

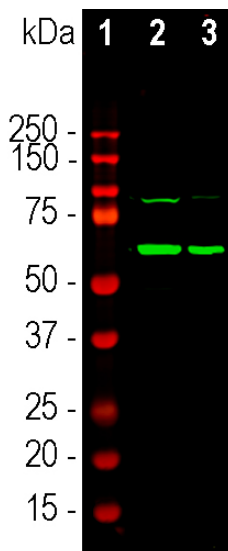
Ordering Information
 Web www.encorbio.com
 Email admin@encorbio.com
 Phone 352-372-7022
 Fax 352-372-7066

HGNC Name: TH
UniProt: P07101
RRID: AB_2737415
Immunogen: Full length human TH as expressed in and purified from *E. coli*
Format: Purified antibody at 1mg/mL in 50% PBS, 50% glycerol plus 5mM Na₂S₂O₃
Storage: Store at 4°C for short term, for longer term at -20°C
Recommended dilutions:
 WB: 1:1,000-1:2,000. IF/ICC and IHC: 1:1,000

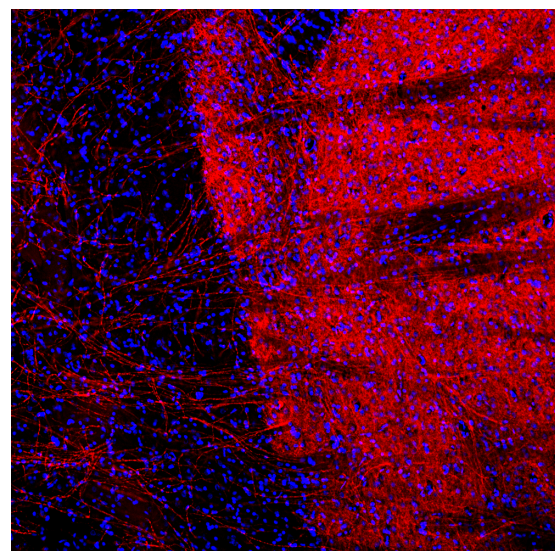
References:

- Pickel VM, et al. Cellular localization of tyrosine hydroxylase by immunohistochemistry. *J. Histochem. Cytochem.* 23:1-12 (1975).
- Bjorklund A, Dunnett SB. Dopamine neuron systems in the brain: an update. *Trends Neurosci.* 30:194-202 (2007).
- German DC, Manaye KF. Midbrain dopaminergic neurons (nuclei A8, A9, and A10): three-dimensional reconstruction in the rat. *J. Comp. Neurol.* 331:297-309 (1993).
- Daubner SC, Le T, Wang S. Tyrosine hydroxylase and regulation of dopamine synthesis. *Arch. Biochem. Biophys.* 508:1-12 (2011).
- Haavik J, Toska K. Tyrosine hydroxylase and Parkinson's disease. *Mol. Neurobiol.* 16:285-309 (1998).
- Torack RM, Morris C. Tyrosine hydroxylase-like (TH) immunoreactivity in Parkinson's disease and Alzheimer's disease. *J. Neural Transm. Park. Dis. Dement. Sect.* 4:165-71 (1992).
- Benes FM, Todtenkopf MS, Taylor JB. Differential distribution of tyrosine hydroxylase fibers on small and large neurons in layer II of anterior cingulate cortex of schizophrenic brain. *Synapse* 25:80-92 (1997).
- Lewis DA, Melchitzky DS, Haycock JW. Four isoforms of tyrosine hydroxylase are expressed in human brain. *Neuroscience* 54:477-92 (1993)

Applications	Host	Isotype	Molecular Wt.	Species Cross-Reactivity
WB, IF/ICC, IHC	Mouse	IgG1 heavy, κ light	~58kDa	Hu, Rt, Ms



Western blot analysis of tissue and cell lysates using mouse mAb to tyrosine hydroxylase, MCA-4H2, dilution 1:5,000 in green: [1] protein standard (red), [2] rat brain caudate/putamen and [3] PC12 cells. The strong band at about 58kDa corresponds to TH protein. The weak band at about 80kDa in the rat brain homogenate is likely an aggregated form of TH, which does not affect the specific cell and process staining of this antibody.



Immunofluorescent analysis of rat brain section stained with mouse mAb to tyrosine hydroxylase, MCA-4H2, dilution 1:1,000, in red. The blue is Hoechst staining of nuclear DNA. Following transcardial perfusion of rat with 4% paraformaldehyde, brain was post fixed for 24 hours, cut to 45μm, and free-floating sections were stained with the above antibodies. The MCA-4H2 antibody stains TH expressing neuronal processes, which are particularly numerous in the striatum, at the right of the image.

Background:

Tyrosine hydroxylase (TH) is a vital enzyme responsible for the generation of L-DOPA from the amino acid tyrosine. L-DOPA is the direct precursor of the neurotransmitter dopamine, and dopamine can itself be processed to produce the neurotransmitters adrenalin and noradrenalin (a.k.a. epinephrin and norepinephrin respectively). Neurons which use dopamine, adrenalin or noradrenalin, called collectively catecholamines, must express TH. TH has a very restricted distribution in the brain but is highly expressed in the cells in which it is found. As a result antibodies to TH are useful for the identification of catecholaminergic neurons. TH positive neurons in the rat are localized into clusters of cells most of which are in the brain stem, including notably the substantia nigra and locus ceruleus (1,2). The clusters of cells are usually referred to by a classification scheme based on that proposed by Dahlström and Fuxe, which labels cells in groups A1 - A17 and C1 to C3 (2). Subpopulations of neurons are localized in the olfactory bulb, habenula and retina. TH positive cells are also found in a subset of cells in the adrenal medulla, sympathetic ganglia, sensory ganglia and enteric ganglia (2). Numerous TH positive axons can be seen coursing through the striatum and to a much lesser degree the cortex originating from the mid brain A8, A9 and A10 nuclei. TH neurons have a huge impact on brain function and behavior but are relatively infrequent- the rat brain contains about 22,000 TH positive neurons in the A8, A9 and A10 nuclei out of a total of 200 million neurons (3). Parkinson's disease is caused by the loss of TH positive dopaminergic neurons in the substantia nigra, which are also relatively low in number (4), and perturbation of TH neurons has been implicated in Alzheimer's disease and schizophrenia (5-7). There is one mammalian gene which produces one mRNA transcript and one protein in rat but four alternate mRNA transcripts produce four slightly different forms of TH proteins in humans (8).

MCA-4H2 was made against full length recombinant human TH based on the 524 amino acid sequence in [NP_954987.2](http://www.ncbi.nlm.nih.gov/nuccore/NP_954987.2), expressed in and purified from *E. coli*. The antibody works well for western blotting and for IF, ICC and IHC (for IHC see data under "Additional Info" tab). We also supply rabbit, chicken and goat polyclonal antibodies to this protein, [RPCA-TH](#), [CPCA-TH](#) and [GPCA-TH](#).

FOR RESEARCH USE ONLY. NOT INTENDED FOR DIAGNOSTIC OR THERAPEUTIC USE.

Abbreviation Key:

mAb—Monoclonal Antibody **pAb**—Polyclonal Antibody **WB**—Western Blot **IF**—Immunofluorescence **ICC**—Immunocytochemistry
IHC—Immunohistochemistry **E**—ELISA **Hu**—Human **Mo**—Monkey **Do**—Dog **Rt**—Rat **Ms**—Mouse **Co**—Cow **Pi**—Pig **Ho**—Horse **Ch**—Chicken
Dr—*D. rerio* **Dm**—*D. melanogaster* **Sm**—*S. mutans* **Ce**—*C. elegans* **Sc**—*S. cerevisiae* **Sa**—*S. aureus* **Ec**—*E. coli*.