Acknowledgements

This thesis is collaboration in the truest sense, and could not exist without the support and input of more people than I can name on one written page. I would like to thank all the people who played important roles in the process:

My utmost gratitude goes to my thesis advisor, Dr. G. C. Varshney for allowing me to join his lab, for his expertise, kindness, and most of all, for his patience. Above all and the most needed, he provided me unflinching encouragement and support in various ways. His truly scientist intuition has made him as a constant oasis of ideas and passions in science, which exceptionally inspire and enrich my growth as a student, a researcher and a scientist want to be. I am indebted to him more than he knows, for his advice, supervision, and crucial contribution, which made him a backbone of this research and so to this thesis. Thanks are due to Mrs. Veenu Varshney, for her motherly care, concern and hospitality throughout my tenure.

I would like to express my sincere appreciation to Dr. Girish Sahni, the Director, Institute of Microbial Technology, for providing an optimum working environment at the Institute, where a lack of resources is something unimaginable due to his managerial skills and foresight. His uncompromising quest for excellence significantly shapes everyone at the institute. Being wife of Kishore, his preaching always reached me indirectly and significantly influenced my scientific temperament. Interactions with him in the seminars and his critical questionings challenged me to set my benchmark, even higher and to look for solutions to problems rather than sticking to the problems. I learned from him, to believe in myself, my work and my future.

I am also indebted to Dr. G.P.S Raghava with whom I had close scientific association during bioinformatics work. His insight in Bioinformatics is second to none. Besides, he sets an example of a world-class researcher for his rigor and passion on research. I am deeply indebted to Dr. K. L. Dixit and Dr. P. Chakraborty, whose help, stimulating suggestions and encouragement helped me in all the time of research. I am especially grateful to Dr. P. Sen, for listening and shaping my ideas to the extent of experimentations. I am highly obliged to him for helping me procure antibodies required for my research purpose. I acknowledge personal care and concern shown by Dr. P. Gupta Saraswati, at the time of need. Besides, I offer my heartfelt thanks to Dr. K. Kishore, Dr. J. Agrewala, Dr. S. Majumdar, Dr. Pushpa Agarwal, Dr. A. Mandal and Dr. Manoj Raje, for their constant words of encouragement, fruitful discussions and help rendered on numerous occasions.

It gives me immense pleasure to convey my thanks to my lab colleagues Dr. Jasdeep, Dr. Souvik Bhattacharjee, Dr. Veena Bhatta, Dr. Vandana, Dr. Sukhinder and Dr. Ajit for their co-operation and valuable advice during the entire span of study. I owe my loving thanks to Ashu, Surinder, Deepshikha, Bhupinder, Abhijit, Shailender, Payal, Ram, Pooja, Anureet and Bhavik for creating a pleasant working atmosphere. The journey of long working hours in the lab would not have been so enjoyable without their congenial presence. I will always cherish the unwinding counseling sessions of Dr. Ajit to see the good in everything and be constructive. The help rendered by Ashu, Abhijit and Brij, is deeply appreciated as without them this work would not have taken the present shape. Million thanks are due to Raj Kumar ji, Selvan ji and Manjit for their expert technical help and all-round general assistance.

I shall always remember the cheerful support of my batchmates Kamlesh, Ashok, Mannan, Janmejay, Vijay, Shekhar, Amit, Manish, Jaspreet, Loveena, Puja, Kamna, Neetu, Neha and late Sandeep not only during the pre-PhD coursework, but also during the successive years. I am indebted to many student colleagues especially Sanjeev, Suhail and Sankalp for providing a stimulating and fun environment to learn and grow, for helping me get through the difficult times, and for all the emotional support, care and concern. Sanjeev’s wife Puja who made our stay very lively, comfortable and enjoyable in Chandigarh needs special mention. Suhail, being a close friend was always there be it for academic reasons or personal consultations. It gives me immense pleasure to acknowledge entire ‘gang of girls’ in the hostel including Dr’s Amita, Amrita, Suman, Anuradha, Sudesh, Meghna, Jaspreet and Puja, Loveena, Sushma, Ruchika, Sneha, Richa, Archan, Shweta, Swati, Payal for helping me get through the difficult times, for all the emotional support, camaraderie, entertainment, and caring they provided. I shall always cherish our evening matches of badminton or ‘phoot phod’, late night birthday parties, holi celebrations, saturday night dinners, foundation day dance rehearsals, Kasauni trip etc throughout my life which made my hostel life worth living and rocking. I owe my sincere thanks to Dr. Suman, for being always there for me to share my feelings, for all time emotional support and for all the fun and adventure we had together, Dr. Anuradha, my roommate, for always being very protective and treating me as her little sis, Dr. Sudeesh for unconditional help especially for my promoter activity assays. I am really blessed to have known such wonderful peoples in my life. I thank my seniors Dr. Jagpreet Singh Nanda, Dr. Dwipatayan, Dr. Srikanth, Dr. Sourabh, Dr. Rahul, Dr. Krishnamurthi, Dr. Rohan, Dr. Arshad and Dr. Vihari for their whole-hearted encouragement. I deeply appreciate the help rendered by them at times of need. I truly acknowledge my junior’s especially Dr. Vijender, Mahesh, Mitesh, Arvind, Haider for providing me their kind support whenever desired. All time help rendered by Dr. Vijender, that too with a kind politeness needs special mention.
I also benefited by the expert and efficient technical assistance of Mrs. Paramjit Kaur for protein sequencing and Mr. Deepak for DNA sequencing and confocal experiments, who have always been a good friend of students at all times. Their technical support was far beyond duty. I greatly appreciate the outstanding collaborative work done by Mr. M.K. Singh in the genesis of HaptenDB. Big thanks is owed to Mr. Surendra Kumar, Department of Biology, University of Oslo, Norway for always being ready to help in sending the research articles on time which were quite indispensable for my experimentations as well as in thesis writing. My heartfelt thanks go to Dr. Azeet Narayan for his timely guidance and help.

Words fail me to express my gratitude for my late father and mother who formed part of my vision and taught me the good things that really matter in life. To them I dedicate this thesis. I feel a deep sense of gratitude for my elder sister Mrs. Shivani Saxena, jiya ji Mr. Sharat Saxena, kids Shubhangi and Bhavni, all of whom, with their support, love, care and concern have always enlightened my life through thick and thin. My di had been a role model for me to follow unconsciously and has always been one of my best counselors. My brothers Mr. Ashish and Dr. Anupam Srivastava have always stood like strong pillars in my life. My elder brother, Dr. Anupam Srivastava, being always so protective about me, have never made me realize vacuum of my father. Thanks for exotic chocolates and beautiful dresses sent from Mauritius, which always recharged my energies. My younger brother, Mr. Ashish Srivastava, though younger to me, have always pampered me with whatever came out of my mouth. I am immensely indebted to my cousin, Mr. Alok Srivastava and his family for being my support system in Chandigarh, during initial years of my PhD. My heartfelt acknowledgement are due to Mr. Alok Srivastava for constantly reminding me to take care of myself, for providing the light moments in those stressful time, for taking his time to listen to everything that I have to say, for making me laugh when I'm nearing a tearful breakdown and for the countless other reasons. Thank you all for your love.

The chain of my gratitude would be definitely incomplete if I would forget to thank my in-laws who stood beside me and encouraged me constantly. Special thanks are due to my mother in law and sister in laws, Madhu and Manju didi, who came and stayed with me for months, leaving behind their families, cooked and took care of my baby and me so that I can recover after delivery and do my thesis at my earliest. I would also like to gratefully acknowledge the support of my husband, Kishore. He helped me immensely by giving me encouragement and emotional support, without whom I would have struggled to find the motivation needed to complete this dissertation. He has always stood in my life as a huge tree, taking all the pains of scorching heat, rain and wind by himself and giving me oxygen, fruits and shade. He encouraged me to grow and to expand my thinking. Thank you doesn't seem sufficient but it is said with tons of appreciation and respect.

With so many thanks due to several people, I have an apology to make to my most precious possession, my little angel, my son Aryan, for neglecting him when he needed me the most and thank him for bearing with me.

I truly acknowledge the help provided by the staff at the Central Animal Facility of the Institute for providing experimental animals. The helpful attitude of Dr. Neeraj Khatri, irrespective of the time I approached him with requests for animal issuance, needs a special mention. Help rendered by Mr. Bawa, Brahimchandji, Vinodji and others are duly appreciated.

The staff at the Bioinformatics Center, Library, Accounts, Store and Purchase section deserves a special mention for all the help rendered at the hour of need. Special thanks are due to the Mess workers for serving food with cheerful smile.

The financial help from The Council of Scientific and Industrial Research in the form of research fellowship is duly acknowledged.

Last but not the least I am indebted to all the experimental animals for their sacrifices without which the study would not have been possible. May God rest their soul in peace.

Now to him who is able to do immeasurably more than we ask or imagine, according to his power that is at work within us. This piece of work will never be accomplished without our God Almighty with his blessings and his power within me and also without the people behind my life for inspiring, guiding and accompanying me through thick and thin.

Date: July, 2009

Place: IMTech, Chandigarh