Purchase Export Search ScienceDirect Advanced search

Article outline Show full outline

Highlights
Abstract
Abbreviations
Keywords
1. Introduction
2. Material and methods
3. Results and discussion
4. Conclusions
Conflict of interest statement
Acknowledgements
References

Figures and tables

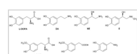

Table 1

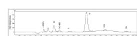

Table 2
Table 3
Table 4
Table 5

Journal of Chromatography B

Volumes 1049–1050, 1 April 2017, Pages 51–59

Determination of catecholamines and endogenous related compounds in rat brain tissue exploring their native fluorescence and liquid chromatography

Beatriz M. Fonseca[a], Márcio Rodrigues[a, b], Ana C. Cristóvão[a], Daniela Gonçalves[c, d], Ana Fortuna[c, d], Liliana Bernardino[a], Amílcar Falcão[c, d], Gilberto Alves[a, c,]

[a] CICS-UBI—Health Sciences Research Centre, University of Beira Interior, Rua Marquês d'Ávila e Bolama, 6201-001 Covilhã, Portugal

[b] UDI-IPG—Research Unit for Inland Development, Polytechnic Institute of Guarda, 6300-749 Guarda, Portugal

[c] CNC—Center for Neuroscience and Cell Biology, University of Coimbra, 3004-517 Coimbra, Portugal

[d] Pharmacology Department, Faculty of Pharmacy, University of Coimbra, Pólo das Ciências da Saúde, Azinhaga de Santa Comba, 3000-548 Coimbra, Portugal

Received 8 September 2016, Revised 23 February 2017, Accepted 26 February 2017, Available online 27 February 2017

CrossMark

Show less

http://dx.doi.org/10.1016/j.jchromb.2017.02.028

Get rights and content

Highlights

- A LC method for the analysis of main catecholamines and endogenous related compounds.
- This LC-FLD method is based on the native fluorescence of target analytes.
- The method enables an easy and fast analysis of the analytes in rat brain tissue.
- The method was successfully validated and requires a small sample volume.

Abstract

The profiling analysis of catecholamines and their metabolites in brain tissue offers a crucial key to understand their functions in the body and the opportunity to follow up neural diseases. A rapid and simple liquid chromatography-fluorescence detection (LC-FLD) method was developed and validated for simultaneously measuring several catecholamines and endogenous related compounds in the rat brain tissue samples. The target analytes measured in this bioanalytical assay were levodopa (L-DOPA), dopamine (DA), norepinephrine (NE), epinephrine (E), 3-*O*-methyldopa (3-*O*-MD), and homovanillic acid (HVA), being the 3,4-dihydroxybenzylamine (DHBA) used as internal standard (IS). The six analytes (L-DOPA, DA, NE, E, 3-*O*-MD and HVA) can be determined in a single chromatographic run of less than 12 min, and all the compounds (analytes and IS) were detected using their native fluorescence and monitored at excitation/emission wavelengths of 279 nm/320 nm, respectively. The chromatographic and detection conditions were experimentally optimized and then several validation parameters (linearity, limits of quantification and detection, precision and accuracy, recovery, stability and selectivity) were examined. In accordance with the international guidelines of the Food and Drug Administration and European Medicines Agency the method described herein exhibited limits of quantification in the range of 2–25 ng mL^{-1}, linearity in wide concentration ranges ($r^2 \geq 0.994$), and acceptable precision (coefficient variation ≤8.76%) and accuracy (*bias* ±14.65%) levels. Since the bioanalytical procedure does not involve pre-purification or derivatization of the sample, the absolute recovery was found to be around 100%. Moreover, the developed LC-FLD method was

successfully applied for the determination of the compounds of interest in tissue samples of different rat brain regions (cerebellum, amygdala, cortex, hippocampus, striatum, mesencephalon, medulla oblongata, *substantia nigra* and ventral tegmental area). Hence, this assay represents a valuable bioanalytical tool to support several pre(non)clinical studies in the broad field of neurosciences, requiring the quantitative analysis of these bioamines and their metabolites.

Abbreviations

3-*O*-MD, 3-*O*-methyldopa; CV, coefficient of variation; DA, dopamine; DHBA, 3,4-dihydroxybenzylamine; E, epinephrine; ECD, electrochemical detection; EMA, European Medicines Agency; FDA, Food and Drug Administration; FLD, fluorescent detection; HVA, homovanillic acid; IS, internal standard; L-DOPA, levodopa; LC, liquid chromatography; LOD, limit of detection; LOQ, limit of quantification; MS, mass spectrometry; MS/MS, tandem mass spectrometry; NE, norepinephrine; OSA, octane sulfonic acid; QC, quality control

Keywords

Catecholamines; Native fluorescence; Brain tissue; Bioanalytical method validation

Choose an option to locate/access this article:

Check if you have access through your login credentials or your institution

Check access

Purchase $41.95

Rent at DeepDyve

Get Full Text Elsewhere

Corresponding author at: Faculty of Health Sciences, University of Beira Interior, CICS-UBI—Health Sciences Research Centre, University of Beira Interior, Av. Infante D. Henrique, 6200-506 Covilhã, Portugal.

© 2017 Elsevier B.V. All rights reserved.

About ScienceDirect Remote access Shopping cart Contact and support Terms and conditions Privacy policy

Cookies are used by this site. For more information, visit the cookies page.

Copyright © 2017 Elsevier B.V. or its licensors or contributors. ScienceDirect ® is a registered trademark of Elsevier B.V.

Recommended articles

Citing articles (0)

Related book content