



Flavin-Containing Monooxygenase (FMO) Protein Expression and Its Activity in Rat Brain Microvascular Endothelial Cells

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ABSTRACT

The aim of this study was to examine whether flavin-containing monooxygenase (FMO) protein was expressed in cultured rat brain microvascular endothelial cells (BMECs), which constitute the blood-brain barrier (BBB), and whether *N*-oxide from the tertiary amine, *d*-chlorpheniramine, was formed by FMO in rat BMECs. BMECs were isolated and cultured from the brains of three-week-old male Wistar rats. The expression of FMO1, FMO2 and FMO5 proteins was confirmed in rat BMECs by western blotting analysis using polyclonal anti-FMO antibodies, but FMO3 and FMO4 proteins were not found in the rat BBB. Moreover, *N*-oxide of *d*-chlorpheniramine was formed in rat BMECs. The intrinsic clearance value for *N*-oxidation at pH 8.4 was higher than that at pH 7.4. Inhibition of *N*-oxide formation by methimazole was found to be the best model of competitive inhibition yielding an apparent *K*_i value of 0.53 μmol/L, suggesting that *N*-oxidation was catalyzed by FMOs in rat BMECs. Although FMO activity in rat BMECs was lower than that in SD rat normal hepatocytes (rtNHeps), we suggest that rat BMECs enzymes can convert substrates of exogenous origin for detoxification, indicating that BMECs are an important barrier for metabolic products besides hepatic cells.

KEYWORDS

Rat Microvascular Endothelial Cells; Flavin-Containing Monooxygenase (FMO); FMO Protein Expression; FMO Activity; BBB

Cite this paper

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