ACKNOWLEDGEMENT

“In every block of marble I see a statue as plain as though it stood before me, shaped and perfect in attitude and action. I have only to hew away the rough walls that imprison the lovely apparition to reveal it to the other eyes as mine see it.” ~ Michelangelo

Stone carving reflects for me the process of writing a thesis. The researcher-sculptor begins with a purpose, a question, a vision, a method; but from those beginnings emerges something else. A figure twisting out from stone as a result of the influence of the sculptor’s hand, mind, materials and tools. As the researcher-sculptor chips away, the thesis takes shape, influenced by the researcher-sculptor themselves, the pressure and techniques they apply, and the materials, data and methods with which they work, and most importantly the people who lend their help and support along the way.

After a rigorous period of five years, writing this note of thanks is the final carving that I am making to my thesis. It was both a painful and enjoyable experience accompanied with bitterness, hardship, frustration, encouragement, courage, and trust. It has been a period of intense learning for me, not only in the scientific arena, but also on a personal level. Writing this thesis has had a big impact on me. Over the course of this journey, I came to realize that it was teamwork that got me here. This PhD thesis will not be complete if I fail to acknowledge all the people who helped me reach the finish line.

First and foremost, I would like to thank God Almighty for providing me the blessings to complete this work. I thank him for giving me such a bountiful life, for seeing me through the tough times in the past years for bestowing me with such wonderful people around. Without his grace nothing would have been possible. I also would like to ask him that this project be another tool to help in the treatment of cancer patients.
I would like to express my deepest gratitude to my guide, Dr.N.Malathi, Vice Principal, Faculty of Dental Sciences and Professor & Head, Department of Oral Pathology and Microbiology, Sri Ramachandra University & Research Institute, Chennai. Her outline system for constructing scientific papers, her interest in communicating scientific ideas to diverse audiences, and her willingness to tackle some of the hardest problems are aspects of her leadership that I admire and plan to emulate in the future. I am very much indebted to her guidance, which helped me chart out the course for this thesis, for her patience in helping me through various issues, for her time, effort and knowledge, without which this thesis would not have been complete. She was not only the catalyst for my ever growing research but also a source of inspiration and encouragement from the start to the completion of my PhD.

Along with Dr.N.Malathi, I would like to thank my PhD co-guide, Dr.K.Ranganathan, Professor and Head, Department of Oral and Maxillofacial Pathology, Ragas Dental College, Uthandi, who has the attitude and substance of a genius: he continually and convincingly conveyed a spirit of adventure in regard to research, and an excitement in regard to teaching. It was extremely easy to work with him. He was always there to give me timely tips to ease my work burden, and most importantly he taught me to believe in and be confident of my work. Without his guidance and persistent help, this thesis would have not been possible.

I would also like to thank my internal research advisory committee member, Dr.T.S.Lokeswari, Professor and Head, Department of Biotechnology, College of Biomedical Sciences, Technology and Research, Sri Ramachandra University & Research Institute, Chennai. I have been extremely lucky to have a mentor who cared so much about my work, and who responded to my questions and queries so promptly. She helped sculpt this thesis, made a lot of corrections and played a huge role in transforming this piece of work into what it is now. During the entire process of thesis writing, she made me a better observer of my own mistakes and taught me the art of presenting my scientific work in a beautiful way.

All my mentors were always there for me through each and every step of this roller coaster journey of PhD research. I thank them from the bottom of my heart, for their support.
The backbone of my research has been all the plant work that I did at the College of Pharmacy, Sri Ramachandra University, Chennai. For this, I wish to thank Dr. D. Chamundeeshwari, Principal, College of Pharmacy and Professor & Head, Department of Pharmacognosy, Sri Ramachandra University & Research Institute, Chennai, for guiding me through each and every step of the plant work. If not for her guidance and expertise, this work would not be what it is now. I owe a hearty thanks to Mrs. S. Latha and Mr. R. Thirumalai Kumaran, Assistant Professors, Department of Pharmacognosy, College of Pharmacy, Sri Ramachandra University & Research Institute, Chennai, for helping me through the entire routine work for my thesis. I also wish to extend my gratitude to Mrs. Indra, Mrs. Sangeetha and Mr. Naveen from the Department of Pharmacognosy, College of Pharmacy, Sri Ramachandra University & Research Institute, Chennai, for their help and co-operation. Also, I take this opportunity to extend my gratitude to all the staff and faculty members of the College of Pharmacy, Sri Ramachandra University & Research Institute, Chennai, who have unflinchingly extended their time, expertise and guidance whenever I knocked on their doors.

I also wish to thank Dr. Alan Mathew Punnoose, Assistant Professor (Research), Centre for Regenerative Medicine and Stem Cell Research, Central Research Facility, Sri Ramachandra University & Research Institute, Chennai, my most respected mentor, for teaching me techniques like Primary and secondary cell culture, Polymerase chain reaction (PCR), and image analysis using fluorescence microscopy, confocal microscopy, etc. He helped me troubleshoot a lot of problems, instructed me in doing certain techniques perfectly, even taught me some basic mathematical calculations, and inculcated in me the habit of following the right lab practices.

Dr. Solomon F.D. Paul, Principal, College of Biomedical Sciences, Technology and Research and Professor & Head, Department of Human Genetics, Sri Ramachandra University & Research Institute, Chennai, you were a big pillar of support by never saying never, and granting me permission to carry out and learn any technique. Thank you for your unconditional support. I also want to express my deepest gratitude to my friend and teacher, Ms. Teena Koshy, Department of Human Genetics, College of Biomedical Sciences, Technology and Research, Sri Ramachandra University &
Research Institute, Chennai, who helped me learn and perform karyotyping for my samples.

For all the oral tissue samples that I collected for my study, I would like to thank **Dr.C.Ravindran, Professor and Head**, Department of Oral and Maxillofacial Surgery, Faculty of Dental Sciences, Sri Ramachandra University & Research Institute, Chennai, for giving me his kind approval. I would also like to thank his postgraduates for timely updating me with the selected cases.

One of biggest parts of any research is statistics. The key to success for any research lies in thoroughly understanding the theory behind the statistics and in applying it practically in the study. For this, I am highly grateful to **Dr.Suresh Varadarajan, Associate Professor**, Department of Community Medicine, Sri Ramachandra Medical College, Chennai. His approachability and the patience with which he handled and resolved my endless doubts and queries is what helped me navigate the statistical part of my research.

I would also like to use this opportunity to express my deepest gratitude to **Dr.H.Thamizhchelvan, Professor**, Department of Oral Pathology and Microbiology, Faculty of Dental Sciences, Sri Ramachandra University & Research Institute, Chennai for his guidance, encouragement, motivation and support when I needed it the most.

For their invaluable time, patience and the effort that they put in for teaching me data entry and presentation, for their out of the box ideas and techniques, for their motivation and support throughout my work, I wish to thank **Mr.S.Rajasekaran**, Senior Research Scholar, Centre for Regenerative Medicine and Stem Cell Research; **Mr.M.G.Dinesh, Ms.Srivaani, Ms.Janani and Mrs.Parmeshwari**, Senior Research Scholars, Herbal and Indian Medicinal Research Laboratory (HIMRAL), Central Research Facility, Sri Ramachandra University, Chennai and **Dr.Himavanth Reddy**. I would also like to extend my heartfelt thanks to **Ms.Veni.A**, Department of Biotechnology, College of Biomedical Sciences, Technology and Research, Sri Ramachandra University, Chennai, for helping me learn high performance thin layer chromatography (HPTLC) and for being there for me whenever I needed her support.
I am deeply indebted to Dr. Sandhya Sundaram, Professor, Department of Pathology, Sri Ramachandra Medical College, Chennai, for permitting me to use their reverse transcriptase polymerase chain reaction machine (RT-PCR).

I would like to thank our Chancellor, Shri V.R. Venkataachalam, for instituting the concept of research for dental clinicians and for giving me an opportunity to explore the field of research. I would also like to extend my respectful gratitude to Dr. T.K. Parthasarthy, Professor of Eminence & Chief Advisor; Dr. S.P. Thyagarajan, Professor of Eminence & Dean (Research); Dr. J.S.N. Murthy, Vice Chancellor; Thiru. N. Natarajan, Registrar; Dr. K.V. Somasundaram, Dean of Faculties; Dr. D. Kandaswamy, Dean of Dental College; for their continuous support and encouragement. I would also like to thank Dr. Vijayalakshmi Thanasekaraan, Controller of Examinations and Thiru. T. S. Thiagarajan, Deputy Registrar (Examinations), for their extended co-operation and guidance throughout my PhD journey.

I would like to thank the Indian Council of Medical Research for providing the funding which allowed me to undertake this research, and the board of reviewers for timely reviewing the progress of my PhD work and giving me their feedback.

I owe my deepest gratitude to Professor Jayaraman, Director of Institute of Herbal Botany, Tambaram, for helping with the authentication of the plant materials. I also wish to extend my sincere thanks to Mr. Rajendran, Seasonal Herbs, Tuticorin for providing me with a timely supply of plant materials. I would like to acknowledge Sargam laboratories, Guindy for their technical assistance provided for Gas Chromatography and Mass Spectrometry.

I would like to thank Dr. T. Malini and Central Research Facility, Sri Ramachandra University and Research Institute for providing technical support and guidance for using confocal microscopy.

I would also like to thank the Sri Ramachandra University’s Central Library ‘Sri Ramachandra Harvard Learning Centre’ for the facilities provided during my thesis writing period.
My acknowledgement will be incomplete if I fail to mention the entire staff and faculty of the Department of Oral Pathology and Microbiology, especially Dr. Sharada T. Rajan, Dr. N. Sangeetha, Dr. S. Mythili, Dr. S. Vijaya Nirmala; my batch mates: Dr. V. Saranya, Dr. R. Suganya and my lovely juniors: Dr. Soumya Anandan, Dr. Dilip Kumar, Dr. Saranya, Dr. Bhargavi, Dr. Rajiramesh, Dr. Ashwini Reddy, Dr. Serena Francis, Dr. Sivagami. You people pushed me every time I thought I had enough, and that was quite often. I also owe my sincere thanks to Mrs. Yuvrani, Department of Oral Pathology and Microbiology, Faculty of Dental Sciences, Sri Ramachandra University, Chennai, for helping me in this study.

Finally, I would like to dedicate this thesis to my parents. I have been extremely fortunate in life to have such parents who have shown me unconditional love and support. I am eternally grateful for their wise counsel and sympathetic ear. You are always there for me. Thank you both for giving me the strength to reach for the stars and chase my dreams. My sisters, brothers, aunties and uncles also deserve my whole hearted thanks as they have been encouraging, supportive and have shown faith in me and my work. Lastly, there are my friends. We were not only able to support each other by deliberating over our problems and findings, but also by talking happily about things other than just our papers.

Thank you very much, everyone!

Dr. Adtani Pooja Narain