



**Williams:** This is an interview with Dr. Rafi Ahmed for the American Association of Immunologists (AAI) Oral History Project. Dr. Ahmed is Director of the Emory Vaccine Center at Emory University. He is also the Charles Howard Candler Professor of Microbiology and Immunology at Emory, and Georgia Research Alliance Eminent Scholar in Vaccine Research, and professor of microbiology and immunology at Emory at the School of Medicine. He was awarded the AAI Excellence in Mentoring Award in 2015. We are at the IMMUNOLOGY 2015™ in New Orleans, Louisiana. Today is Monday, May 11<sup>th</sup>, and I am Brien Williams.

Thank you very much for dropping by.

**Ahmed:** Thank you. My pleasure.

**Williams:** Let's start out by you talking about your family background, where you grew up and so forth.

**Ahmed:** Yes. I was born in India in a city called Hyderabad. It's in south central India. It's a wonderful, wonderful city.

**Williams:** How so?

**Ahmed:** Great cultural history, a city that promoted pluralism and tolerance of different groups of people, very well known for its hospitality, its cuisine. Wonderful city.

My father worked for the state government. My mother was a very active social worker. I'm an only child of my parents. I went to school in Hyderabad, did my high school over there and then I did my college also in Hyderabad. I went to Osmania University in Hyderabad and got a bachelor's degree in chemistry.

**Williams:** At what point did you begin thinking about a lifetime of science?

**Ahmed:** I'm not sure. I don't think I—there wasn't any eureka moment or thing, "This is—now I have to be a scientist." There never really was. After I did my undergraduate education, I wanted to come to the U.S. for my graduate education, and I picked the general area of science, general area of biology, and even though—

**Williams:** What led you to chemistry to begin with?

**Ahmed:** Oh, there, actually, we didn't have—I should say that my major was actually chemistry and biology both. At that time really there were not that many tracks in the Indian education system at that time. If you're getting an undergraduate degree in science, you either kind of became a physics and math major, with chemistry being common for both, or you became biology, botany, zoology, and chemistry. So I was basically more in the biology chemistry track.

Then I wanted to do graduate work in microbiology area without any real reason why I should be doing microbiology as opposed to something else. But then as I started doing graduate

**Ahmed:** Oh, very welcome. A foreigner in Pocatello, Idaho, in 1970 was quite a rarity, and so I had a host family there, and I'm still in touch with them forty-five years later, made friends who have been friends for over forty years now.

**Williams:** Was there any Indian community there?

**Ahmed:** No. There were two other Indian students. There were three of us, three Indian students. There were very few international students in Pocatello, Idaho, at that

**Williams:** Quite an accomplishment.

**Ahmed:** Yes.

**Williams:** So just talk a little bit about the flavor of being in Montreal and McGill. Was that exciting?

**Ahmed:** Yeah.

**Williams:** How's your French?

**Ahmed:** No, that's one of the reasons. I don't have any French. [laughs] I wish I had learned French when I was there. They were interesting times. It was a great accomplishment.



**Williams:** But you must have gotten the southern California bug, because then you moved up to UCLA [University of California, Los Angeles].

**Ahmed:** Yes. I was then recruited by UCLA to join them, and I moved to the Department of Microbiology and Immunology at UCLA in the School of Medicine, and I was there for eleven years. I went from being an assistant professor to full professor during that period.

**Williams:** So during that period you must have refined your interests.

**Ahmed:** Yes, greatly. So while I was at Scripps, I was really more interested—even though I was looking at immune response to a viral infection using this mouse model of infection, lymphocytic choriomeningitis virus, we still used that for many of our studies, but while I was a postdoc, the interest still was from the side of the pathogen. So I was really more concerned with the pathogen. Even the immune responses were being studied by me there.

But then I had, I think, a pretty significant shift after I set up my own lab, and I think I kind of on my own became more of an immunologist, and I then became much more interested in fundamental questions about immune responses, and then, for me, the virus really was more as a tool for inducing immune responses. It's not that I was ignoring the virology aspect. I couldn't, because I really was trained as a virologist, and my grounding there was pretty solid. But I really became more interested in immunological questions, so I think I kind of became an immunologist, I think, when I set up my lab at UCLA.

**Williams:** And what was it like being at UCLA?

**Ahmed:** It was a good place. I am one of those few people who actually really like Los Angeles. It's one of my favorite cities. I think very few people who move from La Jolla actually are happy to move to Los Angeles. [laughs]

**Williams:** There's some reason for that, isn't there?

**Ahmed:** Yes, there's a lot of reason for it. But I'm a big-city person, always have been, and I just like the energy of Los Angeles, the fascinating diversity of Los Angeles.

**Williams:** What about the ambience of the School of Medicine?

**Ahmed:** It was good. It's a large school, you know, so you kind of create your own ambience. The department I was in was a very good department, very strong in immunology, very strong in virology. In fact, I was recruited there more as to do the virology, which I did, but my interest kind of shifted totally over there. But it was a very good, good environment. Jack Stevens was the chair of the department there, very supportive chair, and had built a lot of interactions between the faculty there. It was good times, good times at UCLA.





So basically Emory and Georgia Research Alliance kind of recruited me to Emory



And people who were working in the cancer arena had shown around the same time that tumor-specific cells that infiltrate tumors, that is TILs, tumor-infiltrating lymphocytes, that they had very similar properties, that is, that they were not very functional in terms of—and that was one of the reasons why the tumor was not being eradicated or being eliminated. And this was in the late 1990s when our papers and other papers came out describing T cell exhaustion during chronic infection or cancer.

Then the next big question was what is the mechanism of this T cell dysfunction, and perhaps even more importantly, could you rescue these T cells or regenerate these T cells so they can become functional. And this led to the discovery that an inhibitory receptor called PD-1, programmed cell death-1, this was cloned by a scientist in Japan, Tasuku Honjo, and other people had been working on this pathway, so we were not really the first to clone or identify this inhibitory receptor. But what we showed from our work in the first linkage of T cell exhaustion with PD-1, so what we identified—

[6(e)]TfDe(d)-1(0(To)Tiw8Tou0.3Bd4(c)40



**Ahmed:** I think what makes a good mentor is working closely with the people that you have, respecting them, teaching them how to ask important questions. To me, that probably is the most critical thing, is try and direct them towards asking important questions, not just doing the experiment, but to address something important in a very fundamental way. And I think if you address very fundamental issues, I think that that's probably the first key. The first key decision is you ask something that people will be interested in.

**Williams:** And what form does mentoring take at Emory in your lab? I mean, do you have meetings regularly or—

**Ahmed:** Yes, yes, right, I do, and, again, these have evolved over the time, perhaps evolved in the wrong way. [laughs] What I mean by that is the lab has grown, as your group grows large, you know, but basically my style for many, many years was to meet regularly with the people in the lab, have a weekly lab meeting where one person presents, but also continuous interactions. On a daily basis, weekly basis, I would have one-on-one weekly meetings with the people, and I really enjoy the science. So I'm very, very interested in the science, looking at the data in great detail, not superficially, but sit down with them, learn from them at the same time, because they usually get better than you are in what they're studying. So I think there's very close personal interaction in terms of looking at the science and designing experiments with them, interpreting the results.

And then as I've stated, for me, as I was telling you these brief two-minute comments that I made after getting the mentoring award, was that in some ways the most satisfying thing has been to see how well they've done after they've left the lab. So it was great to have them as part of the group, but really the greater joy for me comes when I look at them now and see how many of them now are so successful.

**Williams:** How large is your lab now?

**Ahmed:** I have about twenty people, and the lab size has varied, I would say, between ten and twenty for the last fifteen years or so. Ten is a better number than twenty. [laughs] It's much more manageable.

**Williams:** Yes. Are you aware of potential flaws in mentoring? Are there some things that you're—

**Ahmed:** That I've done wrong?

**Williams:** That have gone—how not to go wrong.

**Ahmed:** Oh, how not to go wrong. Could you elaborate on that, what you mean? [laughs]



As opposed to these smaller meetings with all PIs [principal investigators], here you have students, you have postdocs. I think really it allows you and it gives you time to interact with the younger people.

**Williams:** Right, right. Just a few sort of last questions here. I noticed that you are a member of the American Society for Investigative Pathology, and I thought that sounds very forensic. What is that about?

**Ahmed:** I don't even know why I'm a member of that, but I am. [laughs]

**Williams:** It sounds like police departments and whatnot.

**Ahmed:** No, no, no. No, it's not that. It's actually—pathology is a broad discipline and a lot of science is done, and a lot of immunologists actually trained as pathologists, so immunology and pathology have been linked in many ways. So, basically, the reason for that was because we were addressing hosts back to an interaction, both from a logical point of view and also from the pathogenesis point of view. So that's where that comes in. [laughs] I was not in forensic medicine and trying to figure out who committed what crime. No. [laughs]

**Williams:** I also notice that you are on twenty-eight scientific advisory boards.

**Ahmed:** Too many. Is that true? I don't know. I don't know what the real number is, but I'm on too many.

**Williams:** Well, I don't know whether they're still all twenty-eight at the same time.

**Ahmed:** I don't know. Maybe it's higher, maybe it's lower. I don't know.

**Williams:** But what's that all about?

**Ahmed:** Well, they are useful. I'm on advisory boards for many vaccine-related companies, now actually on some of the cancer-related groups on their advisory board, and then on advisory boards of some small biotech companies, advisory boards of people who have large programs, scientific programs. They need an advisory board, so I'm on several of them. And I think they all have some value. I learn from those, and I especially find when I'm an advisory board of a science program, a program project, I learn from the excellent science that they're doing and can offer some advice to them. They may or may not take it. [laughs] So it's actually a learning process and hopefully of some value to the people on whose boards I am.

**Williams:** Do you get around a lot, I mean with these boards and whatnot? Are you a global traveler?

**Ahmed:** Too much. I'm traveling all the time, yes. Traveling way too much.











**Ahmed:**

It's a good question. I don't really steer them, but I think while they are there, there's an awareness of where the opportunities are, and now I kind of encourage them to also a little bit become more interested in the human immune system.

There's a trend within the NIH and elsewhere that there will be more funding for human studies. If that doesn't compensate for the decrease in funding for basic research, it will be a net loss.

**Williams:** All right. Any last thoughts you want to contribute to this historical record?

**Ahmed:** No, I think I've said enough. Last part is I think I made the right decision at some point.

**Williams:** Great. Very good. Thank you so much.

**Ahmed:** Thank you.

[End of interview]