

BACKGROUND

Monoamine oxidases (MAO) (EC 1.4.3.4) are integral proteins of outer mitochondrial membranes devoted to the organism homeostasis protection. They are major flavin-containing enzymes which occur in various cells, both neuronal and non-neuronal in the central nervous system (CNS) and peripheral organs. In the CNS, MAO not only plays a physiological role in the metabolic inactivation of released monoamine transmitters (catecholamines, 5-HT) and in the detoxification of xenobiotic amines but also a pathophysiological role by generating cytotoxic free radicals during aging and neurodegenerative diseases. These enzymes are abundant in organs in direct relation with the environment: lungs, gastrointestinal tractus and liver. Their main function is to precede an oxidative deamination of biogenic amines, exogenous (tyramine) and endogenous (NE, dopamine and 5-HT) in peripheral tissues and brain. Thus, MAO enzymes are involved in the regulation of neurotransmitters which control mood, behavior, movement, memory, appetite, sleep and personality. Their inhibition, by either exogenous or pharmaceutical substances, leads to the increase of the above monoamines and has major consequences in the central nervous system.¹

There are two MAO isoenzymes, MAO-A and MAO-B, which differ by their substrate specificity and even more by inhibitor selectivity. The genes coding for MAO-A and MAO-B are both located on the short arm of the X chromosome. Comparison of the deduced amino-acid sequences showed that MAO-A and MAO-B have around 70% amino-acid sequence identity. The two genes *MAOA* and *MAOB* are arranged in a tail-to-tail orientation, and both span at least 60 kb, consist of 15 exons, and exhibit an identical exon-intron organization. The promoter regions share 60% sequence homology and both promoters consist of GC-rich regions. MAO-A is inhibited by low concentrations of clorgyline whereas MAO-B is irreversibly inhibited by low concentrations of deprenyl.² In humans, the highest concentrations of MAO-A are found at the organism's barrier: gut, placenta, lungs and liver, corresponding to the enzyme's ontogenetic detoxifying function. High concentrations of MAO-B are found in glial cells and blood platelets. Moreover, MAO-B is primarily found in the brain, accounting for 70%–80% of MAO in the brain. MAO-A preferentially deaminates bioamines of endogenous source such as 5-HT, epinephrine and NE, while MAO-B is the major metabolic step for changing active dopamine to its inactive catabolites, 3,4-dihydroxyphenylacetic acid and homovanillic acid. MAO-B preferentially degrades exogenous bioamines ingested in the diet such as phenylethylamine and benzylamine. Dopamine and tyramine are equally catabolized by both forms of MAO. These substrate specificities are relative, however, since, depending on conditions, all the above bioamines are substrates for both

isoenzymes. End products of the MAO action on bioamines are aldehydes and H₂O₂ involved in oxidative processes. Aldehydes are either oxidized in 5-hydroxy indol acetic acid (5-HIAA) for 5-HT catabolism or reduced in 3,4-dihydroxyphenylglycol (DHPG) for NE catabolism. The formation of 5-HIAA from 5-HT via MAO is accompanied by the generation of ROS which participate in smooth muscle cell proliferation, hypoxia and respiratory distress and cancer growth. Various MAO-B inhibitors are used for the treatment of Parkinson's disease. The antiparkinsonian effect of MAO-B inhibitors is primarily attributed to decrease the rate of turnover of striatal dopamine and prolong the duration of action of both endogenously and exogenously derived dopamine.³

References:

1. Bolasco, A. et al: Expert Opin. Ther. Pat. 20:909-39, 2010
2. Bortolato, M. et al: Adv. Drug Deliv. Rev. 60:1527-33, 2008
3. Chen, J.J. et al: Clin. Ther. 29:1825-49, 2007

TECHNICAL INFORMATION

Source:

MAO-B Antibody is a rabbit antibody raised against a short peptide from human MAO-B sequence.

Specificity and Sensitivity:

This antibody detects endogenous levels of MAO-B proteins without cross-reactivity with other related proteins.

Storage Buffer: PBS and 30% glycerol

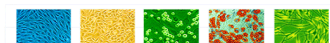
Storage:

Store at -20°C for at least one year. Store at 4°C for frequent use. Avoid repeated freeze-thaw cycles.

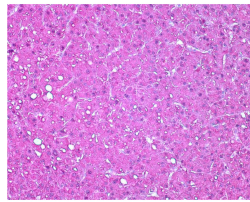
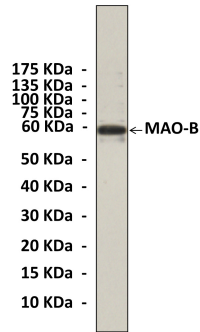
APPLICATIONS

| Application: | *Dilution: |
|--------------|------------|
| WB | 1:1000 |
| IP | n/d |
| IHC | n/d |
| ICC | n/d |
| FACS | n/d |

**Optimal dilutions must be determined by end user.*



QUALITY CONTROL DATA



Top: Western Blot detection of MAO-B proteins in HepG2 cell lysate using MAO-B Antibody. **Bottom:** This antibody also stains paraffin-embedded human hepatoma tissue in immunohistochemical analysis.

