# The American Association of Immunologists Oral History Project

## Transcript


Richard W. Dutton, Ph.D.
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Interview conducted by
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**Williams**:

**Dutton**: No, no, it absolutely reinforced it. I got completely immersed in it.

**Williams**: So what was your graduate time like?

**Dutton**:

**Williams**: Did you do a thesis then?

**Dutton**: Yes.

**Williams**: In that area?

**Dutton**: Yes.

**Williams**: That's interesting. Talk for a moment—this is a little bit of a tangent—about the relationship between scientific research and the technical side of things. How dependent has the history of immunology, for example, been on technical development?

**Dutton**: Yes, I think there is a very close interaction in both directions. Technological advances completely revolutionize areas of research. I mean, flow cytometry is the most striking of them. I remember when it was initially developed thinking there really wasn't much point in it because you could do separations in other ways, but now it's something you use all the time. There's no experiment that we do could be done without hours and hours of flow cytometry. It's gotten so sophisticated that it's absolutely indispensable.

**Williams**: So that's what I was sort of expecting you to say, that there is an indispensable relationship between the two.

**Dutton**: Yes. That, of course, was developed by an immunologist. Actually, I think original flow cytometry was analyzing pollen grains, and I don't know how he came to know about this and use it for separating cells. Then, of course, the fluorescent labeled antibodies which actually Susan Swain was in the lab of Albert Coons, who developed that technology. She was a graduate student.

**Williams**: So after completing your time at London, you then made this trip to America, and kind of interesting how that came about. I read about that, so tell us.

**Dutton**: Well, it was totally an accident, actually. I had arranged to go and do a postdoctoral fellowship at NIH [National Institute of Health] with a guy called Sydney Udenfriend, and that was in biochemistry on tryptophan metabolism. But for some reason, he decided that he was going to come to England and do a sabbatical in London, I think, so that fell through, and that was a bit of a shock.

But at that time, an American immunologist just happened to come into the lab and say that he was looking for somebody to come and work in his lab, and since I just wanted to guy called John Vaughan. He died about ten years ago, I think. But he was an excellent person to start off in immunology.

**Williams**: You intended then to find a way to come to the States in . . .

**Dutton**: Yes, at that time everybody aspired to do a year's postdoctoral fellowship, and so I came intending to come for a year, but actually the year stretched on to almost three years, and I did go back to England for about a two-and-a-half-year period before finally emigrating.

**Williams**: What was the allure of the States in '57?

**Dutton**: Well, I think it was where there were a lot of active research going on, at this place where there was money to do research, and also I just wanted to come visit America. [laughs] It was sort of an adventure.

**Williams**: So what was Vaughan's operation like?

**Dutton**: Well, at that time, he was, I think, an assistant or associate professor at the Medical College of Virginia. He had studied with Elvin Kabat, also a leading immunologist, and he had a lab with about five or six people in it, I think, in Richmond. About a year after I went there, he moved to University of Rochester, New York, and we went there. My former wife and I went there and we both worked in his lab.

**Williams**: Speak about your former wife just for a moment. She also was a scientist.

**Dutton**: Yes. We worked together while we were in America, and then when we returned to America, to San Diego, by that time we had small children, but she went back to work and worked in Jon Singer's lab at the University of San Diego.

**Williams**: So, that's right, you went back to London from '59 to '62. What caused that to happen? What were you doing then?

**Dutton**: Well, originally I had intended to emigrate, so I was going back home and I worked there. I had an NIH grant, very modest by current standards, but it was perfectly adequate to fund me and my little group of people, about four or five people. But I didn't have any position; I just had space. They just gave me space, so that was it. It was clear that getting any sort of permanent position in London was going to be very difficult.

At that time, I had done some work that was attracting some attention, and I got an offer to go to Scripps Clinic in La Jolla. Frank Dixon was the director of the Pathology Department there, and he asked me would I be interested in joining their group, and it occurred to me that since I didn't have any other job, that might be a good idea. [laughs]

**Williams**: Why were things tight at that point in Britain?

**Dutton**: Well, Britain went through a very bad economic time after the end of the war, and I remember that at the time I made my decision, I think more money was spent on a single horse race than was given to the entire University Research Committee in

**Williams**:

**Dutton**: Well, I can't remember the exact details, but I think it was not specifically restricted to minority students, but I think that probably about 50 percent of the students were minority students. The idea was to have courses that would connect to the student's high school education, which was, in general, less advanced than the main population.

It worked pretty well, I think. I remember teaching in it was pretty tough. It was difficult to get some of the students involved in the sort of biology of it, the science of it. But the third college gradually evolved, and I don't know whether it still has any minority bias or whether it's absorbed into the—I mean, the goal was to have it absorbed into the general education system, and I imagine that's probably happened by now.

**Williams**: So talk about some of the research highlights of your time there.

**Dutton**: Well, we had developed this in vitro system and, of course, every five years or so something completely revolutionary happens in immunology and, I guess, in other fields, and so one started working on the new things. One of the things that we did early on was to show that T cells, which help B cells make antibody, do it by elaborating factors. We call it the T cell replacing factor. So in 1970, we discovered that you could stimulate the T cells to make a product which would then replace the T cells in giving help, and these were the cytokines that now everybody knows about.

They didn't sort of catch on immediately, because people were worried that they didn't have any antigen specificity, and so other people were describing antigen-specific factors that turned out not really to exist eventually, but they sort of had the limelight. We tried to fractionate and characterize these factors, and we didn't really have the tools at that time. We didn't realize that we were not talking about a single factor but maybe twenty different factors, and we didn't have clean assay systems to really separate them and purify them. We did eventually. We did purify something that at that time was called B cell growth factor 2, which turned out to be Interleukin 5, and we did actually get the N-terminal sequence of that after purifying it, but we were beaten to the post by somebody who cloned the gene for it, so we decided we couldn't really compete with large groups that had the resources that we didn't have.

So we also worked on MHC, reactions to MHC, histocompatibility reactions which showed that the histocompatibility locus in mouse was the H2 locus. We [unclear] the mixed lymphocyte response to histocompatibility mapped to H2. We did a number of other things with T cells. I remember John Kappler and Pippa Marrack were in their lab. They worked on assays for measuring T cell help and also limiting dilution assays to identify individual helper cells.

Then mainly we went off into looking at subsets of T cells. First of all, there weren't any T cells, there were just lymphocytes, and then first there were T cells

**Dutton**: Well, she was offered a very exciting position as being the director at Trudeau [Institute], and we'd always had this sort of fantasy that it would be nice to have a little research group office of our own, where we didn't have to deal with any bureaucracy, we didn't have to teach three hundred undergraduates immunology and so forth. We were a little worried about how viable an independent research institute would be, but we decided to give it a go, and actually it turned out to be very good choice, I think. We had an excellent time there.

**Williams**: Did you visit before—you certainly visited before you accepted the position.

**Dutton**: Yes. Susie got the invita.Dutto/TT1 o fa D Do whe want to gorotc heo o f22 daycare center, too, which one of the trustees gave money to fund, which made it a very attractive place for young postdoc couples to come to.

**Williams**: You and Dr. Swain were having a family, too, right?

**Dutton**: Yes, they were born in San Diego, but I think our son was sixteen when we came, and our daughter was nine.

**Williams**: Describe what the Institute was like when you got there.

**Dutton**: Well, it was relatively small. I think there were about five or six faculty, and it had a relatively modest budget, but I think we were fortunate in our timing. That was the period when NIH funding was expanding, doubling, over a five-year period of 1996 to 2002, and we were able to recruit a number of really excellent people. So the place expanded enormously while we were there. I think we doubled the number of faculty and probably increased the funding of the place about fivefold. So it was a very, very good period. Also we were able to build a new wing to the Institute, and they really were exciting times.

**Williams**: Did you come in with sort of plan of action, or did it evolve once you were there?

**Dutton**: We did some pretty careful planning before we moved and then we did continuously planning. The chair of the Board of Trustees, about a year after we were there, asked us to develop a five-year plan for the expansion of the place, and we did that. Then we had a second five-year plan when that was done.

**Williams**: It sounds very Soviet.

**Dutton**: [laughs] It was a lot of fun. It's very difficult to do that sort of planning because there's a worst-case scenario and a best-case scenario, and an awful lot of difference between the two, so we would sort of narrow them down to something in the middle and plan around those expectations.

**Williams**: And they pretty much worked?

**Dutton**: Yes, they did. Actually, they worked very well.

**Williams**: So what were some of the major accomplishments that were made by the Trudeau Institute while you were there?

**Dutton**: Well, I think we worked on a number of disease models, infectious diseases, So we worked on tuberculosis, on some other bacterial diseases, influenza, toxoplasma gondii, and a worm disease, helig— [laughs]. I can say it if I don't think about it. I'm completely blocked on it. It's a worm that infects the intestine. All of these different infectious agents require quite different types of immune response to deal with them. Some of them require antibodies, blocking antibodies, some of them require cytolytic T cells to kill them, and some of them require cytokine responses and innate responses. Heligmosomoides polygyrus.

**Williams**: Are describing what you and Dr. Swain were doing or the whole group?

**Dutton**: We had two or three groups that worked on viral diseases, one very successful group that worked on tuberculosis, Andrea Cooper and her group, and they made some good advances. Also, the previous director, Dr. North, Robert North, he had also worked on tuberculosis and made some very interesting observations.

**Williams**: Did he continue to work with you all or not?

**Dutton**: When he resigned, he retired from the directorship, he continued to work, and, in fact, I think he's only just retired a year or two ago, and I think he still has a connection. He lives there at Saranac Lake.

**Williams**: So were there downsides to your coming there or problems that you confronted?

**Dutton**: No. I mean, some people, I think, found it very remote. It was fifty miles to the neares little administrative

**Williams**: So talk a little bit more about this place. You said that they're a good group of people and so forth. Is there any particular mission of the department here that you see?

**Dutton**: Well, I think the state, when they decided to put the medical school in Worcester, put a lot of money behind it, and I think UMass-Worcester has sort of been steadily rising in its academic profile. I think it's beginning to establish a very strong reputation, and, of course, the new building that they're putting up just across the way here will allow them to continue that. Getting research funding is very difficult for everybody, but so far people are managing to get at least some level of grant support.

**Williams**: Do you have much connection with the academic program?

**Dutton**: I personally don't, no. I do give a few sort of seminar-type meetings with the students, but I don't do any of the mainstream teaching.

**Williams**: I was looking at a description of the reasons why the medical school was founded, and one of them was a state commitment to the production of more primary-care physicians. Is that still part of the mission here?

**Dutton**: Yes, I think so, and I think they continue to be rated very highly in that area. I forget what it is, but they're right up in the single-digits listing in the country.

**Williams**: Are there other areas of particular focus?

**Dutton**: Well, they have Craig Mello, who's a Nobel laureate for his work on microRNAs, and they have a very strong group in innate immunology, and I'm sure they have groups in other areas of medicine that I'm not familiar with, but certainly in the area that I'm familiar with, they have a very good reputation.

**Williams**: Looking back on your scientific career, what do you want to be remembered for?

**Dutton**: Well, I think my main contribution was to develop in vitro models for studying the mechanisms of the immune response, using those for discovering that there were these cytokines that were involved in the interactions between different types of lymphocytes. That's probably my more important things.

**Williams**: To the layman, what importance does that work have?

**Dutton**: Well, it's mainly understanding how the whole system works. We haven't, for the most part, focused on any translational research. I think that when I first started out in science, the operation was very much smaller than it is today. I think I did a calculation the other day that there are probably twenty times as many people doing immunology now as there were fifty years ago, and the amount of funding devoted to it was also twenty times smaller. So for people to

research go to.  Obviously they go into biotechnology of one sort or another.  But the old model where you studied under your professor, then you became a professor yourself isn't going to work, because you had a rate of expansion that was too great to support.

There was a paper in *Science* that I keep trying to find that I've never been able to retrieve by somebody called Carter, who pointed out that the rate of expansion of the NIH budget for science would exceed the gross national product by the year something or other in the future, that

that has lots of people, you'll lose out, and if you're not competitive, you won't get your next grant. So I think it tends to be sort of a winner-take-all situation.

**Williams**: So how does that work in the application process? You apply for the first grant and then immediately once you get it go for the second?

**Dutton**: Junior faculty when they're recruited, they generally get a startup package that is designed to set up their lab with equipment and then fund them till they can acquire their own funding. So at Trudeau, we had an amount of money that was calculated to fund them for three to five years, by which time they had to be independently viable, and that, by and large, is what happened, but it means you have to only recruit people who are going to be really successful, otherwise you've wasted your startup package.

**Williams**: And the funds for the startup package come from NIH?

**Dutton**: Well, at Trudeau they came from the interest on the endowment, and we used to have about $2 million a year in sort of discretionary research-funding money, which we used for startup packages and for supplementing people who were temporarily between grants.

**Williams**: And where did those funds come from?

**Dutton**: They partly came from the overheads for the grants. The grants had an 84 percent overhead, I think, at Trudeau, and they also came from various other funding sources, a few funds from the state, and also we had an earmark both from the state and from the federal government. They were put into an aggregate pool. They weren't specifically—I mean, we didn't take the money from one thing and use it for something else, but they just contributed to the general operation of the Institute.

**Williams**: Did you enjoy any particular support from the state because you were a treasurer?

**Dutton**: Yes. I think the Institute, it's such a small community that the sort of financial viability of the community was dependent upon having a functioning institute, so local senators and representatives would work to get state funding of one sort or another. Either you support the Institute and keep the community viable or you let the Institute go and then you have a community that needs to be supported. So it's same amount of money, whichever way you distribute it.

**Williams**: So the Institute was critical to the economy of the community.

**Dutton**: Yes. The community had a hospital, a regional hospital. It had the state prisons, a lot of state prisons in the Adirondacks, correctional facilities. It had Trudeau Institute, had a community college, and American Management Association, and tourism. So those are the main incomes of the community.

**Williams**: Were there any particular hot-button issues while you were on the Council?

**Dutton**: I remember t0 Td ( Tc 0(o)-10(u -4(ar-1( t)-6(i)--1(em)0(r)-10(1r)-1( t)ca-6(b)-)-1(t))-4(o)e2(h5)-

**Dutton**: I did. I went on several, talked to my local congressman. I remember meeting with the congressman from Rochester, New York, and also with the staff of the two senators from California, Dianne Feinstein, and meeting with those people. Mainly one meets with their staff who are in their mid to late twenties and extremely enthusiastic and extremely knowledgeable. We had a very good public affairs fellow at the time at the AAI.

**Williams**: Patrick White?

**Dutton**: Bob White, I think his name was. [ed. Patrick White was the director of AAI public affairs]

**Williams**: Yes, Bob White. That's right. I just read Gail Bishop's current presidential message saying exactly the same things that you did.

**Dutton**: I think all the last ten to twelve of those said the same thing.

**Williams**: That's right. There's been no significant breakthrough, has there?

**Dutton**: Well, I think the trouble is that most of the people in basic research are applying for these RO1 grants, and not only has the total amount of money available stabilized or even declined a little, but there's been a shift towards more translational programs. So a lot of the money that was going into what I would consider to be basic research is now going into translational programs of one sort or another that pay for things that are not research. So the amount of money for research has dropped rather more than just a look at the total budget would suggest. Now, as a basic researcher, I would say that it would be nice if the translational part was paid for out of another pot, but that doesn't seem to be the going idea.

**Williams**: Where does immunology stand compared with other scientific branches that NIH funds?

**Dutton**: I actually don't know. I suspect they're fairly comparable. There have been special initiatives like money put into HIV/AIDS research and things like that, but on the whole, I think it's been reasonably stable. Probably more money has gone to diabetes research and so forth, but, actually, I don't really know.

**Williams**: You received the Lifetime Achievement Award from the AAI in 2004. How did that make you feel?

**Dutton**: Good. It was nice.

**Williams**: You're a fellow of the American Association for the Advancement of Science, and that's quite an honor, isn't it?

**Dutton**: Yes, certainly felt good.

**Williams**: Was there any particular reason why you were nominated and elected to that?

**Dutton**: No, I think that some people noticed that I wasn't a member and thought I should be.

**Williams**: Another position you held

the most exciting thing, to do an experiment and find that your idea was correct and to be able to prove it.

**Williams**: Did you develop a particular modus operandi for doing your scientific work?

**Dutton**: I think one thing that I tried to do was to make sure that everybody felt that they could contribute to what was going on, so in the lab we always took the view that anybody should come forth and say whatever they thought they wanted to say and not feel that they had to keep their mouth shut, and I think that's always a very fruitful way to operate. You find that people who you least expect to say something important actually quite often do. The more input you get and the more involvement you get in the research, the better. So I think we had a very egalitarian sort of structure in the lab.

**Williams**: Would you advise trainees at this point to pursue a career in immunology?

**Dutton**: I think that you have to be really interested in what you're doing if you're going to be successful, so I think people who feel compelled to do research are the ones that should be going into their career, because otherwise they won't have the motivation to be successful.

**Williams**: Any particular path you'd suggest to those who are a little bit less motivated?

**Dutton**: Well, that's their problem, I guess. [laughter] If they want a specific training for some non-research-oriented job, if they have a clear idea of what it is, that's a reasonable thing to do. But I think that most of the successful people that I know are compelled to keep coming back to the things they study. They do things, they get frustrated, they get disappointed, but then they feel they have to go back and try again. You have to have an intensity of feeling to be successful.

**Williams**: If you had it to do over again, would you pretty much do the same thing?

**Dutton**: Yes. I think I've been very fortunate to have a very enjoyable career.

**Williams**: And what does a scientist do for fun?

**Dutton**: Oh, all sort of things. Depends who they are, I guess. I like outdoor activities. I like reading. I like music, travel. I don't have a p' fun?

**Williams**: Are we leaving anything unsaid today that you'd like to express?

**Dutton**: No, I think we've covered pretty well most things.

**Williams**: Very good. Thank you very much for this interview.

**Dutton**: Thank you.

[End of interview]