The American Association of Immunologists
Oral History Project

Transcript

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Interview conducted by
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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 11th, 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 work, I realized it's something I really enjoyed, and I think not so much by real rational process that I came to the decision. I think it was more it just kind of happened. But I think I ended up picking the right career for myself. [laughs]

Williams: That's fortunate, isn't it, because a lot of people don't.

Ahmed: Yes, I think I found the right niche, but without any real rational thinking going into it, yes.

Williams: Did you do any graduate work in India or was that—

Ahmed: No.

Williams: So talk about the process of getting to the States.

Ahmed: Yes. Actually, there I came to the United States in 1970, so I've been here now almost forty-five years, and it's been a wonderful journey. Actually, I ended up in a place where very few people first go to, which is I went to Idaho from India, ended up in a small town in southeastern Idaho—Pocatello, Idaho.

I did a second undergraduate there because the graduate degree I had from India was not equivalent of a four-year degree that you get in the U.S., and I was changing, I wanted to go into microbiology, so I took some additional courses. I then got a second undergraduate degree in microbiology at Idaho State University. It was wonderful. It was, in some ways, my formative years, I think, were spent in Pocatello, Idaho. [laughs]

Williams: What were the reasons that you chose Pocatello?

Ahmed: Again, no conscious reason. I applied to several places, I got in several places, but this was, I think, the most affordable one, it was probably, and I didn't know at that time the real difference between Idaho and Iowa. I was coming to America. It didn't matter. [laughs] I knew it wasn't California or New York, but, for me, the rest of America was a little bit fuzzy what was in the middle, middle or northwest. But, again, I think I lucked out. It was a good experience. I learned the U.S. system of education, and I just loved it. I realized that this was certainly the way study should be done.

Williams: And as a foreigner, you felt welcomed in Pocatello?

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 time. There were a few faculty members. Maybe Pocatello at that time was about 40,000 people, and might have been maybe twenty Indians at most. [laughs]

Williams: Of your group of fellow students in India, did a lot of them come to the States or were you sort of the exception?

Ahmed: No, a lot of them did come to the States. In the '70s, the trend had already shifted towards people coming to the U.S. Before that, actually, it was England in the 1950s, '60s, because of the connections with Britain historically. People went to England to do graduate work or advanced studies. But starting from the 1960s, it had shifted, more people going to the U.S. In the seventies, I would say more would come to the U.S. than going to England for their graduate work. Many of my friends from there, many of my classmates from my time in Hyderabad when I was doing undergraduate, many of them came to the U.S.

Williams: What accounted for the increase in interest in coming to the U.S.?

Ahmed: I think there were more opportunities here, many more opportunities.

Williams: So you got another undergraduate degree at Idaho State.

Ahmed: Yes.

Williams: And then you moved to Harvard, is that correct?

Ahmed: No. Actually, I had a little bit of a detour in between, and I won't go into all the reasons why the detour happened, but I ended up actually working for two years in Montreal at McGill University as a research assistant in the biochemistry department there. That, again, was a good experience. That was really my first exposure to a research lab, because at Idaho State there wasn't much research going on. It was really more academic training and coursework and so on, but I learned a lot, actually. But McGill was my first exposure to how really science is done, and, again, I realized that I had picked the right profession [laughs], that it was something that I really enjoyed, and I understood what the questions were. I worked for a very good person over there, Angus Graham, who was the chair of [the Department of] Biochemistry, a very good virologist. So I worked with Angus, and then he encouraged me that I should apply to the best graduate school I could get into, and I got into Harvard, and I went there in '76.

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. I was there from '74 to '76. That's when there was this [Jean] Drapeau was the mayor and there was this big push for French independence and the awareness of the French language being pushed quite a bit. So I was there a little bit—I wouldn't use the word "turbulent," but times which were kind of interesting politically. But Montreal was a wonderful city then and still a very exciting international city, so I really loved the time I had over there.

Williams: And McGill was an outstanding place for science?

Ahmed: Absolutely, yeah, with a great history of achievement in science.

Williams: And you selected to go there from Pocatello?

Ahmed: Yes. I ended up actually finding a position there to work. I just wanted a break, kind of work for a few years, couple of years, because a good opportunity came up and I took it.

Williams: Right. So what was it like arriving at Harvard?

Ahmed: Oh, again, I realized again all the energy that was there in terms of the science and just the academic. I think it's the best place to be for graduate work. Very, very exciting.

Williams: So how long were you there for?

Ahmed: I was there for four and a half years. And I worked for a virologist, Bernie [Bernard N.] Fields, and I trained. So my graduate training is not as an immunologist; my graduate training is as a virologist and doing classical virology, a little bit on the molecular side, but not really hardcore molecular virology but doing virogenetics and so on with that. Really didn't do any immunology in my graduate school.

Williams: And that narrowness of your scope there was not troublesome to you? You were happy doing that?

Ahmed: Oh, yeah, yeah, yeah. No, not at all, no. I was learning virology. I was becoming a virologist.

Williams: So did immunology always sort of hover on your—

Ahmed: No, but then when I was thinking of going for a postdoc, I wanted to either change the viral systems I was working in and really become more deeply involved in virology; that was one option. The other was to kind of look at immune responses to viral infections. After some discussion with Bernie Fields, who was my mentor, and also my own thinking, and I'd realized that actually even though I'd not really taken any immunology courses at Harvard when I was there, that I would relate more to—I'm more of a biologist in thinking, so I thought that the immunobiology of viral infections would be a good area to go into.

So I then went for a postdoc in 1981 to Scripps [The Scripps Research Institute] in La Jolla, and I worked with Michael Oldstone for three years. So I was a postdoc with Michael Oldstone from '81 to '84, and that was my first introduction to immune responses to viral infections.

Williams: I guess you were doing work at the direction of your mentor there?

Ahmed: Yes, yes, of course.

Williams: You weren't doing independent study yet? Right.

Ahmed: No, no, of course. I was training. Yeah, everything was new at that time because I'd certainly not done any experiments with looking at immune infecting. It was mostly studies that were done in mice, but really had not done any mouse experiments. I had actually not even handled an adult mouse in the lab. [laughs] I'd done some experiments in Bernie's lab. We were infecting some neonatal mice just to look at various differences between certain strains, but starting from learning how to hold the mouse. [laughs] Something very, very basic, yes.

Williams: And, of course, Scripps is a real hardship place to be, isn't it?

Ahmed: Yes, and at that time Scripps was—and still is, but I think at that time was really one of the premier places for immunology.

Williams: And also one of the premier places to live.

Ahmed: Yes, it's very pretty, yes. I think sometimes I thought it was too pretty. [laughs]

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.

Williams: Did you do much teaching?

Ahmed: No, not much, because we were part of the School of Medicine, so did not have to teach undergraduates. I enjoy teaching, but I really wouldn't want to be teaching a course for a whole semester. [laughs] But I did teach. I taught medical students. I gave the viral immunity lectures to medical students the entire time I was there, and then I participated in graduate teaching of the Ph.D. students.

Williams: And was there any clinical activity?

Ahmed: No, I'm not a physician. By training, I'm a Ph.D., so there were no clinical.

Williams: Yeah. So did you become a basketball fan?

Ahmed: Yes, I became a very big basketball fan. Actually, I kind of became a pro basketball fan while I was in Boston, because the Celtics were there, and then the Lakers were in—I'd also picked up an interest in ice hockey when I was in Montreal because, as you know, the biggest thing in Montreal are the Montreal Canadiens. [laughs]

Williams: A far cry from Hyderabad.

Ahmed: That's right, far cry from Hyderabad, very far cry from Hyderabad, yes indeed. [laughs]

Williams: Well, I think the eighties were still the time of UCLA's dominance in collegiate basketball with John Wooden. Or had he already left?

Ahmed: No, that had ended.

Williams: Oh, I see. Okay.

Ahmed: The era of Lew Alcindor, who later became Kareem Abdul-Jabbar, and then Bill Walton. But I followed. But sports was big there, you know. Sports was big at UCLA.

Williams: So how could any other place lure you away from southern California?

Ahmed: Yes, it happened in a strange way. I was very happy in Los Angeles, loved the city, I was happy at UCLA, and then this opportunity came up in '95, or I would say '94, when Dick [Richard W.] Compans, who was Chair of Microbiology at Emory University School of Medicine—and there's an organization there called the Georgia Research Alliance, and this is a fantastic organization that has really promoted science in Georgia. Their mandate really is to kind of recruit and attract people from the best scientists they can attract to universities in Georgia.

So basically Emory and Georgia Research Alliance kind of recruited me to Emory University, and the idea was to start an academic-based Vaccine Center at Emory University. At that time, it was a bit of a new idea. There were a few vaccine centers around, and the academic-based vaccine centers in the U.S., but really not that many. I also didn't work on vaccines. I'm not really a vaccinologist. But really addressing fundamental questions about immune responses. And the area that I had really gotten fascinated with is the area of immunological memory. How do you retain memory to an infection you got as a kid, or how does a vaccine you got when you were six months old, how do you still have memory for it twenty years later or thirty years later? So that had really fascinated me. I really was fascinated by how immunological memory is and how we remember the pathogens of the vaccines we got.

See, even then I wasn't really working on developing a vaccine. I was addressing an area that was very fundamental to how to make a successful vaccine. And this opportunity came up, and initially when Dick Compans contacted me, I really had no interest in moving to Atlanta. And I went there and interviewed. I didn't care much for the city, but something there clicked, and I just felt that this was an opportunity. So I made that move against the advice of all my colleagues, who said, "You're crazy to leave UCLA and go to Emory University." Also, when I compared L.A. and Atlanta, for me there was just no comparison. L.A. was much better in every possible way for me.

Also my family was very much against moving. My wife was really certainly not keen on—we had a very nice living situation there, and our kids were small, but they also were not that keen on moving. So against the advice of all my friends and my colleagues and my family, I said, "Let's make this step, take the step, and see what happens." And it's turned out to be the right decision, because I think, again, I kind of lucked out and made the right decision.

Williams: For you, for your wife, for your kids?

Ahmed: I think eventually for everyone. My wife adjusted in a few years and is very happy now with Atlanta. I don't think she now wants to leave it to go anywhere. And it worked out well for our kids too. And professionally it worked out fantastically for me.

Williams: So talk about your achievements in science.

Ahmed: So I think, as I told you, one of the areas that we were very interested in was immunological memory, so we started kind of dissecting step by step some of the key events which are needed to generate long-term memory. A student who was with me at UCLA, Mark Slifka, he identified that you get these long-lived plasma cells which are critical for giving you long-term humoral immunity.

Then we started studying, addressing questions about how CD8 T cell responses or T cell memory is maintained. There was a strong belief at that time that the only way you retain long-term immunological memory is by having continuous stimulation of the immune system by some residue and antigen, and that you couldn't really get intrinsically long-lived populations of memory T cells. But, again, that student in my lab did, showed that actually memory T cells are intrinsically long-lived. Studies in mice at that time, later on extended by other people in humans, but showed that for the life of a mouse you could get memory CD8 T cells that can persist and retain the numbers in the absence of any antigen. And that was a big breakthrough because it's a conceptual change in how we look at immunological memory. We then started understanding more and more about what is required to generate those cells. So I think a lot of information has come from that in terms of the signals and the properties of these memory cells.

We then also showed, along with other people, that memory cells actually can undergo the slow self-renewal, and that's what maintains their numbers so they're like stem cell-like properties that keep them going for very extended periods. We defined the functional properties of memory cells, why they're very protective, how they can very quickly respond to reinfections.

And then I think another achievement, finding which came from our lab which, interestingly, has had some applications in the treatment of cancer is we were interested in asking a very basic question. We asked the question, since we'd already defined how CD8 T cells differentiate during the context of an acute infection, which is how your functional memory cells which can live for extended periods, we then asked the question what happens if you have a chronic infection. Do you still get these highly functioning memory cells in the setting of a chronic infection?

And we showed that actually the pathways, the differentiation pathways of what happens during acute infection with an antigen being cleared and a chronic infection where antigens do persist are strikingly different. So instead of these highly functional memory cells that you get following an acute infection or a good vaccine, in contrast to that, what you get after chronic infection is the cells are still physically present, that is, the viral-specific cells are still there, but their function is greatly compromised. Then we and others coined the term that these cells are functionally exhausted.

So that really was one of the first reports showing that in the conditions of the chronic infection you get dysfunction of the T cells. These studies were extended by other groups into human infections like HIV infection, hepatitis C infection, hepatitis B infection, that humans again have HIV-specific CD8 T cells or HCV [hepatitis C virus] or HBV [hepatitis B virus], but their function is greatly compromised. By "function," I mean ability to expand more upon encountering the antigen, ability to kill the target cells, ability to secrete inflammatory and anti-viral cytokines is greatly reduced.

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—and this was work done at Emory University—we showed that these exhausted CD8 T cells which you see during chronic infections express very high levels of this inhibitory receptor, programmed cell death-1.

Then in collaborative studies that we did with Gordon Freeman at Dana-Farber [Cancer Institute] and Arlene Sharp at Harvard Medical School, we showed that blockade of this inhibitory receptor were observed in increased T cell function in vivo and were observed in viral control. So this was the first kind of in vivo demonstration in a chronic infection model showing that you can essentially restore function back in the T cells by a relatively simply approach, because it's just infusing an antibody directed either against individual receptor or the ligand that it binds. So essentially what you're doing is—so there's a brake on the T cells. The simple analogy is there's a brake on the T cells, and even though you're pushing the accelerator, the car doesn't advance because this receptor is kind of blocking it. And then by adding this antibody, you're essentially releasing the brake, because the inhibition now is relieved.

And these studies have really moved very fast. It is not our work, but work mostly done by people in the cancer arena, and so now PD-1 blockade is one of the most exciting ways of immunotherapy for cancer.

Williams: And has it reached translational—

Ahmed: Yes, it's been licensed, actually. It's moved very fast, so there are now—Bristol-Myers Squibb has a PD-1 drug that's licensed, Merck [& Co., Inc] has one, and it's showing promising results in eight cancers now: melanoma, lung, bladder, head, and neck. Very, very exciting area.

So we made some small contribution in a viral field, looking. So what I like about this is that we really were neither working in cancer nor thinking about immunotherapy. We were asking a very fundamental question about how T cells differentiate during acute infection versus a chronic infection, very basic question about T cell development or T cell differentiation. And from that, studies came that contributed to our understanding of T cell exhaustion, the role of this inhibitory receptor in T cell exhaustion, and how blockade of this inhibitory receptor interaction results in better T cell function and control of the infection.

Williams: Are you continuing to work in this area?

Ahmed: Yes, we continue to work in this area because we would like to see, first, understand in greater detail the mechanism of inhibition, but also try and understand how you can improve it, what can you combine it with, what combination therapies can you do, and in that direction we have shown that you can combine therapeutic vaccination with PD-1 blockade, and that gives you much more effective control of infection. We're also looking at other strategies of combination therapies.

Williams: Has this work brought you into the field of products too? Are you active in pharmaceuticals and—

Ahmed: Yes, we have licensing and I have some patents on PD-1 related immunotherapies, and we have done some licensing of this to Genentech.

Williams: So you've become partially a businessman.

Ahmed: I wouldn't say that. No, no, I will never be a businessman. I'm very bad at it. [laughs] The university has done some of these things, and I have just stayed focused on very basic research. I don't have any biotech companies that I've formed, although there were opportunities to do that. But basically it's something that I don't really do well.

Williams: Anything more you want to say about the science of your—

Ahmed: No. I think it's been a wonderful journey.

Williams: And you've explained it very well.

Ahmed: Yes, right. And I think the other part which has been more satisfying and for which, actually, I'm getting this award is the training of these wonderful people I've had in my lab.

Williams: So let's talk about that for a bit. What makes a good mentor?

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]

Williams: Well, I just—it seems to me that probably mentoring styles are not universally uniform.

Ahmed: No, I think they're very different. They're very different, yeah. And I'm not sure that there is a perfect style. It's not that if somebody has a different style, they're not equally good or even better mentors. No. My style has really always been very open and transparent with my trainees, and really treat them as equals, as far as the science is concerned, not in other things, you know. But as far as science is concerned, you treat them as equals, give them enough independence, but at the same time make sure that they're directed on the right path.

Williams: So it's not a hierarchical setup that you—

Ahmed: No, no, it's not, because I don't have a hierarchy within the lab. It's not that you report to me, but other people, no, it's always been the same, same level. For students or postdocs, to me they're all the same.

Williams: So while we're on the subject of your award, let's talk about the AAI for a minute. You became a member in 1984, I believe.

Ahmed: Yes, that's right.

Williams: And that was while you were at UCLA.

Ahmed: As soon as I joined. I signed my lab in '84, and I think I became—I told you I became an immunologist *[laughs]*, so I joined the AAI in 1984.

Williams: And your motivation there was what? I mean—

Ahmed: Oh, and I was going to be doing immunology, and this was a great organization. It was the official body for immunology in America; published one of the premier journals, *The Journal of Immunology*, so it's what you do if you're an immunologist. You join the AAI.

Williams: And there have been benefits to you personally?

Ahmed: Yes, I've been engaged, not perhaps as much as I should have been, but I've been engaged with the AAI, coming to the meetings and participating on some of the committees over the years.

Williams: What stands out for you attending the annual meetings? Do you have some particular memories of occasions or—

Ahmed: Well, the AAI meeting accomplishes many things. One is you hear always very good science. But it's also a meeting place. You meet your colleagues, and also an important place to meet the younger people. A lot of students come to AAI.

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.

Williams: Because of these—

Ahmed: Well, these plus meetings. Yes, the ABs [advisory boards] are now taking up more time than they were before. But I also travel to a lot of meetings and give lectures at different places, so I'm traveling a bit more than I should.

Williams: From the global perspective all this travel must give you, do you see changing trade winds in terms of where immunological activity is going and flowing and changing and whatnot?

Ahmed: Yes. I mean, the nice thing is that there's actually very strong immunology now in many parts of the world. Of course, the U.S. has been very dominant, but Europe is very strong, but now there is also very strong immunology in Southeast Asia. Japan has always historically been very, very strong, but now you have very strong immunology in Korea, and, actually, I'm involved with some of the programs over there. In China, very strong immunology. I'm involved with programs in China, also in South Asia.

In India there's strong immunology now. I've been very engaged with advancing or promoting science in India. For the last fifteen years, I've been working with the Ministry of Science in India. I feel it's important to give something back to where you've come from. So I'm very engaged with the different scientific institutions in India. In fact, one of the advisory boards I've been on for the last fifteen years is an advisory board for the Ministry of Science in India, for the government of India, and I'm very engaged with that.

Williams: Does this activity in these other parts of the world—how is it reflected in the U.S.? I mean, are we losing our leadership?

Ahmed: Well, I would turn it around and look at the more positive side of it, you know, and that is, I think, that there are good interactions, actually, at almost all of these places which are doing—in all of these countries which are advancing and becoming and improving science over there in areas of immunology and pathogenesis or infections or vaccine. They all have interactions with the U.S. So in some ways positive, I think, it even enhances the research over here because we now interact with scientists over there that allows us to address some interesting questions. For example, if you're doing something in infectious diseases, it's great to be working with a group where the infection is endemic for that area. In fact, we have just started a collaboration with two or three different institutes in India to study dengue virus infection there, immunology of dengue infection in India. So I think, to me, I don't see it more in terms of who's the leader. I think I see it more in terms of additional opportunities and for collaboration to address important questions.

Williams: So, talking about India, would there still be the trend that so many students in India would still aspire to come to the States?

Ahmed: Yes, they do. In fact, even more. But what's now happening is that as the facilities, the infrastructure for science has improved and overall economy of India has been improving, so now a significant number of very talented young scientists who come to the U.S. or go to Europe for their postdoctoral training or graduate work are actually going back, which is a very good sign, very good sign for the country. So they're not losing everyone, you know. This brain drain is—you know, some people actually are going back, and they are going back because they want to go back, not because they couldn't get a position here. That is, they're turning down positions here and going back to India. This is a very healthy trend.

Williams: What about the funding situation in this country and its effect on science as it's practiced here?

Ahmed: I think there is a bit of a crisis, as you are well aware. The U.S. still has the largest science budget in the world. You do have NIH [National Institutes of Health] budget of $30 billion, which is a lot, but there is a crisis in the sense that the budget has remained flat for many years. It's becoming harder for people to get funding, especially for the younger people, and I admire the AAI for taking a lead, in that AAI has been very proactive in lobbying with the Congress and the Senate to increase funding. And those efforts continue, but also we should be looking at how the money is spent. Funding usually goes into two parts, as you're probably aware. One is these R01-type funding, which is independent funding for a given lab, and then there are these larger joint or these program projects. I think there has to be the right ratio that goes for R01-type funding and the right ratio that goes for the program project, because both serve their own purposes. They both need it.

The R01 funding needs to be protected because it's really the best mechanism, especially for young investigators, it's the best mechanism for them to launch their career. And the R01 system really has been the backbone, has really been what has made American science so successful. So we need to kind of retain that. At the same time, there's a trend now for bigger science that requires collaborative work. I think we should also encourage that in the right way, but, again, keep the right balance between. So as we lobby for increased funding, there should also be a dialogue about the R01-type funding and how much goes towards these larger programs. I'm a fan of both, but I think the right balance, it's critical to maintain the right balance.

Williams: Have you been active in both or have you been—

Ahmed: In my own lab? Yes, we have been fortunate to get both, yes.

Williams: Both?

Ahmed: Yes.

Williams: Give an example of a group activity.

Ahmed: So we have actually been—so when I say "we," I'm using the collective, the Vaccine Center in addition to my lab. We have a lot of program projects on HIV vaccine program that, again, is not something an independent lab can do. It really has to be a joint effort, so we're a part of that. We've been part of these very successful Human Immunology Center programs that NIH and NIAID [National Institute of Allergy and Infectious Diseases] has launched. The systems biology programs, we're a part of that. We're also part of a flu center in addressing—these are all human studies.

One thing I didn't mention in my own lab is we kind of made it—ours was exclusively a mouse immunology lab until the mid to late 19—actually, even early 2000. But then we kind of made a transition again. This was because of the initiative of NIH and NIAID to encourage human immunology, and they launched a program for Human Immunology Centers. So we applied for that in early 2000. We were among the first recipients of those Human Immunology Centers, even though we had not done much. But NIH, I think, kind of took a gamble with us, and that's been very successful to now. But half my lab actually does human immunology. So I think these large programs have been very beneficial.

Williams: Is a lot of your time devoted to administrative things and grant writing?

Ahmed: Yes, a lot of my time is devoted to grant writing, but that's essential. We need to do that. Some of it is also devoted to running the Vaccine Center that I had. We have about thirty faculty who are part of the Vaccine Center. There are about three hundred scientists who work within that, so that takes up—but I don't mind it, it's an important activity and the colleagues I have are really terrific.

Williams: Talk about the Vaccine Center for a bit. I mean, it sounds wonderful. [laughs]

Ahmed: Yeah, it's an interesting concept. If you have an academic center that's based at a university, you're not going to be producing vaccine. You're not a manufacturing plant and so on. So we set it up in such a way that the real foundation for the Vaccine Center would again be fundamental science, but it would be science that would be a little bit directed to vaccine discovery, vaccine-related aspects, and that's worked out very well.

And then we kind of built a second layer above that, to pick some areas, specific areas where there would be targeted programs in vaccine development. So we picked HIV as one of them. There's work on malaria vaccines going on. So it

sits on the basic discovery platform and then targeted vaccine areas, like right now we have malaria, influenza, and HIV efforts in that.

And then we at the same time established a center for doing clinical trials, so we have a very strong component of our Vaccine Center is a clinical component. Mark Mulligan, who's an ID [infectious disease] physician and a scientist, M.D.-Ph.D., he runs our clinical center, which is very well funded. We have one of the vaccine trial evaluation units that actually test vaccines coming into the pipeline. And that also allows us to address—not only do clinical trials in moving vaccines forward, but also to learn human immune responses to those vaccine candidates that are being tested. So there's basic discovery, there's targeted programs, there's a clinical component to it, clinical trials.

Then we also were fortunate to recruit Walter Orenstein, who was at the CDC [Centers for Disease Control and Prevention] and headed the vaccine policy program over there. So we have a small program on vaccine policy. What I mean by that is really advocacy for taking the vaccines. So there's this interesting small component that we have, which has brought us a little bit more breadth and kind of connects us really with what happens after the vaccine goes into the body and how is it used, where is it used, what are the challenges in using it, and if there's opposition to the vaccine, how do you deal with that. So it's kind of a comprehensive Vaccine Center in that sense.

Williams: And how many such centers are there around the country?

Ahmed: How many vaccine centers? There are now many universities have vaccine centers. Probably there must be about fifteen, twenty at least.

Williams: So there's a lot of competition in the field.

Ahmed: Yes, but also, again, we interact with them, and they all have their own niches. Ours is among the larger ones, but there are also some very other successful ones.

Williams: You keep using the word "we." It was a creative team that designed the Vaccine Center?

Ahmed: Yes. We got a lot of support from the Emory administration. The Georgia Research Alliance, which I mentioned to you, played a big role. We have a lot of collaboration with Centers for Disease Control, CDC, which is right next door to Emory. In fact, when I was moving, that was one of the attractions, that CDC was right next door and there would be opportunities for collaboration. Those have worked out very well.

Williams: What do you see as the future for your students and trainees in your lab, and where do you steer them?

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. I hope that doesn't come at the risk of the fundamental mechanistic work, but that's the trend. So I do encourage them, because there's an opportunity at the Vaccine Center or in my lab that they can do mechanistic work using mouse models, but at the same time, we always are getting human samples from vaccination or infection, where you can ask some interesting questions there. I think we're now probably better to have a little bit more broader skills than before.

Williams: How have you balanced life as a family man with being a man of science?

Ahmed: Ah, that's a good question. I don't know. Probably haven't done that very well. [laughs] But I have a wonderful family, my wife and two children, and I think they're all happy with that. I think they've adjusted. They know that I really enjoy the science, so I'm away a lot.

Williams: Your wife is not a scientist?

Ahmed: No, she's a teacher, actually. While our kids were still in high school, she was very actively engaged with their schooling and everything, but after our kids went to college, she actually went back to school and got a degree in teaching, so she's now a teacher and very much enjoys teaching. She teaches at an elementary school and is very talented, and now I think she's busier than I am. [laughs]

Williams: And what career paths are your two kids following?

Ahmed: Our daughter majored in English and then got a degree in creative writing. I think she wants to teach English in college and write. I told her she can always write my grants. [laughs] And our son is a biostatistician and works at the Fred Hutch [Fred Hutchinson Cancer Research Center] in Seattle.

Williams: What do you do to have fun?

Ahmed: I enjoy the science so much, I'm not sure what I do for fun. No major activities in that sense, no. I enjoy sports. I just—

Williams: You didn't take up surfing in California?

Ahmed: No, I didn't take up surfing in California. No, no. [laughs] I used to play a lot of sports when I was in India, but now I don't. But I follow a lot of things. I follow politics. I follow sports. I like movies, always been a movie buff. Read a little bit.

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]