Acknowledgements

First and foremost I offer my sincerest gratitude to my supervisor, Prof. Anjan Kr Dasgupta, who has supported me throughout my thesis with his patience and immense knowledge whilst allowing me the room to work in my own way. No matter what the problem was be it personal or professional, I could always lean upon him to discuss the issue and each and every time he patiently listened to them without showing any sign of irritation or frustration. It was his confidence on me which transpired into this thesis. One simply could not wish for a better or friendlier supervisor and I consider myself to be extremely lucky on this front.

I would also like to thank, Prof. Himadri Datta, Regional Institute of Ophthalmology (RIO), Calcutta Medical College, for his guidance and continuous encouragement throughout my PhD period.

A special thanks to my family. Words cannot express how grateful I am to my Late Grand Father MD Yaqub, it is because of him what I am today. Although, he is not with me today but I still miss him and his love and affection that he showered upon me since I was 6 months old. The most important person in my life, my Aapa, she has done everything for me. She has been the pillar of strength for me, she cared for me, scolded me, guided me and loved me unconditionally just like a mother would do for her child. A mere thanks would be insufficient for all the sacrifices she has done for me till today. Thank you Aapa. How can I forget Amma, my Grand Mother, Amma you are the best, she still keeps a constant eye upon me that I get to eat properly whenever I return home. My mother, I call her Ammi is the coolest person I have come across, thank you Ammi for your love all and those delicious foods.
A big thanks goes to all my three mamu, Arif mamu, Akif mamu and Pintu mamu, for treating me like their own child and taking care of my studies and all my other tantrums, without you all it would not have been possible where I am today. My aunt Nilo aunty and shabana aunty for your love and care. My sister Ruby and my brother Danish, I still cherish our childhood fights. My cousins Amir, Inteshab, Ehtesham, Rafia, Zubia, Sobiah, Nashit, Danial, Shadan, Anum, Rafay and my little sweetheart Aashiyaa, for giving me memorable moments which I cannot forget. They are my source of happiness whenever I am down. Thank you all. Thanks to Bhabi, Rozina maami and Naaz maami for your care and affection.

This thesis would not have been possible without the support of my seniors and juniors. I am fortunate to work in a lab where the seniors were absolutely caring and friendly, thank you Hirak da (Dr. Hirak Kumar Patra), Santi da (Dr. Santiswarup Singha), Suryyani di (Dr. Suryyani Deb), Sarru di (Dr. Sarita Roy), Puspita di, Sounik da, Tammy da (Dr. Tamoghna Bhattacharyya) and Jyoti di. I must say that my equation with Sarru di is abosulute friendly. Thank you sarru di for being there at most difficult and happy times. My seniors Dibya rani (Dibyajnan Chakraborty), what I can say about Dibya rani, he is my support system. Thank you Dibya rani. Kana babu (Dr. Avijit Ghosh), Sandip da (Dr. Sandip Samaddar), Biku bhai, Rudra da, Shyamalina di (Dr. Shyamalina Haldar), without your support and encouragement it would have not been possible for me. My friends Granthan, Amit Chowdhury, George, Ayan, Bosu (Anirban Bose), Buffa (Abhishek Mondal), Bit (Souvik Bit), Munna (Abhishek Bhattacharya), Aniket Das, Ishita Shome, Tuk Tuk (Sanhita Ray), you people are totally awesome and I cannot imagine my life without you. Thanks for your confidence and belief in my ability and for keeping me grounded. You people are the source of inspiration for me, thank you all for the love and support you have given me. Thank you Bappa da, Kaushik da and Khuku di for the memorable moments in the lab.

A special mention about Peu Santra, thanks for being there all the time. Your support has given me immense confidence to achieve whatever little I have done.
Thanks to Sumanta Bera, Smruti Savale, Debanjan Sen, Jayesh Khandelwal and Jayanta da for their support in collecting samples from Calcutta Medical College. I would also like to give a big thanks to Dr. Krishna Kumar for helping me writing my thesis in latex. Thanks to Soumyajyoti Banerjee and Dr. Soumen Roy of BOSE Institute, Kolkata for the work we have done together. Thank you Amaresh Panigrahy for his help during proteomic experiment.

I am grateful to our Head of the Department Prof. Maitrayee Dasgupta and all the faculty members of the Department of Biochemistry, University of Calcutta for their support and guidance. All my fellow colleagues and juniors working in the Department of Biochemistry.

Thanks to RIO, CRNN (CU) and DBT-IPLS (CU) for all the help during sample collection and experimental measurement.

A huge thanks to all the canteen staffs Gour da, Joy da, Disco, Uttam da, Arun da senior, Arun da junior, Mama, Gopal da, Pinte da and Ranesh da for their love and affection towards me. Thanks also to all the faculty members and office staffs of the Department of Microbiology and Biotechnology.

In conclusion, I recognize that this research would not have been possible without the financial assistance of ICMR and UGC-RFSMS and express my gratitude to these funding agencies.