# *Development of sensitive HPLC method with fluorescence detection for determination of memantine and its application to pharmacokinetic study*

**A thesis Presented by**


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**For partial fulfillment of**
**The degree of PhD in Pharmaceutical Sciences**
**(Pharmaceutical Analytical Chemistry)**

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2013

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the Name of Allâh, the Most Beneficent, the Most Merciful.

نَرْفَعُ دَرَجَاتٍ مَّن نَّشَاءُ وَفَوْقَ
كُلِّ ذِي عِلْمٍ عَلِيمٌ

We raise to degrees whom We please, but over all those endowed with knowledge is the All-Knowing (Allâh).

صَدَقَ اللهُ العظيم

76 verse from

To my family

# *Acknowledgement*

First and foremost, all praise and glory to the Almighty ALLAH, the most kind and merciful to whom I am always indebted. Thee do I worship and Thee aid I seek.

My sincere thanks and gratitude go to Professor **Horria Abdel-Maged Mohamed,** for her kind support, stimulating suggestions, enthusiastic guidance and encouragement helped me in all the time of the research and writing this thesis.

My sincere appreciation to Professor **Hanaa Mohamed Abdel-Wadood,** for her sincere help, guidance, kind support, valuable scientific comments and supervision throughout this work.

I would like to express my sincere gratitude and deep appreciation to Professor **Kenichiro Nakashima,** for his encouragement, valuable suggestions and support in the course of this research.

I wish to express my worm thanks for Associate Professor **Mitsuhiro Wada,** for his constant support and helpful suggestions and for his great effort during the research period.

I sincerely thank Assistant Professor **Rie Ikeda,** for her valuable, detailed and constructive comments that contributed to this thesis.

I wish also to express my thanks and appreciation to all members in the division of pharmacoinformatics, department of clinical pharmacy, course of pharmaceutical sciences, graduate school of biomedical sciences, Nagasaki University.

I wish also to express my thanks and appreciation to all members of the department of pharmaceutical analytical chemistry, faculty of pharmacy, Al- Azhar University, Assiut branch and to all members of the department of pharmaceutical analytical chemistry, faculty of pharmacy, Assiut University and my deepest gratitude goes to my mother, ants, brothers and my sister for their love, continuous encouragement and support throughout my life.

I extend heartfelt thanks to my wife for her understanding, comforting, support and, above all, bringing me the most impressive scene, I have ever met, on the birth of my daughter and my sons.

*Mohamed Gamaleldin Hassan Oraby*

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1- **Mohamed G. Hassan**, Kamla M. Emara, Horria A. Mohamed, Hanaa M. Abdel-Wadood, Rie Ikeda, Mitsuhiro Wada, Naotaka Kuroda and Kenichiro Nakashima: Determination of memantine in rat plasma by HPLC-fluorescence method and its application to study of the pharmacokinetic interaction between memantine and methazolamide. **Biomedical Chromatography; 26** (2012), 214-219.

2- **Mohamed G. Hassan**, Rie Ikeda, Mitsuhiro Wada, Naotaka Kuroda, Hanaa M. Abdel-Wadood, Horria A. Mohamed and Kenichiro Nakashima: Interaction study of acetylcholinestrase inhibitors on pharmacokinetics of memantine in rat plasma by HPLC-fluorescence method. **Biomedical Chromatography; 27** (2013), 1685-1689.

## List of abbreviations

| | |
|---|---|
| **AChE** | Acetylcholinestrase |
| **AD** | Alzheimer's disease |
| **ASC** | Anthraquinone sulfonyl chloride |
| **AUC** | Area under curve for concentration versus time |
| **CAI** | Carbonic anhydrase inhibitor |
| **CL** | Clearance |
| **$C_{max}$** | The peak concentration |
| **Conc.** | Concentration |
| **CYP450** | Cytochrome P450 isoenzymes |
| **DIB-Cl** | 4-(4,5-diphenyl-1*H*-imidazol-2-yl)benzoyl chloride |
| **DMF** | Dimethylformamide |
| **DP** | Donepezil |
| **EDTA** | Ethylenediamine tetra-acetic acid |
| **EMEA** | European Medicines Agency |
| **FAB-MS** | Fast atom bombardment mass spectrometer |
| **FDA** | Food and Drug Administration |
| **FL** | Fluorescence |
| **FLX** | Flouxetine |
| **Fmol** | Femtomole |
| **FMOC** | 9-fluorenylmethyl chloroformate |
| **GAL** | Galantamine |
| **HPLC** | High Performance Liquid Chromatography |
| **Inj.** | Injection |
| ***i.p.*** | Intraperitoneal |
| **IS** | Internal standard |

| | |
|---|---|
| ***i.v.*** | Intravenous |
| **IUPAC** | International Union of Pure and Applied Chemistry |
| **LIF** | Laser induced fluorescence |
| **MEKC** | Micellar electrokinetic chromatography |
| **MRT** | Mean resident time |
| **MT** | Memantine (1-amino-3,5-dimethyladamantane) |
| **MZA** | Methazolamide |
| **NAC** | (2-naphthoxy)acetyl chloride. |
| **NBD-Cl** | 4-Chloro-7-nitro-2,1,3-benzoxadiazole |
| **nAChRs** | Nicotinic acetylcholine receptors |
| **NMDA** | *N*-methyl-D- aspartate. |
| **OPA** | *o*-phthaldialdehyde |
| **RFI** | Relative fluorescence intensity |
| **RIV** | Rivastigmine |
| **SPE** | Solid phase extraction |
| **THF** | Tetrahydrofuran |
| **E** | Molar absorbitivity |

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