

Avery August: The data are the data

 Stephanie Houston 

Avery August is a Professor of Immunology in the Department of Microbiology and Immunology at Cornell University. His work is focused on T cell receptor signaling and the development of T cell subsets. I chatted with Avery about his journey in science so far.

Where did you grow up?

I was born in and grew up in the country of Belize in Central America, and moved to Los Angeles, California, as a teenager.

When did your interest in science begin?

What was your first experience of science?

My interest in science began as an early teenager growing up in Belize, where I was drawn to courses in chemistry, biology, and physics, trying to satisfy my curiosity about how things worked. In reflecting back, I think I started “doing” science when I used to do simple experiments with plants (e.g., “discovering” that plants grew towards light), and with various household chemicals, mixing them to see what would happen. I was always curious about how things worked. I didn’t know that someone could be a “professional” scientist until college, when I was exposed to undergraduate research.

Where and with whom have you studied (undergraduate, graduate, postdoc)?

I started my higher educational career at the Los Angeles Community College, having dropped out of Los Angeles High School after the 11th grade. I transferred to California State University at Los Angeles (CSULA), initially as a pre-med student (it was the only thing I knew you could do with an interest in biology), first majoring in microbiology, then in medical technology (my eventual undergraduate degree). I changed from microbiology to medical technology because they were closely related and found

out that a degree in medical technology would allow me to be able to get a job as a clinical laboratory scientist, and I was worried about being able to get a job after graduating college. I ended up not doing clinical laboratory science and going to graduate school due to a number of reasons. One, I couldn’t afford to do a year of unpaid internship that was required to sit the medical technologist licensing exam, and two, I was introduced to research by one of my undergraduate professors, Prof. Costello Brown, and ended up working in the chemistry laboratory of Prof. Phoebe Dea at CSULA with the support of a National Science Foundation program (Research Instruction in Minority Institutions) to support research experiences for students underrepresented in STEM (my first research paper came from this work as an undergraduate student). After graduation, I spent 1 yr in a master’s program in chemistry and biochemistry while applying to graduate schools (I left without the degree) and was fortunate enough to be accepted to the Weill Graduate School of Medical Sciences at Cornell University in New York City. There, I worked with Dr. Bo Dupont at The Sloan Kettering Institute of Memorial Sloan Kettering Cancer Center. I subsequently did a postdoc at The Rockefeller University working with Dr. Hidesaburo Hanafusa.

What interested you about your current area of study?

I took an undergraduate course in immunology and was fascinated by the fact that



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the immune system develops such diversity prior to any immune response, and that it can theoretically respond to any antigen. In graduate school, I became interested in understanding how T cells are activated, first working on the mechanisms of CD28 co-stimulation, and later on T cell receptor activation of T cells. My research group continues to work on mechanisms by which the T cell receptor signal strength regulates the development of different T helper cells, as well as the development of CD8⁺ effector and memory T cells. The long-term goal is to use such information to manipulate these processes for health.

What are you currently working on? What is up next for you?

My research group continues to work on mechanisms by which the T cell receptor

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Members of Avery August's laboratory

signal strength regulates the development of different T helper cells, as well as the development of CD8⁺ effector and memory T cells. We have been working on several broad areas, including dissecting pathways regulated by T cell receptor signal strength that are regulated by the tyrosine kinase Itk, in controlling the fate of various CD4⁺ effector T cells such as Th17 and regulatory T cells and Tr1 cells. We are also working on the intersection between T cell receptor affinity and T cell receptor signal strength in controlling the development of memory CD8⁺ T cells. The long-term goal is to use such information to manipulate these processes for health.

What kind of approach do you bring to your work?

We use a wide variety of approaches, including animal models of lung inflammation caused by infection such as influenza (and

more recently SARS-CoV-2) or by allergens (such as those that cause allergic asthma or hypersensitivity pneumonitis), to examine T cell responses *in vivo* as well as *in vitro*, examining transcriptomic landscapes while manipulating signaling pathways.

What did you learn during your PhD and postdoc that helped prepare you for being a group leader? What were you unprepared for?

Some of the most interesting lessons I learned during training include the idea that the exceptions are interesting. Those data that do not fit the predictions can lead to some interesting discoveries; and the data are the data, we are trained to interpret them rather than fall in love with our hypotheses. Also, to pay attention to discoveries from other fields, and that cutting edge techniques can accelerate discoveries in a

field, but the biological question is important. I was completely unprepared for the day-to-day activities of managing people, and budgets, and had to learn on the job.

What has been the biggest challenge in your career so far?

Hmm... I would probably say navigating stereotypes of what a scientist should look like (e.g., not like me). Realizing during my own training that students who come from backgrounds traditionally excluded from science have few role models, and understanding the challenge of potentially serving as a role model while also trying to be a successful scientist. Also, coming to the realization that running an academic lab is like running a small business, where you are raising funds to support the research and to support the trainees whose careers are dependent on resources for their research.

What is the best advice you have been given?

If it's not interesting, think hard about whether it's worth the time working on it. Also... the data are the data.

What hobbies do you have?

DJing a variety of electronic music, including jungle, drum and bass, and EDM. I also enjoy riding bicycles.

Any tips for a successful research career?

Work on interesting things and pay attention to discoveries from other fields, as they often spark questions or provide insight that could be important for your field.