மருத தொளி புரூஷர்களுக்கு
மாநிலமுநித் தலைக்குறை
ஒங்கலவொன்று உடன் சுவாசகமாக
உரியவை கொண்டே சொல்லி சனாந்தம்
அன்புடன்
Dedicated to
My Beloved Parents, Brother, Sister, and Friends
DECLARATION

I do hereby declare that this thesis entitled “D-PINITOL INHIBITS 7, 12-DIMETHYLBENZ (a) ANTHRACENE INDUCED MAMMARY CARCINOMA IN SPRAGUE DAWLEY RATS AND IN HUMAN BREAST CANCER CELL LINES (MCF-7 AND MDA-MB-231): A BIOCHEMICAL AND MOLECULAR APPROACH” has been originally carried out by me under the guidance and supervision of Dr. M. P. BALASUBRAMANIAN, M.Sc., Ph.D., Professor, Department of Pharmacology and Environmental Toxicology, Dr. ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani, Chennai- 600 113 and this work has not been submitted elsewhere for any other degree.

Date : ____________________________ (T.RENGARAJAN)

Place : Chennai- 600 113.
ACKNOWLEDGEMENT

I wholeheartedly place deep sense of gratitude on record for the opportunity given by the Almighty i.e., the tenure of my research work under the guidance of Dr. M. P. Balasubramanian, M.Sc, Ph.D., Professor, Department of Pharmacology and Environmental Toxicology, Dr. ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani Campus, Chennai-600 113. He has shown me the way to maximize my potential professionally as well as personally. His time honored guidance and support fuelled in me the attitude that was necessary to sustain. He was instrumental in instilling in me the right attitude, specific skills and his philosophy which has helped in completing this piece of work.

I am extremely grateful to Dr. R. Venkatakrishna Murali, M.D., Ph.D., Professor and Head, Department of Pharmacology and Environmental Toxicology, Dr.ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani, Chennai-600 113, for providing the laboratory facilities and for prompt help rendered, whenever approached.

I wish to express my deep sense of gratitude to Dr. D. Sakthisekaran, M.Sc., M.Phil., Ph.D., F.A.B.M.S, Professor and Head, Department of Medical Biochemistry, Dr.ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani, Chennai-600 113, for his valuable suggestions and constructive criticism as a doctoral committee member.

It is my pleasure thanks to Dr. S.L. Maheswari, Professor, Dr. S. Karthikeyan, Assistant Professor, Dr. Senthilkumaran Palanimuthu, Assistant Professor and Dr. G. Vijayakumar, Assistant Professor, Department of Pharmacology and Environmental Toxicology, Dr.ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani, Chennai- 600 113, for their considerable care and constant support all along my research work.
I express my deep sense of gratitude to Dr. K. Balasubramanian, M.Sc., M.Phil., Ph.D., Professor, Department of Endocrinology, Dr. ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani, Chennai-600 113, for their constant encouragement and suggestions throughout the course period.

I profoundly thank Dr. R. Vijayalakshmi, M.D., Department of Pathology, Maadha Medical College, Chennai, for her considerable help and suggestions during the course of my histological studies.

I am also indebted to Dr. S. Prakash, Ph.D., Assistant Professor, Department of Anatomy, Dr. ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani, Chennai-600 113 for interpreting the immunofluorescence micrographs and giving his valuable suggestions.

My sincere thanks to Dr. S. Sriman Narayan, Ph.D., Director i/c, National Centre for Nano sciences and Nano technology, University of Madras, Guindy, for their timely help to my study.

I extremely thankful to Mrs. Rita Rajan, CMC Vellore and Dr. Sarasabharathy for transmission electron microscope studies and interpretation.

Words are insufficient to express my thanks to Dr. N. Nandakumar, Ph.D., for being a brother and sailed for the last four years. He has read parts of my thesis and provided me valuable comments and helped me much in getting things formal in a correct way. I am also really at loss of words to thank him for publishing scientific data and constant encouragement whenever I struggled during the period of my research work.
I am really at loss of words to thank my beloved friends Mr. M. Kathiresh kumar, Mr. R. Arunkumar, Mr. P. Elumalai, Mr. C. Kirubanand, Mr. M. Karthick Ganesh, Mr. P. Rajesh, Mr. V. Sivabalan, Mr. K. Periyasamy, Mr. J. Selvaraj, Mr. K. Selvakumar, Dr. Ganesh, Mr. S. Sathish, Mr. Ezhilarasan, Mr. R. Raghu and all under/post graduate friends for their supports, comments, help and co-operation throughout the research work above all their love for my good will.

I am glad to express my heartfelt thanks to My seniors Dr. M. Illayaraja, Dr. T. Jayakumar, Dr. P. Rajendran, Dr. R. Jayaprakash, Dr. K. Langeswaran, Dr. S. Gowthamkumar, Dr. D. Alexander, Dr. L. Haribabu, Dr. S. Perumal, Dr. R. Arunkumar, Dr. K. Chitra, Dr. A. J. Jagadesan and Dr. A. Balamurugan for their valuable suggestions.

I convey my special thanks to my colleagues who gave me the feeling of being at home at work Miss. R. Revathy, Mr. S. Vijaya prakash, Mr. V. Sathishkumar, Mr. K. Bharathiraja, Mr. P. Tamilselvan, Mr. B. Lokeshkumar and Miss. K. Sindhu for their kind co-operation and encouragement during the course of the study.

I would like to record my heartfelt thanks to T. Nithyanandan and his colleagues for their help and support all along the course of my study.

I am deeply thank my well-wisher Mr. N. Karikalan, Assistant Professor, Department of Physics, Hindustan University, who stood as pillars giving unstrained and constructive encouragement and craved to see this day of life.

I convey my heartful thanks to Mr. Gunasekaran, Mr. Rajendran and Mr. R. Narayanan who helped me during my research period.
It is my duty to express my thanks to the **Administrative Staffs** of the Department of Pharmacology and Environmental Toxicology, Dr. ALM PG IBMS, University of Madras, Taramani Campus, Chennai, and **Central office staffs** for their considerable care and help, moral support throughout the tenure of the study.

A million thanks would not be sufficient to convey my gratitude to my beloved parents **Mr. R. Thamaraiselvan** and **Mrs. R. Dhanavalli**, who stood as pillars, shouldering me right from my starting till this. Stagnating dreams and carving to see me in this form. Without their sacrifice, I would not have been what I am today.

I would like to thank my brother **Mr. T. Balasubramaniyan**, for his personal care, moral support, help and above all his love for my good will which served a vital backbone to me during my entire research tenure.

I also express my sincere thanks for the financial support given by the **Department of Science and Technology (DST)**, New Delhi, India in the form of **DST-PURSE-JRF Fellowship** is gratefully acknowledged.

Most importantly, I wish to thank God for guiding my path in life according to his will.

*(T.RENGARAJAN)*
## CONTENTS

1. INTRODUCTION
   
2. MATERIALS AND METHODS
   27

3. RESULTS AND DISCUSSION
   97

4. SUMMARY AND CONCLUSION
   164

REFERENCES
   i-xliii

ANNEXURE