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Institutional Interviews : 2008 : 2008 Sep - George Washington University, Department of Microbiology, Immunology, and Tropical Medicine

INSTITUTIONAL INTERVIEWS - 2008

September 2008



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Microbiology at George Washington University

Featured Institutional Interview

According to an analysis published in ScienceWatch.com in July of this year, George Washington University had the highest percent increase in total citations in the field of Microbiology for the December 2007-February 2008 update period. In **Essential Science IndicatorsSM** from Thomson Reuters, GWU's citation record in this field includes 156 papers cited a total of 5,230 times between January 1, 1998 and April 30, 2008.

In the interview below, Dr. Peter Hotez, Professor and Chair of GWU's Department of Microbiology, Immunology and Tropical Medicine, talks with correspondent Gary Taubes about the history and development of the department.

SW: What were you doing prior to your move to George Washington University in 2000 to create the Department of Microbiology, Immunology and Tropical Medicine?

I'd spent 12 years on the faculty at Yale, building up a program there in molecular parasitology.

SW: What was the impetus for starting the department and why do it at GWU instead of Yale?

We'd obtained funding from the Bill and Melinda Gates Foundation to develop a hookworm vaccine. The grant actually went through an organization called the Sabin Vaccine Institute: Sabin was prepared to give the grant to my lab and they basically said, "Set it up wherever you think you can get the work done best." What was clear was that as an academic scientist I now had to learn how to do product development, but I had to do it in the nonprofit sector.

The problem with hookworm is that it's a disease of the world's poorest people. Six hundred million people have hookworm and almost all of them live on less than a dollar a day. This means any vaccine has to be developed in the nonprofit sector. So where was I going to learn how to make a vaccine and then do product development? It's not easy to do that in close collaboration with industry because industry is more or less a closed system.

There were multiple advantages to setting up a lab in Washington. One was we'd be close to the Walter Reed Army Institute of Research, which has experience making military vaccines. They were fairly open to helping us, both the current members of WRAIR and the retired personnel. A critical person was Phillip Russell, a Major General of the Army who was on the board of the Sabin Vaccine Institute and was in the Washington DC area. So that was incentive number one to move to Washington. Incentive number two was that Washington is an important center for global health policy. You have the Pan

American Health Organization, the World Bank, and the Global Health Counsel. So there was this combination of factors that made Washington look like the ideal place to learn how to make the vaccine and, equally important, to learn how to develop the policy to assure that the vaccine is used once it's developed.

We looked at many schools in the Washington area. We thought initially of going to Johns Hopkins, which is kind of Yale south. At George Washington, there was essentially an empty floor of a building that we could use. I thought that would be a great opportunity to build something new and I liked the idea of doing so. There was a department of microbiology on the books at GWU, but it only had a couple of faculty and they were no longer pursuing active research programs.

To me this idea of creating a department from scratch was far more exciting than going to an existing department, as would have been the case at Hopkins. I wanted to realize the vision of a department devoted to tropical and infectious diseases. There are only a very few basic science departments of parasitology and tropical diseases. One is at New York University; the others are at Hawaii and Tulane. I thought it was important to have one in Washington DC.

"Over the next few years I want our department to become a go-to department for solving problems of parasitic diseases and HIV/AIDS in developing countries."

SW: How big was the grant from the Gates Foundation?

The initial grant was \$18 million, but that also included support for the clinical development piece and supporting the clinical laboratory in Brazil, as well as work in collaboration with other institutions of the Human Hookworm Vaccine Initiative, including the Queensland Institute of Medical Research in Brisbane, Australia, and the London School of Hygiene and Tropical Medicine. We have since (2006) been re-funded.

SW: What was your strategy for recruiting talented faculty to a brand-new department, one without any track record?

Well, first of all, we had to identify people that could buy into the idea of doing very applied research and development to make products. If you went to one of my lab meetings, you probably wouldn't find it interesting, because a lot of what we talk about is quality control and quality assurance and all these other things you do in industry.

Then the idea was to have the faculty members that were not making a hookworm vaccine, which is what we'd be doing, but were interested in immunology of parasitic and tropical diseases. We also felt that we could not ignore the HIV/AIDS pandemic, and we emphasized that in our recruiting.

We basically said, "Look, this is not a wealthy school; it's only modestly resourced outside the hookworm vaccine. We're not going to try to be everything to everyone. We're not going to have an adenovirologist; we're not going to have a flu virologist; we won't have a bacterial pathogenesis person like so many microbiology departments. We'll try to be good in three areas that are complementary: one is parasitic tropical diseases; one is immunology and immunity to infection; the third will be HIV/AIDS."

SW: Was it difficult to get good people to come?

It was not that hard. The only thing I couldn't sell was having a big, critical mass of scientists, but because the DC area itself is so enriched in research, that in itself was a good selling point.

SW: How large is the department?

We now have 20 faculty members, some of them research faculty only.

SW: How did the department evolve in coincidence with your hookworm vaccine work?

Well, one thing we had to do was get to work on the vaccine. This, essentially, was like setting up a biotech company, but a non-profit one in an academic setting. At the same time, we're bringing in people with independent NIH grants who could also build up research programs that would be complementary to what we're doing.

The key was focusing our attention on some very important individual recruitments that would kind of anchor the department: people like Paul Brindley, an eminent parasitologist who was at Tulane; Imtiaz Kahn, who worked on toxoplasmosis immunology at LSU; John Hawdon and Bin Zhan, molecular parasitologists who came with me from Yale; Jeff Bethony, an immunologist from the Southwest Foundation; Michael Bukrinsky, who is an HIV virologist; and Fatah Kashanchi, who also does HIV. We also recruited two more junior immunologists, Stephanie Constant and David Leitenberg. Another very important component was hiring a strong administrative staff. So I recruited Maria Elena Bottazzi to

serve as vice chair for administration. For the Human Hookworm Vaccine Initiative, we recruited Gaddam Goud, who was working in industry at the time, as well as Bin, and Dr. Botazzi also has a leadership role in product development.

We embarked on a collaboration with the Sabin Vaccine Institute so that the lead scientists and physicians there, such as Ami Shah Brown, David Diemert, Mike McQuestion, and Ciro de Quadros, have faculty positions with us as well as The Institute for Genomics Research (TIGR), emphasizing faculty that were doing parasite genomes, including **Najib El-Sayed** and Elodie Ghedin. As long as we're in Washington DC, why not hit the ground running by partnering with like-minded institutions?

SW: In retrospect, what was the most challenging aspect of getting your department up and running?

There were a number of things. Getting people to roll the dice on an unknown entity, not a big-name school, was one of them. The people we recruited could have gone anywhere; they could have gone to Harvard, Hopkins, you name it. So they had to buy into the vision of a department committed to diseases in developing countries. That was very important. And then doing the product development was also, personally, challenging—learning how to build products. Throughout this time we also kept close ties with the Sabin Vaccine Institute. I've now become president of that Institute and they're now located on the edge of the GWU campus. So we're building links there. The doctoral-level staff at the Sabin are now also members of the GWU faculty.

SW: How many of your 20 faculty members are also at the Sabin Institute?

Right now, there are three, including me.

SW: How did it feel personally to go from a full-time researcher to someone who spends a large proportion of time as an administrator?

Fortunately I have very good administrators. I have Dr. Botazzi and a chief financial officer at Sabin named Brian Davis. I realized about myself that I'm not a terribly good financial manager, so I have someone who takes care of that. What I love is talking to my faculty and seeing this department realized as a department devoted to diseases of developing countries. I think one of the reasons why we've been so successful is because of our focus. It also helps, of course, to have university administration that's supportive—a dean (Jim Scott) and vice president for health affairs (Skip Williams) who buy into the idea. We like to joke that we're the only department of microbiology in the country without a microbiologist—we don't have a classical bacteriologist in our department.

"Six hundred million people have hookworm and almost all of them live on less than a dollar a day."

SW: Your department's most-cited papers are on bacterial genomes. How did that come about?

That's interesting. What happened was that while I was at Yale, there was a talented student there named Najib El-Sayed, and he then moved to TIGR. When I moved to GWU, the deans arranged an affiliation with TIGR, and Najib was leading the way on the work on parasite genomes, so we brought him into our department. Then TIGR collapsed and everything was scattered. The fallout was that we lost Najib to the University of Maryland.

SW: How do you see your department evolving over the next five years?

Well, I want to keep it going. If you look at the big picture, GWU is not a science-intensive university. It's not up there with some of the big players, even just those with Washington in the name, like Washington University in St. Louis or the University of Washington in Seattle. I would at least like our department to stand out as something that could be considered right up there with these other important departments of microbiology. That means continuing to build on our critical mass and what we've started to see developing in the last couple of years. It's very exciting.

The faculty are now writing grants and doing projects with each other, not just with the collaborators they had before they came here. So, for instance, people are working together on parasite-HIV co-infections. That's going to be so important in the future. There's evidence suggesting that when you have worms, it increases your susceptibility to HIV/AIDS. There's maybe a three-fold increase in transmission. We're looking at the mechanisms for that. We also are now the scientific headquarters for *PLoS Neglected Tropical Diseases*, the first open-access journal on this topic.

Over the next few years I want our department to become a go-to department for solving problems of parasitic diseases and HIV/AIDS in developing countries. This includes developing new vaccines for parasitic diseases and other infections. I think co-infections are going to be huge. I think we're on the

verge of making some very exciting new products, new control tools, for these neglected diseases. I think were becoming competitive with some of the more advanced science departments in molecular bacteriology.

SW: Do you think you're now competitive with Hawaii, Tulane and NYU?

Those are wonderful departments and I think we're there now. We're not quite with the Harvards and the Dukes yet.

SW: Are you planning on adding more faculty?

We're looking to expand in our existing areas, so we can build on this critical mass that we have. Really nothing dramatically new, though, just expanding where we're already going. We want to be able to hire another first-rate person working on parasitic worms. We really want to capture a market share, you could say. The other thing we haven't done enough is to recruit really young faculty right out of their post-docs. So we want to bring in some younger blood. Most of the people we've recruited have been mid-career.

SW: Is there a reason for that?

It's because this is still a relatively resource-poor university, we've had a reluctance to take a risk on those kind of young researchers.

SW: So back to what got this all started: What's the status of your hookworm vaccine?

It's now in clinical trials. There is a pipeline of antigens moving through clinical trials in Brazil. It's become a very interesting model for how to make products in the nonprofit sector. We're looking at the next five years to really give us a sense of whether these vaccines are working well in developing countries. They work well in animals. We have to show they work well in people and that they're safe. So we have a series of safety trials to do.

SW: What would you like to convey to the general public about your institution's work?

That I think it's possible, even in this day and age, to build a world-class department from scratch, with sufficient commitment and focus and the support of the community and the administration. I am particularly looking forward to seeing how the new University President, Steve Knapp, unfolds his vision for building research here. And, of course, thank God for the Bill and Melinda Gates Foundation for making all of this possible! ■

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The Department's current most-cited paper in Essential Science Indicators, with 311 cites:

Read TD, *et al.*, "The genome sequence of *Bacillus anthracis* Ames and comparison to closely related bacteria," *Nature* 423 (6935): 81-86, 1 May 2003. Source: *Essential Science Indicators* from Thomson Reuters.

Keywords: hookworm vaccine, vaccine development, vaccine policy, parasitic tropical diseases, immunology, immunity to infection, HIV/AIDS, department development, research partnerships, funding, bacterial genomes.



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