyacyl-CoA dehydrogenase: cloning and characterization of the coding sequence.
[5] , Shi Y., Samuel S.J., Lee W., Yu C.H., Zhang W., Lachaal M., Jung C.Y.
Cloning of a L-3-hydroxyacyl CoA dehydrogenase that binds to GLUT4 glucose transporter cytoplasmic C-terminus: possible crosstalk between glucose transport and fatty acid metabolism.
[6] , O\'Brien L.K., Sims H.F., Strauss A.W.
Human short chain L-3-hydroxyacyl-CoA dehydrogenase.
[7] , Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G., Klausner R.D., Collins F.S., Wagner L., Shenmen C.M., Schuler G.D., Altschul S.F., et al.
Generation and initial analysis of more than 15,000 full-length human and mouse cDNA sequences.
[8] , Barycki J.J., O\'Brien L.K., Bratt J.M., Zhang R., Sanishvili R., Strauss A.W., Banaszak L.J.
Biochemical characterization and crystal structure determination of human heart short chain L-3-hydroxyacyl-CoA dehydrogenase provide insights into catalytic mechanism.
[9] , Barycki J.J., O\'Brien L.K., Strauss A.W., Banaszak L.J.
Sequestration of the active site by interdomain shifting. Crystallographic and spectroscopic evidence for distinct conformations of L-3-hydroxyacyl-CoA dehydrogenase.
[10] , Yang S.-Y., He X.-Y., Schulz H.
3-hydroxyacyl-CoA dehydrogenase and short chain 3-hydroxyacyl-CoA dehydrogenase in human health and disease.