

[Purchase](#)[Export](#)[Search ScienceDirect](#)[Subn](#) [Advanced search](#)[Shopping cart](#) | [Martin Hinz](#) | [Help](#)You have **Guest** access to
ScienceDirect [Find out more...](#)

Biochemical Pharmacology

Volume 62, Issue 10, 15 December 2001, Pages 1409–1415

Blood-brain barrier and neuronal membrane transport of 6-[18F]fluoro-L-DOPA¹Randa E. Yee^a, David W. Cheng^a, Sung-Cheng Huang^a, Mohammad Namavari^a, Nagichettiar Satyamurthy^a, Jorge R. Barrio^a

Choose an option to locate/access this article:

[Purchase \\$39.95](#)[Get Full Text Elsewhere](#)[Show more](#)

DOI: 10.1016/S0006-2952(01)00787-0

[Get rights and content](#)

Abstract

The transport of 6-[¹⁸F]fluoro-L-3,4-dihydroxyphenylalanine ([¹⁸F]FDOPA) across the blood-brain barrier (BBB) and neuronal membranes was compared with that of L-3,4-dihydroxyphenylalanine (L-DOPA) in rats. The carotid injection method was used as a direct measurement of [¹⁸F]FDOPA, 1-[¹⁴C]-L-DOPA, and 3-[¹⁴C]-L-DOPA transport across the BBB, while isolated nerve terminals were used to examine neuronal membrane transport of [³H]-L-DOPA. [¹⁸F]FDOPA appeared to use the same large neutral amino acid carrier for BBB transport as L-DOPA and L-phenylalanine. **In addition, carbidopa [L-α-hydrazino-α-methyl-β-(3,4-dihydroxyphenyl)propionic acid] was found not to have direct interference with the transport carrier on the BBB, but indirectly inhibited aromatic L-amino acid decarboxylase (AAAD) activity in brain endothelium by depletion of pyridoxal phosphate, a necessary cofactor of the enzyme.** In striatal and cortical synaptosomes, [³H]-L-DOPA uptake was inhibited by non-radioactive L-DOPA, FDOPA, and 6-fluoro-L-*meta*-tyrosine (6-FMT). The inhibition was significantly greater in terminals isolated from the striatum than in those from the cerebral cortex. FDOPA, 6-FMT, and L-DOPA equally inhibited the neuronal transport of [³H]-L-DOPA. This suggests that FDOPA and 6-FMT compete with L-DOPA at similar transport sites at the neuronal membrane.

Keywords

AAAD; Brain uptake index; L-DOPA; Carbidopa; Synaptosomes

Corresponding author. Tel.: +1-310-825-4167; fax: +1-310-825-4517

¹ **Abbreviations:** AAAD, aromatic L-amino acid decarboxylase; BBB, blood-brain barrier; BUI, brain uptake index; carbidopa, L-α-hydrazino-α-methyl-β-(3,4-dihydroxyphenyl)propionic acid; L-DOPA, L-3,4-dihydroxyphenylalanine; FDA, 6-fluorodopamine; [¹⁸F]FDOPA, 6-[¹⁸F]fluoro-L-3,4-dihydroxyphenylalanine; 4-[¹⁸F]FMT, 4-[¹⁸F]fluoro-L-*meta*-tyrosine; 6-[¹⁸F]FMT, 6-[¹⁸F]fluoro-L-*meta*-tyrosine; MeAIB, α-(methylamino)isobutyric acid; MPTP, 1-methyl-1,2,3,6-tetrahydropyridine; PD, Parkinson's disease; PET, positron emission tomography; and PLP, pyridoxal phosphate.

Copyright © 2001 Elsevier Science Inc. All rights reserved.

[About ScienceDirect](#)[Terms and conditions](#)[Contact and support](#)[Privacy policy](#)[Information for advertisers](#)

ELSEVIER

Copyright © 2014 Elsevier B.V. except certain content provided by third parties. ScienceDirect® is a registered trademark of Elsevier B.V.

Cookies are used by this site. To decline or learn more, visit our [Cookies page](#)[Switch to Mobile Site](#)

Recommended articles

[Metabolism and blood-brain clearance of l-3,4-dihy..](#)