ACKNOWLEDGEMENTS...

A journey is easier when you travel together. Interdependence is certainly more valuable than independence. This thesis is result of my doctoral research whereby I have been accompanied and supported by many peoples. It is a pleasant aspect that I have now the opportunity to express my gratitude for all of them.

It is the moment of great pleasure and immense satisfaction for me to express reverence to my mentor, Dr. Om Parkash Katare, Professor in pharmaceutics, University Institute of Pharmaceutical Sciences, Panjab University, for his dexterous guidance, and unflagging encouragement. His overly enthusiasm and integral view on research, and his mission for providing 'only high-quality work and not less' has made a deep impression on me. Thanks are also due to him for providing me to work under his guidance and providing requisite research facilities to carry out work. His love, affection and personal touch in all ups and downs never let me feel alone without my family. Since my first day in the laboratory at UIPS, he has given me many inimitable opportunities that create exquisite ambience around my research work.

I indebted to Dr. Bhupinder Singh Bhoop, Professor in pharmaceutics and biopharmaceutics, UIPS for furnishing supervisory impetus and sharing his pearls of wisdom. He always remains a source of knowledge and motivation and always available whenever I needed. His guidance and crucial contribution made him a backbone of this research work. He not only gave a right direction to the execution of this work, but also contributed to my personal grooming as a researcher. His comments on manuscript drafts are themselves a course in critical thought upon which I will always draw. His capacity to combine critique with sympathy and commitment towards his researchers inspired me a lot.

Professor Emeritus Dr. S. K. Kulkarni, at UIPS, is always a source of inspiration for me. I will always be grateful to him for his tremendous support and encouragement throughout my stay at UIPS.

Dr. Karan Vasisht, Chairman, UIPS, is always a source of inspiration and encouragement for me. I always remain indebted for him for providing me opportunity to work in his team at UIPS.

Dr. Vijay Goni, Additional Professor, Department of Orthopaedic Surgery, PGIMER, Chandigarh, to whom I fail to express my gratitude in words. I am grateful to him for being the clinical investigator and ensuring smooth execution of the clinical studies under his close supervision and guidance. And today I feel proud to record that it was indeed an enriching experience to work with an exceptionally experienced surgeon and a learned clinical scientist like him. On personal front also his association always bring cherished feel.

All my teachers, esp. Prof. V. R. Sinha, Prof. A. R. Rao, Prof. (Ms.) Renu Chadha, Dr. (Ms.) Indu Pal Kaur, Dr. (Ms.) Shishu, Dr. Anupam Sharma, Dr. (Ms.) Maninder Karan, Dr. Kanwaljit Chopra and Dr. (Ms.) Sanju Dhawan, for providing necessary support whenever required and grooming my intellectual development in different spheres.

Dr. J. N. Verma, Managing Director, Lifecare Innovations Pvt. Ltd., Gurgaon, whose support has been of great value to me throughout these years. Thanks are
also due to him for financial support for research and allowing me to use his pilot-
plant facilities for carrying out some formulation development studies.

Mr. M. L. Sharma and Mr. Jagtar Singh (SAIF, Panjab University); and Mr. 
Nripendra Singh & Mr. Rahul (NIPER, Mohali), for rendering the expert 
technical support during various analytical studies.

The technical and non-teaching staff of University Institute of Pharmaceutical 
Sciences esp. Mr. Karam Singh, Mr. Chaman Lal, Mr. Anil Kumar, Mr. Buta 
Singh, Mr. Swarup, Mr. Satish, Mr. Ajay, Mr. Shadi Lal, Mr. Sharda, Mr. Swaran 
Singh, Mr. Budhi, Ms. Usha, Mr. Jindal, Ms. Anuradha, Ms. Radhadayal, Mr. 
Kundal, Ms. Satnam, Mr. Ashwani, Mr. Sumit, Ms. Jaisika, Ms. Rajani, Ms. 
Mandeep, Ms. Jaspal, Mr. Chetman, Ms. Pushpa and Mr. Pardeep for their vital 
help and also Mr. P. D. Choudhary, our librarian, for providing me with library 
facilities.

Dr. Rajiv Khurana and Dr. Naveen A. Khurana, for whom I have great regard. I 
warmly thank them for sharing their bright thoughts with me for any professional 
or personal matter. They had been a source of enormous professional and personal 
support throughout these years. I just pray to God almighty to bless them and 
also their son Pratul with lots of happiness, health and many many good things in 
life.

All my team mates esp. Kaisar, Bhawna, Basant, Anshuman, Poonam, Rishi, 
Deepak, Shantanu, Shetu and Sarvesh, with whom I had been 
associated during this duration. It was a pleasure to work with them. I want to 
especially thank Basant for being there whenever nay help was solicited. Basant, 
I would always cherish our comfortable stay together and hope that we will be 
able to stay in touch forever. Without your support and friendship, I would not 
have been able to simultaneously explore research and myself.

My friends and colleagues Jai, Raj Kumar, Neelima Maam, Ashok, Gandhi, 
Prince, Amit, Preet, Premna, Rakesh, Pran, Bala, Anurag, Kiran, Damanjeet, 
Azaki, Rohit, Nidhi, Harinder, Swati, Manoj, Varun, Neeraj, Vandita, Puneet, 
Disha, Ravi and Paul for creating an conducive environment for nurturing of my 
thoughts and vision during my stay.

My juniors Geeta, Naveenjot, Arvind, Himanshu, Antarpreet, Monica, Gajanand, 
Nitish, Chetan, Bimal, Chander Bhushan, Mausami. Aman and Rahul for their 
indefatigable help while compiling this dissertation. Thanks to Anadi, Deepa, 
Shweta, Neha, Puneet and Sameer too, for being there whenever their support 
was solicited.

My friends, Paramvir and Vikas to whom I am indebted for more than they know. 
I am also thankful to Dr. Shashi Bhushan, Scientist, IIIMT, Jammu, for his 
esential assistance in carrying out cell-line studies. I am also grateful to the 
team of Orthopedicians at PGIMER, which includes Dr. Sudesh Peham, Dr. 
Shakthi, Dr. Ashish, Dr. Tajir, Dr. Naveen and Dr. Shashidhar for providing full 
support in completing my clinical studies.

My parents, for giving me life in the first place. They deserve special mention 
for their inseparable support and prayers. My respected father, Late Shri. Devi 
Charan Bhatia, who put the fundament of my learning character, and showed me 
the joy of intellectual pursuit ever since I was a child. My loving mother Smt.
Shanta Bhatia, for educating me with aspects of life, and for absolute support and encouragement to pursue my interests and aspirations. Her continued prayers enabled me to bypass all the persistent obstacles to thesis completion. I am also grateful to my respected brother Mr. Kuldeep Bhatia and Dr. Sandeepan Bhatia, their tremendous support, guidance, encouragement and creating a mantle around me to face challenges. I always remember my Bhabhi Late Ms. Rekha Bhatia, for her motherly touch and wish peace to her soul. I am fortune to have Bhabhi, Ms. Neerja Bhatia, who is like my sister with whom I shared all my personal as well as professional issues and she deals with great levels of understanding and advice.

Words fail me to acknowledge my nieces Jyoti and Rupal for their naughty and innocent gestures, which are great stress-busters, whenever I am at home.

Lifecare Innovations Pvt. Ltd., Gurgaon and Department of Biotechnology, New Delhi, for the financial assistance by granting me with the fellowship and contingency. The acknowledgment is also due to Council Scientific and Industrial Research, Department of Science and Technology, Indian National Science Academy, India and Phospholipid GmbH, Germany for providing international travel grants to me for presenting my research work at international conferences and meetings.

Phospholipid GmbH, Germany; FERRO PFANSTIEHL, USA; Amerchol Corporation USA; American Lecithin Company, USA; Genzyme Pharmaceuticals, Switzerland; BASF Corporation, USA; J B Chemical & Pharmaceutical Ltd. Mumbai; Biochem Pharmaceutical Industries, Mumbai; LGC-Promochem, Bangalore; RPG Life Sciences, Mumbai and Beekay Finochem, India, for generously providing me ex-gratis samples of lipids, drugs or other excipients.

The PU’s and PGIMER’s Ethical Committee for providing approvals to carry out my research work on animals and for clinical studies, respectively.

All those researchers, scientists, and other people who have worked, written, published and distributed various books, journals, publications, and patents, I have referenced from.

Those experimental animals who laid down their lives in making my research endeavor successful. May GOD grant them eternal peace.

Above all, I thank ‘ALMIGHTY’ with whose beatitude I could reach this far. ‘HE’ bestowed me with blessing from time to time and enabled me to present this dissertation in the current form!

(Amit Bhatia)