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## Science is fun every single day

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**M**igrating from a small town in the Punjab, after India's partition in 1947, my mother landed in New Delhi as a young bride. Months of bloody turmoil followed, during which the future appeared grim and uncertain. But after the dust and hatred had settled, my mother began to slowly realize the great potential independent India seemed to offer in the field of education. For one thing she observed these 'Madrasis and Bengalis' around her who were so highly educated- yet led such 'simple' lives- and she secretly resolved that her children must get the best education. So what if that needed money, which was hard to come by? And so it was that my father found himself willingly spending a substantial part of his salary on sending his children to top-of-the-rung 'English-medium' schools rather than the free-of-cost neighborhood school.

In high school, science and maths came naturally to me, and I easily scored high grades. I was a very dreamy girl (still am!). I was not driven by ambition and drifted merrily along. Since I was scoring well (even better than many of the 'Madrasi and Bengali' girls in my class), my mother was satisfied. However, I had no personal goals- no thoughts for my future. My mother, on

the other hand, did have a goal for me. She thought I should do my B.Sc., B.Ed., take up a teaching job and get married. I can't blame her. In a family where most of the boys, not to mention girls, didn't enter college, that was ambition enough. In any case, she had never heard of a Ph.D.

Whether it was the way science was taught in school, or my own dreaminess, or my mother's emphasis on scoring high marks), I more or less looked at science as a subject to score highly in, rather than as a source of wonderment or of creative joy. It was only in class eleven, when we were introduced to genetics, and the DNA double helix, that I felt myself participating in the thrill of scientific discovery, of not merely accepting the formulae laid down in the text book, but of stopping to wonder and question. However, I still never imagined myself becoming a practicing scientist.

My first realization of how timid I was in my approach to life came when we attended our first National Science Talent summer school, where we met the contingent from Mumbai. These students had much better exposure than the Delhi group; they had met internationally renowned scientists visiting Mumbai for lecture tours; they knew about the thrilling discoveries in molecular biology, and it occurred to me that it was within my grasp to explore more challenging avenues than school teaching. At the same time, I realized the blunder I had committed in selecting botany as my subject of study in B.Sc. (Hons.). Since my heart was, by then, firmly set on molecular biology I found it impossible to reduce the beautiful and myriad differentiation processes in plants to mere 'life cycles' to be mugged up.

Relief arrived in the final year of B.Sc., when we got an excellent and charismatic professor to teach us plant physiology. You could sense electrons getting energized by photons of light impinging upon chlorophyll. It was participatory teaching where, apart from being informed of the established facts, we were also made aware of the grey areas, which required further research to get illuminated.

As far as I was concerned, school teaching was definitely fading into the distance. A new ambition to do research in molecular biology was taking root, without my consciously realizing

it. But that meant getting admission into M.Sc. biochemistry. In the whole of New Delhi only two institutes offered that course – the All India Institute of Medical Sciences, and Indian Agricultural Research Institute, and both admitted only one or two students each year in this subject. As luck would have it, that year, 1971, A.I.I.M.S. decided not to admit any student to this course. So that left only I.A.R.I., which had two seats.

My mother refused to let me try for admission to institutes outside Delhi because she was preparing to look for a groom for me. She was already upset with me for vetoing her idea of opting for B. Ed. Not wishing to rock the boat further, I decided to prepare really hard for the I.A.R.I. interview, and as is usually the case, when you really want something you get it. Getting admission into the M. Sc. biochemistry course at I.A.R.I. was the final turning point. Excellent teachers instructed us in state-of-the-art molecular biology, molecular genetics and enzymology.

Meanwhile, pressure was building at home to initiate the process of arranged marriage – for which one had to get photographed in a suitably attractive pose. That was the first time my mother heard of my plans to do a Ph.D. A storm literally broke loose. The same mother who years ago had resolved to give her children the best education now declared that enough was enough! My father could understand my desire for a career, but he was branded as most impractical in these matters. Actively arguing with my mother was not an option. Knowing how much she had sacrificed in the prime of her life to give me the education I could easily have missed, I had no right to break her heart. At the same time, growing up at the peak of the feminist movement I was almost obliged to withstand such pressures. The only path left to me was passive resistance- an otherwise arduous route, but one that becomes easy when you develop the confidence that arises from understanding your innate strength.

So, with a bit of 'Gandhigiri,' I managed to stall my mother's attack and completed my Ph.D. Meanwhile, slowly I tried to convince her that a woman's place in the world was not the same as before, and that marriage was not the ultimate goal of life, with the result that when I, still unmarried, set sail for the U.S.

with a postdoctoral fellowship she was no longer worried about my future. In fact, two years later she herself stepped out of the house to work for a voluntary organization that had set up schools for slum children.

In retrospect, my mother did me a favor by offering resistance. It toughened me and prepared me for further challenges. The most difficult challenge was when I myself became a mother. In whose care could I leave my lovely little daughter and go off to the lab? The absolute and unconditional support of my husband, himself a scientist, and also a collaborator by that time, was a big help. Yet, he had his own immense pressures to bear. We had just moved to a new job, in a new city, and were new parents. We worked in shifts for almost a year until we could find a reliable day care. However tough the going, our research had become such an integral part of our lives that one could hardly imagine life without it. That was my sustaining force.

Earlier on, during my Ph.D., I had realized how lucky I was to get into scientific research. The power, however infinitesimal, of hoping to comprehend how life processes work, was to me a soul-elevating experience. It was exciting that one could lead a whole life in such pursuits. One could have fun every single day- if not with one's own research findings, then with new discoveries coming from other lands. Even the frustrations one experienced almost on a daily basis were part of the fun, because finally when a new experiment worked, it was the purest form of joy.

My personal take on scientific research, after having dabbled with it for that many years, is that if fame and wealth are what you expect from a career in science you are asking for too little. For when science is practiced in its pristine form, it has the power to elevate you to a finer level of existence- one where Truth is absolute and the narrow limits of human perception are duly acknowledged.

So, to the young women choosing a career in science, I would say (borrowing from a popular ad)- When it comes to Science, be demanding... because you are worth it!