

Statement of Purpose

I realized the power and magic of biology when I was in seventh standard. My cousin who was suffering from Hodgkin Lymphoma had to undergo stem cell transplantation, and this treatment was the last resort to cure his cancer since no other treatments were working. As a precocious ten year old, I thought that cancer was an incurable disease, and even stem cell therapy will not cure him. I felt miserable at even the thought of losing him within some years. As the years passed by, I realized that his cancer had been cured. This incident ignited a fire to learn deeply about various aspects of biology and try to develop techniques that improve the quality and quantity of life people live. Thus, my decision to pursue a Ph.D. in this fascinating domain is another step in my quest to help people lead healthier lives and a natural progression in my academic journey.

My immersive interest in life sciences had started germinating in high school itself. Innovation and inquisitiveness coupled with the commitment to give in every ounce of labor to strive for excellence embody me as a person. What is the source of life? How does the human body function? Is human cloning possible? As a young girl, I found myself curious about these concepts and chose to pursue Biology in an attempt to understand them. My deeply abiding interest in life science saw me score an impressive 97% in Biology in the class XII boards, with a complementary 94% in Chemistry. It was a proud moment for me when I received a full scholarship to pursue B.Sc. Research in Biotechnology in the prestigious Shiv Nadar University. These three undergraduate years have been a prodigious learning experience for me. From gaining insights into Cell Biology and Genetics, Fundamentals of molecular biology to learning about Gel Electrophoresis, Bio analytical techniques like Western blotting, colony PCR, qPCR, studying about these further concretized my desire to undertake further studies in this domain. This comprehensive program has laid a solid foundation of Biochemistry including Protein, DNA and RNA purification, SDS-PAGE, Recombinant DNA technology covering Cloning and cDNA synthesis.

To gain a deeper understanding of molecular biology and prepare myself for the rigors of postgraduate studies, I immersed myself in various projects, internships, conferences and workshops. My internships tested and honed my research skills, empowering me with an in-depth perspective and valuable research experience. As a summer intern at Indian Institute of Technology, Kanpur, I gained hands-on knowledge in penetration effect of Fmoc-F on self-prepared lipid vesicles-GUVs, MUVs and SUVs. I prepared lipid vesicles by sonication method and performed dye release assay using fluorimetry technique to analyze the results. At another internship at Jawaharlal Nehru University under Dr.Mukesh Jain, I tried to transform Arabidopsis using Gateway cloning technology and designed primers using Gene Runner and Primer3 prepare competent cells.

It was my undergraduate research project on gene regulation in plants, which was a transformative learning experience for me. Though I began with a basic understanding of the project, I read up on various journal articles and books available in our library to overcome the experimental problems encountered during the process. Under the guidance of Dr. Rohini Garg, I identified the role of G-quadruplex on gene regulation through histochemical staining, fluorimetry and Real Time PCR to see the expression of reporter genes and to quantify the expression of the genes coding for G-quadruplex structure in Arabidopsis.

My dissertation on 'Cloning and protein purification of Helicase Gene' to identify conserved signature motifs in Helicase domain has been a challenging research experience. These projects have tested my mettle as a researcher as being in a comparatively new lab with a small group, I had many responsibilities. This helped me shape my organizing skills to multi-task and manage both lab and coursework. For instance, once I was given the responsibility to design primers for six different genes for different cloning methods of which I had no prior experience. I had to submit the primers within a short duration so that they could be ordered and further PCR could be performed using those Primers. It took two sleepless nights, a bunch of videos on the internet and the basics that my PI taught me to successfully submit the primer sequences. This learning experience gave me confidence in my abilities to learn and explore new avenues as a researcher. The immense satisfaction and pride of working for my dissertation is an unparalleled feeling, an achievement that has given me a purpose in life: Molecular research.

A stellar career in research with postdoctoral aspirations, and being a part of a great research team that works to bring a positive impact in the lives of millions of people living all around the world form a part of my visions for the future. The opportunity to pursue P.Hd studies at Cornell University will be the culmination of my research ambitions. Apart from cutting-edge research facilities, pedagogy steeped in research, a nurturing academic environment and world-renowned faculty, Cornell stands far above the other universities in this domain. Ranking amongst the top-ten universities in Innovation and patents, and with its long list of Nobel laureates, the university promises to be an ideal vestibule for research.

As an avid researcher and candidate for Doctoral studies in Molecular and Cell Biology, I am keen to delve deeper into research on the molecular level, gaining erudition in this exciting field, in addition to helping people lead healthier lives by using this knowledge in biotechnology, health care and . I look forward to making good use of the Medical archives and medical libraries at Cornell and the opportunity to network within the scientific community, building lifetime professional bonds. The lab rotation concept will surely help me acquire the necessary tools of research, while the teaching experience as well as research-intensive thesis projects will broaden my horizons. As my undergraduate research and thesis project was in Plant & Molecular Biology techniques, I particularly wish to work under the guidance of

Professor June Nasrallah. Her work on plant cell-cell signaling has really drawn my attention and I would love to work on something similar under her expert instruction.

Sharing knowledge and experiences with the multi-cultural and diverse student body will help me to add my own flavour to this eclectic mix. As a person who has always given equal importance to co-curricular activities, I have been an enthusiastic participant in all extramural activities at school and college. Trained by Shiv Nadar University's counselor and psychiatrist, I have been a part of the Counselling Cell, aiding fellow students in overcoming personal and academic problems. Working for the community has been instilled in me from childhood, and I am proud to be associated with Feeding India, an NGO. As the city leader in August 2016, I found new schools and organized donation drives. I would love to join Cornell Public Service Center and continue working for the community.

The vast spectrum of Biochemistry, molecular and cell biology will continue to pose challenges, and a new set of questions with each advancing year. With my research background and the passion leave my own indelible imprint in this field, I am more than ready to face these challenges. Admission to Cornell will not only be a great honor but also an obligation for hard work; I promise to walk that extra mile to fulfill the same.