Before I embarked on my Ph.D. journey in cancer genomics, I had never thought of a career as a scientist. I had dreamed of becoming a physician for as long as I could remember. But the Fulbright scholarship I won to pursue Ph.D. training in the United States was the chance of a lifetime to continue my education beyond what would have been possible in my home country of Lebanon. I couldn’t say no. In retrospect, I was clueless about what it really means to be a scientist. If I had known, I might have hesitated. But now I see that scholarship as a stroke of good fortune, which sent me along a path that helped me find my life’s purpose.

In my early weeks at graduate school, I spent most of my time reading and thinking about the many unanswered questions in my field. I loved pondering these fascinating puzzles and coming up with ideas, but I did not know how to convert my many thoughts into actual experiments.

After a few months, and with my mentor’s guidance, I began testing my most promising low-hanging-fruit hypotheses. But the experiments generated data that refuted most of them, leaving me discouraged. I had the simplistic view that a scientist transforms ideas into experiments that quickly lead to cogent conclusions. When that didn’t happen, I didn’t know what to do next. I was also under the illusion that there was just one right answer to each puzzle, and when I couldn’t find it right away, I was stymied. I went back to thinking and reading.

I was intellectually stimulated, but I wasn’t getting any tangible results. Soon enough, it became apparent that my research progress was lagging behind that of other grad students in the lab. I should have had a story ready to write up for publication, but all I had were unproven ideas. I started to wonder whether I was cut out to be a scientist.

My mentor offered unconditional support and guidance through this soul-searching and encouraged me to reflect on whether being a scientist was my true calling. I took her words to heart and realized that I wasn’t even sure what it really means to be a scientist, let alone whether it was my calling.

But the puzzles I had read about still captivated me, and I was determined to keep going. My repertoire of experiments expanded. I learned to build on failed experiments and surprising findings by coming up with creative alternative ideas to explore with further experimentation.

After months of focused and rigorous work, my data led to an unexpected result: Our candidate cancer gene is also related to anemia. At first, I didn’t quite know what to think. The result did not match our initial hypothesis, which felt quite disappointing. But I thought the finding might lead in an exciting direction, so maybe it was actually a success.

My mentor was delighted with the intriguing result—and with my change in mindset. I had begun to understand the importance of seeing every disproven hypothesis not as a source of confusion and disappointment, but as an opportunity to tackle something new.

As I learned to practice this approach to research, my love for experimentation grew, and I learned to embrace the scientific method, with all its uncertainty. The seemingly tedious work of graduate research—learning, optimizing and repeating experiments to answer a single question, then starting over after each incremental step—served its purpose as a rite of passage to becoming a real scientist.

Now that I’m about to graduate and move on to a postdoctoral fellowship, I find myself wondering whether I would have chosen to pursue doctoral training if I had known the challenges I would face. But in my naïveté, I made the right choice. From a serendipitous beginning, and with unceasing support from my mentor, I learned what it truly means to be a scientist.

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