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PEOPLE & IDEAS

Ross Levine: Focus on the critical questions

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Ross Levine is a physician-scientist at Memorial Sloan Kettering Cancer Center in New York, where his laboratory studies the genetic basis of myeloid malignancies. Work from Ross' laboratory has shown how mutations in the JAK–STAT pathway and epigenetic regulators play a role in myeloproliferative neoplasms, and JAK inhibitors are now successfully used to treat myeloproliferative neoplasms. We spoke to Ross about his journey in science so far.

Where did you grow up?

I grew up in Rockland County, New York, which is a small suburb ∼1 h outside of New York City. It was close enough to be able to enjoy the city and far enough away to enjoy the outdoors!

When did your interest in science begin? What was your first experience of science?

I was always interested in math and science and had the opportunity to participate in the Columbia University Science Honors Program in high school for my first "real" science experience, which was amazing. I was a late bloomer with respect to laboratory science, as I did not hold a pipette until my first year of medical school. Once I did my first laboratory experiments without breaking anything, I was hooked for life!

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

I was a biology major as an undergraduate at Harvard, where I was also a member of the debate team, which was an incredible experience. I did my medical school education at Johns Hopkins, where I did a "gap year" in the Howard Hughes Medical Institute medical school program in the laboratory of Lora Ellenson. She is an amazing PI and mentor, and I would not be a scientist without her support and without the chance to work in her laboratory. After studying internal medicine at Massachusetts General Hospital and clinical hematology/oncology at Dana-Farber, I did my postdoctoral training with Gary Gilliland, which was the seminal experience of my career and set me on the path to my current role.

Ross Levine and his laboratory group.

What interested you about your current area of study?

My interest has always been in cancer biology and in using mechanistic insights to work toward clinical translation in the longer term. That interest, coupled with my interest in caring for leukemia patients, has continued to shape and sharpen my scientific focus on normal and malignant hematopoiesis.

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

We are fascinated by the process of clonal evolution from normal hematopoietic stem cells to clonal expansion and then to overt hematopoietic transformation. We are highly interested in mapping the genetic and epigenetic events which drive this process and with using novel model systems to understand how this promotes transformation, all the while looking for "pressure points" or vulnerabilities that can be leveraged for therapeutic benefit.

Ross Levine

What kind of approach do you bring to your work?

Energy and enthusiasm! I focus on providing an interactive and supportive environment for the amazing people in my laboratory, giving them the freedom to explore new ideas. I love discussing experimental plans and results with everyone, but I try to stay out of the way of progress!

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

I learned a lot about how to design the right experiment to answer your questions, and more about leukemia biology than I could ever imagine. I think it is hard to prepare for the challenge of running a group when you are a postdoc, even when you have the

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chance (as I did) to mentor students and technicians. I have learned a lot, and made a lot of mistakes, along the way as a mentor and group leader and continue to try to improve in my role every day.

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

At the start, the challenge was to build a critical mass and get sufficient scientific momentum; it felt so hard to achieve this, and it always felt like science was going slower than I wanted. In reality, we were all working so hard to get our experimental systems going and our ideas tested, and once we began to accumulate data it was an incredible experience. As I continue in my career, the biggest challenge remains mentorship and career development. Each of our trainees needs our best efforts and attention, and we have to learn how to best help everyone achieve their fullest potential.

What is the best advice you have been given?

I was told as a trainee that "solving an unimportant question is as hard as solving an important one," and I remind myself and my laboratory of this adage all the time. Science is always hard, so it is key to focus on the critical questions in your field no matter how daunting.

What hobbies do you have?

My family is my major hobby; Erica and I have three kids, aged 15, 12, and 9. I love to run (I ran my first marathon last November) and play tennis and squash; my morning run is how I get every day going on the right foot.

Any tips for a successful research career?

Believe in yourself and your ideas, no matter how hard things get, and always work with other people you like and admire. Science is most fun and impactful when you can work with great friends and colleagues.