PREFACE

Molecular Biology always fascinated me and I always wanted to learn the intricacies of this amazing subject. After the completion of my Master degree in Molecular Biology & Biochemistry from Guru Nanak Dev University, I decided to pursue doctoral thesis under the guidance of my Molecular Biology teacher Dr P K Sehajpal, Professor; in the department of Molecular Biology and Biochemistry, Guru Nanak Dev University, Amritsar.

Before joining research, I knew a little bit about Tuberculosis and frankly speaking, I was little reluctant to work with the pathogenic organism. I guess, my apprehension was felt by my teacher and I was asked to visit Tuberculosis Research Centre (TRC), Chennai to have a hands on training in mycobacterial handling techniques to understand the nuisance of this wonderful field. The trip was, perhaps, organised to make me comfortable working with this infectious agent and it indeed was a great exposure for me and it completely changed my perception about this mysterious pathogen.

After initial interactions and discussion with my supervisor, I came to know regarding the highly adapting nature of this notorious pathogen. Interestingly, most other epidemics were known to lasts for few weeks to months, but tuberculosis is continuously infecting the mankind and reigning the world even today. As a molecular biology student, I wanted to explore the genomic of this pathogen as our laboratory was equipped with most of the facilities for such work and there was no genomic diversity data on clinical isolates from this part of the world. Hence I decided, in consultation with my supervisor, to explore the molecular heterogeneity of M. tuberculosis isolates from Punjab.

I am thankful to my supervisor Dr. P. K. Sehajpal, for providing me this opportunity. I have deepest sense of gratitude for this approach of encouraging and providing freedom during the planning and execution of experiments. His critical evaluation and opinion thereafter enhanced my scientific inquisitiveness. I also express my gratitude to my co-supervisor Dr. B. C. Sarin, Professor, Department of TB and Chest, Sri Guru Ram Das Institute of Medical Sciences and Research, Vallah, Amritsar for all his help.
I am deeply grateful for Dr. S. K. Garg, Emeritus Scientist (CSIR), Department of Molecular Biology and Biochemistry, Guru Nanak Dev University for his generous and continuous motivation during the entire course of this study. I am greatly thankful to Dr. N. C. Kajal, Professor; TB and Chest Hospital, Amritsar for his unremitting help in collection of clinical samples.

I express my warm and sincere thanks to Dr.(s) Vikas Gupta, Head Department of Biotechnology, DAV college, Amritsar; Rajiv Khosla, Head, Department of Biotechnology, Doaba college, Jalandhar and Ajay Kumar for their enthusiastic support during the course of this work. I highly appreciate Mr. (s) Vijay Kumar and Om Prakash for their company in the laboratory and for help during my unexpected visits to the university hostel during the completion of thesis. I would like to thank some of my fellow lab members Mr.(s) Sunny Sharma, Mohd. Shaffique, Sharad and Ms Manvi Kapoor for their support and humour during the research work.

Furthermore, I thank Dr. C.N Paramesivan, Deputy Director, Tuberculosis Research Centre (TRC) Chennai for providing me hand on training in his institute which immensely help me in dealing with this deadly pathogen. I duly acknowledge Dr. Indu Verma Associate Professor, Post Graduate Institute of Medical Sciences, Chandigarh for providing H37Rv strains as gift.

I gratefully acknowledge the financial assistance provided by Indian Council of Medical Research in the form a Junior Research Fellowship to me.

Lastly, I would like to put on record my indebtedness to my parents, wife and son for the patience, endurance and regular motivation that enabled me to complete this research work.

(Ravinder Sharma)