Preparation and evaluation of colloidal systems of an anticancer drug for transdermal delivery

A Thesis submitted

by

Rania Mohamed Yehia Hussain

Bachelor degree of pharmaceutical sciences, 2013, Ain Shams University

Teaching assistant, Department of pharmaceutics and Industrial pharmacy,
The British University in Egypt

For the partial fulfillment of Master Degree in Pharmaceutical sciences (Pharmaceutics)

Under Supervision of:

Prof. Nahed Daoud Mortada

Professor of Pharmaceutics and Industrial pharmacy
Faculty of Pharmacy, Ain Shams University

Prof. Dalia Abd El-Rahman Attia

Professor of pharmaceutics and Industrial pharmacy and HOD
Faculty of Pharmacy, The British University in Egypt

Assoc. Prof. Rania Mohammed Hathout

AssociateProfessor of Pharmaceutics and Industrial pharmacy
Faculty of Pharmacy, Ain Shams University

Department of pharmaceutics and Industrial pharmacy

Faculty of Pharmacy

Ain Shams University

2017

قال تعالي :

"قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا ۖ
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ"

البقرة:آية (32)

Preparation and evaluation of colloidal systems of an anticancer drug for transdermal delivery

Acknowledgement

*First and foremost thank to **ALLAH**, for helping me accomplish my thesis and work.*

*I would like to express my deep appreciation and sincere gratitude to **Professor Dr. Nahed Daoud Mortada**, Professor of Pharmaceutics and Industrial pharmacy, Faculty of Pharmacy, Ain Shams University, for her valuable guidance, kindness, helpfulness and generosity throughout the development of this work.*

*I would specially like to thank **Professor Dr. Dalia Abd El Rahman Attia**, HOD and Professor of Pharmaceutics and Industrial pharmacy, Faculty of Pharmacy, The British University in Egypt (BUE), for her sincerest support, supervision, assistance and motivation devoted for me and the accomplishment of this work. One could not wish for a better mentor, exemplar and extraordinary supervisor.*

*I offer my sincerest gratitude to **Associate Professor Dr. Rania Mohamed Hathout**, Associate Professor of Pharmaceutics and Industrial pharmacy, Faculty of Pharmacy, Ain Shams University, who taught me alot and provided me with an amazing role model in scientific research and life. I couldn't thank her enough for scientifically mentoring this work and her great help and efforts provided throughout the accomplishment of this work.*

I would also like to express my profound gratitude and appreciation to ***Professor Dr. Mohamed Mohey ELmazar*** *Professor of Pharmacology and Toxicology, The British University in Egypt (BUE), for his great help, advice, support and effort he offered in the completion of this work. He is a true father and mentor.*

I am also grateful for ***Dr/ Shaimaa Shafik Abu-Seadah,*** *Lecturer of Pathology, faculty of medicine (girls), Al-Azhar University for her kindness, efforts and assistance in the completion of this work.*

I would also like to thank the BUE pharmacy staff for their support and ***Rawda Samir Mohamed****; Veterinarian,* ***Aya Adel*** *and* ***Moataz Sobhy*** *Research assistances, The British University in Egypt, for their practical and technical assistance.*

I would also like to thank the ***members*** *of the department Pharmaceutics and Industrial pharmacy, Faculty of Pharmacy, The British University in Egypt (BUE), especially* ***Noha Alaa*** *for their valuable help and support.*

I would also like to express my gratitude to all my friends who supported, aided and encouraged me all through the way especially ***Dina Shawqy and Tasnim El-Tantawy****.*

Finally, no words can describe my deepest appreciation to my mother ***Professor Dr. Hanna Shalabi****, my sister* ***Ibtesam Yehia*** *and my brother* ***Mostafa yehia*** *for their aid, motivation, support and infinite patience, along with the rest of my family members for their support all through the way.*

Dedication

I dedicate this work to my beloved mother

Prof. Hanna Shalabi

List of contents

List of Abbreviations

Abbreviation	Meaning
ANOVA	Analysis of Variance
ATP	Adenosine triphosphate
AUC	Area under the curve
EAC	Ehrlich Ascites Carcinoma
ECS	Ehrilch Solid Carcinoma
ELISA	Rnzyme-linked immunosorbent assay
H&E	Hematoxylin and Eosin
HLB	Hydrophilic lipophilic balance
HPLC	High Performance liquid chromatography
JA	Jasmonates
MCF-7	Human breast adenocarcinoma cell line
MDHJ	Methyl dihydrojasmonte
ME	Microemulsion
MJ	Methyl jasmonates
PDI	Polydispersity index
PS	Particle size
ROS	Reactive oxygen species
SB	Stratum basale
SC	Stratum corneum
SD	Standard deviation
SG	Stratum granulosum
SRB	Sulforhodamine B
SS	Stratum spinosum
TDDS	Transdermal drug delivery systems
TEM	Transmission electron microscope
UPLC	Ultra performance liquid chromatography
VDAC	voltage-dependent anion channel

List of Tables

List of Figures