I would like to express my sincere thanks towards all those people who have helped me in completing my thesis and without whose support completing this work would be impossible.

First of all, I wish to thank Dr. Shantanu Chowdhury for accepting me in his lab. His valuable guidance and constructive criticism all these years ensured I remained focused. His never say die attitude and his decision making ability no matter how difficult the time is. He is very good mentor and great motivator. I am thankful for the freedom he gave me in implementing my ideas in research and always being supportive.

With due respect, I acknowledge Prof. S.K Brahmachari, DG-CSIR and Dr. Rajesh S. Gokhale, Director IGIB for providing me the infrastructure to carry out the research in their premier institute, IGIB. I was provided financial assistance for my junior and senior research fellowships from CSIR, Delhi.

I was privileged to be in touch with several other faculty members at IGIB. I would like to thank Dr. Munia Ganguli, Dr. Mitali Mukerji, Dr. Anurag Agrawal, Dr. Vibha and Dr. Beena Pillai who helped me in developing scientific attitude. I also thank, and Dr. Rajkumar Banerjee (IICT, Hyderabad) who helped me with mouse experiments and encouraged me to think differently. I would also like to thank Dr. Hemant Gautam for helping with radioactivity issues. I thank our collaborators at Mayo Clinic.

I also wish to thank my teacher Dr. Urmila Barros at Goa University, who provided me with valuable guidance and encouragement.

I was helped in innumerable ways by seniors at IGIB: Jitender, Arun, Priyanka, Dr. Nambi, Tanay, Lijo John, Niti, Soma, Dr. Faruq, Azeet, Anjali, Kangkan, GP Singh and Rashi to name a few. I thank seniors of Lab 308 for providing stimulating environment and numerous scientific and non scientific discussions.
It was my privilege to have Praveen and Ram as excellent seniors in the lab. They were instrumental in shaping my scientific career. Brainstorming session with both of them helped me pass the rigors of PhD life. It was Praveen who helped me whenever I got stuck with experiments. I learnt nuances of experimental design and execution from him. He taught me how to cope with pressure during PhD career. Time spent with Ram was a great learning experience for me. Through numerous interactions with Ram I learned the art of scientific reading, writing and presentation. He made sure that I stick to my goals during PhD life. His critical analysis of the results was of great help in deciding the shape of PhD project. His suggestion during writing of thesis is greatly appreciated. I am indebted for his help and constant encouragement.

It was in the company of my batch mates that I understood the value of collaborative learning and problem solving. Time spent during course work and all these years were excellent. They always extend their help whenever needed. Especially time spent with Rishi, Sanjiv and Ravindresh was helpful and refreshing. I thank them for numerous brainstorming sessions, parties, excursion trips and most importantly they believed in my abilities.

A special thanks goes to my good friend and colleague Vinod. It was a great learning experience and it was pleasure to work with him discuss ideas, and test the feasibility of those ideas. He always brings another angle to solving scientific problems we face routinely in the lab. Through his creativity, co-operativity, and criticism he made me stay on the right track. His help in computational analyses is highly appreciated.

My stay in the lab was made more stimulating by constant interactions with Richa, Gunjan, Dhurjhoti, Anirban, Isha, Anita Mann, Pankaj Jha, Aradhita, Vivek, Rajiv, Suruchi, Ashutosh, Anamika, Pankaj Narang, Meenakshi, Swarna, Abhishek, Maneesh, Prathima and Vasugi. They kept me intellectually awaken through their discussions. Richa helped in various experiments during early part of PhD including gene expression studies. Ankita, Gunjan and Dhurjhoti brought energy and enthusiasm in this lab and were kind enough to help with various routine experiments. I wish them all the success in future endeavors. Maneesh helped with various experiments. I am thankful to Devesh.
for all the help throughout these years. This lab provided great atmosphere to do good science. I feel privileged to be part of this lab.

I would like to thank friends at IGIB. Richa Singh, Santosh, Satya, Hemant, Satyam, Gaurav Verma, Gaurav Garg, Dilip and Mukesh helped me in several ways and provided congenial and fun filled environment.

I would like to take this opportunity to thank all my roommates Pankaj (baba), Parveeen, Vinay, Ravindresh, Reetesh Vishwakarma, Gunjan, Jivjot Singh, Deepak Kumar and Om Prakash for numerous parties and providing me ideal environment at room. I wish great success for their future assignments.

I wish to thank my good friend Diya. I feel privileged for innumerable help she provided all these years. She always stood beside me during tough times and provided moral support whenever needed. She helped in editing of my PhD thesis.

I am indebted to my friends at Goa Biotech for providing helpful suggestion and moral support throughout these years.

Lastly I thank my family. My parent’s whole heartedly supported my decision to join the PhD program, and continued to motivate me through the years. My brothers and sisters always supported me all throughout these years. I thank Prerna, Pranav, Garima and Mohak exciting atmosphere whenever I was at home.

I sincerely apologize to those whose names I may have forgotten to mention here but my heartfelt gratitude will always be to them for their contributions.

Above all, I thank God for his mercy.

Akinchan Kumar