

It's in the blood

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I was probably destined to be a physician–scientist from a young age. My parents, who both hold PhDs, moved to the United States from India to do post-docs in biology labs when I was two. We didn't have after-school daycare, so my parents would bring me to the lab instead. Some of my earliest memories are of being in the lab while playing with pipettes and parafilm. In art class, while other kids would draw typical after-school activities they enjoyed, like sports or music, I drew beakers, test tubes and ice buckets. So it was probably no surprise that I gravitated towards the sciences, especially biology. In high school, I had great teachers who encouraged my curiosity. As a freshman student at Stanford, I took a seminar class on recombinant DNA technologies, and I was hooked on a research career from that point forward.

I also knew early on that being a physician was appealing to me. There are several physicians in my extended family, and I saw how much they enjoyed their jobs and were fulfilled by the vocation. Also, when I was in college, my father was diagnosed with three-vessel coronary artery disease that required bypass surgery. So I also learned about the impact a good doctor can have on a patient and their family during stressful times. By my senior year, I knew I wanted to apply to MD–PhD programs.

As luck would have it, Stanford accepted me, and I was able to stay in the Bay Area for several more years to continue the work I had started as an undergraduate in the lab of Dr. Irving Weissman. Irv is a legendary scientist, and I learned a great deal from him about experimental design and interpreting results during my doctoral thesis on the role of phagocytosis in regulating normal and malignant hematopoiesis. But Irv also instilled in his trainees a sense of freedom to explore ideas and develop one's scientific intuition. Those years made me into the scientist I am today, and it is an environment I hope to emulate in my own group.



Credit: Siddhartha Jaiswal

After finishing my degree, I decided to enter residency in clinical pathology, which, in the words of a senior attending physician, is like “being the doctor's doctor”. The clinical laboratory influences nearly every medical decision, so providing guidance to other physicians on how to use the results of lab tests to improve patient care was appealing. I packed my bags and moved to Boston for my residency training at Massachusetts General Hospital, where I also completed a fellowship in transfusion medicine.

A big part of the decision to move to Boston was the sheer amount of large-scale biomedical research being done there. With the advent of high-throughput DNA sequencing technologies, a new era of genomics had opened up. I was particularly interested in how big genomics datasets might be used to study pre-malignant

clonal expansions in blood and their clinical implications. To address this question, I joined the lab of Dr. Benjamin Ebert, a rising star in hematologic malignancy research at the time. I knew I would join his lab after our first meeting, as I was struck by his scientific productivity, keen intellect and collaborative nature. The only problem was that I had no training in bioinformatics, so I used my spare time in residency to learn some coding and methods for interrogating sequence data. We were able to use a dataset of several thousand exomes derived from blood DNA at the Broad Institute to show that such clones were highly prevalent in the aging hematopoietic system. To our surprise, these mutations associated not just with risk of hematologic malignancy, but also atherosclerotic cardiovascular disease and death.

In 2017, I accepted an offer to join the faculty at Stanford University in the Department of Pathology, where I started my own lab to continue studying these age-related mutations. This is just the beginning of my independent scientific career, but it is also the culmination of the last two decades of my life. In some ways I have come full circle, having returned to the place where I spent so many years. But I am older and wiser now, my former mentors are now colleagues, and now I am the one doling out advice and helping people get on with their careers. I go to work every day excited about the discoveries that will be made by the trainees in the lab. I know that I am incredibly fortunate in the opportunities I have had in my life, and I hope to pay it back by providing an environment in my own lab that helps young scientists succeed. □

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