

MEETING ABSTRACT

Open Access

Penetration of polar organic compounds through the blood-brain barrier

Huba Kalász^{1*}, Kamil Musílek², Kornélia Tekes³

From 17th Scientific Symposium of the Austrian Pharmacological Society (APHAR). Joint meeting with the Hungarian Society of Experimental and Clinical Pharmacology (MFT) Innsbruck, Austria. 29-30 September 2011

Background

The effect of polar organic xenobiotics in the central nervous system depends on blood-brain barrier (BBB) penetration of these compounds. Newly synthesized pyridinium aldoximes (K-compounds) are promising antidotes for organophosphate intoxications. However, being highly polar, their BBB penetration is questionable. Using an *in vivo* model we aimed to characterize the BBB penetration of K-compounds.

Methods

Male Wistar rats were injected intramuscularly with various doses of pyridinium aldoximes, blood, cerebrospinal fluid (CSF), and brain samples were collected after 5, 15, 30, 60 and 180 min. A recently developed and optimized RP-HPLC method was used for analysis. Samples of brain homogenate, blood serum and CSF were subjected to clean-up using precipitation by perchloric acid (pH < 1) and centrifugation at 14,000 rpm at 4°C for 20 min. Before load onto Zorbax Rx-C18 stationary phase, the pH of the supernatants was adjusted to 2. As mobile phase a mixture of acetonitrile and aqueous buffer pH 4.5, also containing ion-pairing agent, was used.

Results

Dose- and time-dependent BBB penetration of pyridinium aldoximes was experimentally found.

Conclusions

Dose- and time-dependent brain and CSF levels of these highly polar K-compounds following intramuscular administration suggest contribution of active transport

or specific transporters in their BBB penetration. The BBB transport may also depend on the size and charge of the solutes.

Acknowledgements

The authors are grateful to Ms. Györgyi Guth for her skilful technical assistance.

Author details

¹Department of Pharmacology and Pharmacotherapy, Semmelweis University, 1089 Budapest, Hungary. ²Department of Toxicology, University of Defence, 500 01 Hradec Králové, Czech Republic. ³Department of Pharmacodynamics, Semmelweis University, 1089 Budapest, Hungary.

Published: 5 September 2011

doi:10.1186/1471-2210-11-S2-A51

Cite this article as: Kalász et al.: Penetration of polar organic compounds through the blood-brain barrier. *BMC Pharmacology* 2011 11 (Suppl 2):A51.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit



* Correspondence: drkalasz@gmail.com

¹Department of Pharmacology and Pharmacotherapy, Semmelweis University, 1089 Budapest, Hungary

Full list of author information is available at the end of the article