Acknowledgement

This is the occasion to remember those without whom it would have been difficult for me to complete this endeavor. My deepest gratitude is reserved for Dr. Sudha Bhattacharya, who is not only my mentor, but also a great source of inspiration and a role model. With her deep insight, critical interventions and utmost patience, she helped me to develop the work embodied in this thesis. Her encouragement enabled me to overcome trying times, while at the same time she taught me to be strict with my own faults. I am ever grateful for her help, her sensitivity and her faith on me during the hours of my deepest crisis. She has instilled in me a sense of responsibility, dignity and fairness towards life and a desire to excel in my chosen field of work. I feel proud to be a flag bearer of her team and wish to do justice to the training she imparted on me with such care. I express my deep respect for Prof. Alok Bhattacharya, my co-mentor and an equally strong force in my life as Dr. Sudha Bhattacharya. Apart from his excellent guidance, he introduced me to the concept of border-less science and the excitement in cross-fertilizing the ideas flowing from different streams of science. His zeal and passion for science will always remain a source of motivation for me.

It was a privilege to come across some of the best minds in academia during my stay in JNU. I thank Prof. Ram Ramaswamy of SPS, Prof. Kasturi Dutta and Prof. P.S. Ramakrishnan of SES, Dr. Chetan Chitnis of ICGEB, Prof. RNK Bamezai, Prof. Rajendra Prasad, Prof. R. Madhubala, Dr. Shyamal Goswami, Dr. Gauranga Mukherjee and Dr. Natarajan of SLS, Prof. Kunal Chakravarty of CHS, Dr. Avijit Pathak of CSSS and Dr. Sugato Dasgupta of CESP for many exciting discussions which helped me to broaden my horizon. Thanks to the present and past Deans of the school for providing me the facilities available in the school. A special note of thanks to the members of CIF, SLS, for their sincere co-operation. Thanks to Dr. Subba Rao, Dr. Andrew Lynn, Dr. Chari and Mr. Inder of BIC, who had been always helpful with software packages and valuable suggestions, and Mr. Saini for excellent photography work.

My seniors and former lab-colleagues, Dr. Suman K. Dhar, Dr. Monika T. Anand, Dr. Indrani Som and Dr. Nagendra Yadav (whose breadth of knowledge still awes me) introduced me to a very healthy work culture during my initial days. Dr. Devider Sehgal and his wife Dr. Swati had been my pillars of support, whom I can always count on. My present lab mates and colleagues, Dr. Paul, Dr. Rachna, Ranjana, Soma, Paramita, Satish, Nivedita, Divya, Alka, Sujoyita, Shweta, Abhijit and Prabhat provided me with a very congenial working atmosphere. I remember my former colleagues Radha and Amita with great fondness. Rachna and Ranjana had always been co-operative in sharing their reagents. Special note of thanks to Soma and Nivedita, who rallied around me during difficult times and provided me with all kind of support. Thanks to Satish for sharing his data before publication. Abhijit and Prabhat always inspired and motivated me with their new ideas and zest for science. Shamoni, the under grad summer trainee, used to amaze me with her intellectual maturity and clarity at such an young age. I also had great pleasure in discussing various issues with Sucharita. I always marveled at Divya's liveliness, Alka's meticulous nature and Sujoyita's depth of knowledge, all telltale signs of making of a quality team. Jeevanji, Manojji and Sajjanji, through their dedicated service and assistance, always made my work in the lab easier and hassle free. Kuldeep, ever forgetful, nevertheless a good soul, had been a true friend apart from assisting in paper works.

My stay in the science school was enriched by the company of Dr. Tushar, Dr. Elora, Dr. Rajiv, Dr. Archana, Meenakshi, Jha, Anoop, Jaideep, Aniruddha, Dr. Anupam, Deepali, Manju, Bhaskar, Abdul, Giri, BK, Anil and Arun of SES, Dr. Niranjan, Dr. Subhra, Dr. Praveen, Jamal and Monideepa of CPMB, Dr. Neelima, Mitali, Sneh and Dr. Vinita of SLS, Dr. Partha, Dr. Bani, Dr. Sonia, Palash and Vishak of CBT.

I was fortunate enough to be in company with Dr. Nirupam Roy Chowdhury of ICGEB. He introduced me to the concept of practicing perfection in day to day life, and the pleasures and pain associated with it. His sense of dignity and fairness, along with his steely resilience has always influenced me. It was a privilege to know Sri B.N. Bhattacharya, whose poeeties were always fresh and strong and reflected the youth of his heart.

Memories of Chandru, his death and the student movement that followed made an indelible effect on me. I feel fortunate to be a part of the movement, which changed my perception regarding the reality in which we live in.
If not for Rajarshi, I would have missed the whole charm of my initial years in JNU. Playing music with him in the band, pulling down the barricades together during our protest march and our endless clashes with each other had been some of the defining moments for me. He had been a true comrade and a true friend. Similarly for Tirthatanmoy, the incorrigible romantic, and the Sultan of the Strings. An integral part of the underlying chemistry that made the music come to life in the band, in his own way he helped me to reshape and refine my thoughts. The time I spent with him and Krishnakali were some of my best in JNU. With Pavel, born romantic and with a soul which I believe will never be corrupted, I had shared perhaps some of the most fascinating and enriching moments. Himanshu and Pragnya, the most beautiful of people, enriched my stay with their inspiring integrity. Debraj, Kunal, Amrita, Sreemoy and the other members of 'Utnau' will always figure in my mind, not only for their selfless effort to empower the Santhals in Malharpur, but also for their contribution to my personal growth. Kavita, Shubhra, Pranayda, Dipankar, Rashid and Rochelle are some of the people I was fortunate enough to come across during my nearly insignificant political activism. Bodhishottva, Baidik, Sammitra and Mainak were late discoveries, but always lighted up the atmosphere with their sharp wits and exciting debates. Saikat, the incorrigible idealist and a fine mind, and his friend Rupleena shared with me some very exciting times at different levels during the later phase of my stay. Amit Ranjan Basu, a man who led his life in his own terms, had always by my side during troubled times, as was Sonatta. Aurab and Mayurika: beautiful people and brilliant minds, made my stay in UK exceptionally memorable with their company and hospitality.

Ruma, whom I was greatly attached to and though we drifted away, thanks to a strange indifference on my part, has always been a continuous force in my life. Similarly Pampa, completely selfless, had taken extra pains to care for my well being, Sebanti, Nabonita, Vaishali, Arundhati, Madhurree, Shuchi and Anu: we came together and drifted away during different walks of life, but never did they cease their friendship and their genuine care.

I am indebted to the booksellers in Dariyaganj, and Jawahar Book Depot, JNU, for providing brilliant collection of books at amazingly low prices, and thus doing a service to many students like myself.

Kutti mamu, a great influence in my life, had always encouraged me, as did Tapati mami and Pablo. Dadavai and Boudi have always cheered me up with their constant care. My late grandfather, a man far ahead of his times and an erudite scholar, and my late Dida would have been the happiest persons today. Their encouragement at a very early stage helped me to make clear choices in life. The most important contribution to my endeavor came from my parents, my elder brother and my sister-in-law. Dadamoni and Stephanie: without their support, encouragement, patience and love, it would not have been possible to reach the end of this saga. They inspired me by setting new standards by themselves. They have been a force, which will continuously urge me to strive for excellence. Ma: She tried to mould me with her indomitable courage and grit, zest and respect for life, truly modern outlook and split-hair conscience of right and wrong. No returns are enough to compensate for her sacrifices for me. Without her selfless and continuous support, love and encouragement, it would not have been possible for me to see through this effort. Babuji: He wanted me to be bold, radical, honest, transparent, never to be afraid to make mistakes and take up challenges. A continuous source of inspiration, affection and love, he has always guided me during testing times. No words are enough to articulate his contribution to this endeavor.

Fellowship from UGC and DST is acknowledged. I thank CSIR and Biochemical Society, UK for the travel award and the opportunity to present my work at IUBMB 2000, Birmingham, UK.

My thanks to those hundreds of nameless Malis and workers who made JNU such a beautiful campus.

Finally, salutations to those erudite scholars whose works helped me to bring the different strands of my work together and inspired me to pursue academics.

Anindya Bagchi