ACKNOWLEDGEMENTS

This thesis is the end of my journey in obtaining my Ph.D. I have not traveled in a vacuum in this journey. This thesis has been kept on track and been seen through to completion with the support and encouragement of numerous people including my well wishers, my friends, colleagues and various individuals. At the end of my thesis, it is a pleasant task to express my thanks to all those who contributed in many ways to the success of this study and made it an unforgettable experience for me.

It is the almighty who bestowed me the power, courage and will to meet the ups and downs of life. I bow my head in reverence to him.

At this moment of accomplishment, I to acknowledge my guide, Dr. Badaruddoza, Senior Assistant Professor, Department of Human Genetics, Guru Nanak Dev University. This work would not have been possible without his guidance, support and encouragement. Under his guidance I successfully overcame many difficulties and learned a lot. The joy and enthusiasm he has for his research was contagious and motivational for me, even during tough times in the Ph.D. pursuit. His unflinching courage and conviction will always inspire me, and I hope to continue to work with his noble thoughts.

I am also extremely indebted to Dr. Vanita Kumar (Head of the Department), Prof. A.J.S. Bhanwer, Prof. (Mrs) Sharda Sidhu, Dr. (Mrs) Gursatej Gandhi, Dr. (Mrs) Vasudha Sambyal, Dr. (Mrs) Anupam Kaur, Dr. Manpreet Kaur and especially Dr. Kamlesh Guleria for being morale boosters for me and I am obliged for their support and persistent efforts in imparting me the knowledge of this rapidly evolving field and also for providing necessary infrastructure and resources to accomplish my research work. I warmly thank them for their valuable advices, constructive criticism and their extensive discussions around my work.

I thank my RDC members, for their helpful suggestions and comments during my progress report presentations.

I am thankful to Dr. Badaruddoza, Prof. A.J.S. Bhanwer, Prof. Sharda Sidhu, Prof. A.K. Thukral, Dr. A.S. Soodan, Dr. A.P. Vig and Er. M.S. Bhatti who taught me in Pre-Ph.D. lecture courses.

The members of my lab have contributed immensely to my personal and professional time at Department of Human Genetics. The group has been a source of friendships as well as good advice and collaboration. We have been like a family. My experience in the lab was greatly enhanced as it filled out from just Sandeep, Basanti, Manpreet and me. I will easily miss hanging out with them. I wish to sincerely thank Sandeep with whom I spent most part of my Ph.D. tenure. I had many rounds of discussions on my project with her that helped me a lot. I admire her distinguished helping nature. My thanks go in particular to Basanti. She has been a source of great emotional support. My special appreciation goes to Manpreet.
(UGC project fellow) for her friendship and encouragement during the last phase of my thesis compilation. Many works like correction, typing, proof-reading, reference preparations have been done by her. I wish her to complete her Ph.D. very soon. To my lab-mates, thanks for the fun and support. I greatly look forward to having all of you as colleagues in the years ahead.

I am highly indebted to Dr. (Mrs.) Kawaljit Matharoo and my colleagues for providing a stimulating and fun filled environment. I am thankful to Mrs. Rajni Khanna, Akbar, Naresh, Radhika, Kapila, Taran, Rubina, Shivani, Nabodita, Jasmine, Yoginder and Seema. Their presence and vital help made my research easy and enjoyable.

I would also like to extend huge, warm thanks to my dear juniors, Neha, Shiwali, Minakshi Ahluwalia, Minakashee (Jammu), Maggi, Gurleen and Arti for their valuable help and support. Special thanks to Anamika and Jaspinder for their co-operation and unflinching support.

A journey is easier when you travel together. Interdependence is certainly more valuable than independence. This thesis is the result of Balraj and Tarun who were always there when I really needed. Thank you doesn’t seem sufficient but it is said with appreciation and respect to both of them for their support, encouragement, care, understanding and precious friendship. I would like to thank my dear friend Balraj for crisis support during a few computer meltdowns.

I would like to thank my friends Sunil, Aman, Hitesh, Manjesh, Dr. Mukesh, Dr. Puri, Dr. Kulwinder, Dr. Sukhdev, Dr. Deepak, Mandeep Singh, Rai and Tanveer for their help in various ways. I doubt that I will ever be able to convey my appreciation fully, but I owe them my eternal gratitude.

I am grateful to the non-teaching staff of the Department of Human Genetics, Mr. Kewal Krishan, Mr. Gurbaksh, Mr. Ramola, Mr. Surjit, Mr. Aman, Mr. Subhash, Balbir and Kshushwant for their cooperation and help with the administrative work.

In this juncture of time, words fail me to express my appreciation and gratitude to Mrs. Arzoo for her support, generous care and cordial adjustment. She was always beside me during the happy and hard moments to push me and motivate me. Thanks are also due to Natique and Shadman for their cheerful company.

A penultimate thank-you goes to my wonderful parents. For always being there when I needed them most, and never once complaining about how infrequently I visit. They bore me, raised me, supported me, taught me, trusted me and loved me. My father deserves far more credit than I can ever give him. A special mention goes to my late mother, who always believed in me. Although she is no longer with us, she is forever remembered. I am sure she shares our joys and happiness in the heaven. I remember her constant support when I
encountered difficulties and I remember, most of all, her delicious dishes. To her I dedicate this thesis.

My special regards to my brothers, Dr. Ajay and Dr. Vijayant, and my dearest Lata Bhabhi ji for their sincere encouragement and inspiration throughout my research work and lifting me uphill this phase of life. I thank them for encouraging me to be independent thinker, and having confidence in my abilities to go after new things that inspired me. My indebtedness towards my lovely niece, Bhawika and my sweetest nephew, Ishu, they have given me more than I can say. Their endless and priceless love made all this possible. I owe everything to them. An honorable mention of my cousins Sonu and Montu and Somlal Jijaji for always being there to help me.

Besides this, several people have knowingly and unknowingly helped me in the successful completion of this project.

**Special Acknowledgements**

My special acknowledgements go to all those people who made possible the difficult task of ‘Sampling’ for my experiments. My warm appreciation is due to the department for providing all the necessary facilities and help for the collection of samples.

For this research, data were essential. I collected a lot of data. It’s my fortune to gratefully acknowledge the support of some special individuals Sonu, Montu, Somlal jijaji, Harman, Sunny, Sarbijit and Jeevan who helped with this, for which I would like to thank them wholeheartedly. My thanks are due to the subjects who participated in the study, without their co-operation to this piece of research could not have come in form.

**Financial Support**

I take this opportunity to sincerely acknowledge the University of Grant Commission (UGC), Government of India, New Delhi, for providing financial assistance in the form of Rajiv Gandhi National Fellowship (No. F.16-31/2006/SA-II) which buttressed me to perform my work comfortably.

Raman Kumar