

The Physician-Scientist

Angela C. C. Wang, MD

“Physician-scientists are persons with medical training who spend most or all of their time performing basic, disease-oriented, or patient-oriented research” (1).

People often talk about physician-scientists as if they were freaks of nature, neither wholly physician nor scientist, but an unnatural combination of two breeds, as if the two could not possibly occupy the same being or mind at the same time. Some analogies depict the physician as the “engineer” who applies the principles of the “pure” scientist. Physicians are said to practice the *art* of medicine and to be focused on making people “feel better.” Scientists, on the other hand, are detail-oriented, motivated by a desire to understand underlying mechanisms (2). As a result, the physician-scientist occupies a unique niche. They are not completely accepted by clinicians, who doubt that someone who practices part-time medicine could possess cutting-edge skills and who feel that the real medicine is practiced only at the bedside. Similarly, PhD scientists question the rigor of research performed by MDs who are distracted by the demands of administering to the sick.

In the Hawaiian language, the word for half-breed is “hapa,” a word that is strictly defined as: portion, fragment, part, fraction, installment; *to be partial, less* (3). I would argue, however, that being a hybrid or physician-scientist offers the opportunity to combine the best of both worlds—to be *more*. When you think about it, the attributes of a good physician and a good scientist complement and even synergize in ways that neither camp can fully comprehend. For me, being a scientist was a natural extension of my innate curiosity about the basic mechanisms of disease. There is nothing more frustrating than treating a septic patient with vasopressors, realizing that we are using largely the same drugs as when I started internship two decades ago. Or reading another article about steroids in acute lung injury and wondering what is it about the (anti)-inflammatory process that we still don’t understand? To paraphrase one of my professors, if it weren’t for basic science, we’d still be investigating better ways of ventilating patients with the iron lung!

Similarly, I never thought of the time I spent in the lab as being totally divorced from clinical practice. Being a scientist forces you to think with brutal honesty. What is my hypothesis? How do I test this? What are the proper controls? Is there another explanation for my findings? Even now, one of the great services I perform as a pulmonary consultant is to think of alternative diagnoses and to determine the tests I need to prove/disprove them. “Show me the data,” my old nephrology-attending used to say.

I did my research fellowship at the Lung Biology Center at the University of California, San Francisco. I had spent a few summers as a student doing minor research projects, but this was my introduction to full-time, full-scale laboratory work. We were a mix of PhDs, MD-PhDs, and MDs. One of the labs focused on heat-shock proteins. Others on integrins. It was intense and it was fun. One didn't think about “work-life balance.” The long days in the lab made for an easy camaraderie among fellow postdocs that transitioned easily into friendships and social activities (usually centered around eating!) during weekends and evenings. I never felt like I was giving up anything to be in the lab. We were all in it together.

It wasn't the same for everyone. I noticed a few traits that seemed to distinguish between those who were likely to stay in the lab and those who ended up leaving. Being meticulous and patient helped. Waiting for a gel to develop can be enormously frustrating for someone used to hanging up a neosynephrine drip and expecting a response within minutes. Others felt frustrated at being so close to completing a subspecialty fellowship and having to start all over again in a lab where they did not even know how to pipet. Some fellows thought that the technical “dirty work” should be relegated to technicians. Others could not stand the grant-writing drill. The bottom line, though, was that you had to love science.

Being a physician-scientist had other benefits. After a bad day in the unit, I could retreat to the more controlled atmosphere of the laboratory where I consoled myself with the thought that I at least I was trying to make sense of what was going on biologically, even if it was only in a Petri dish or a mouse. Vice versa, after a frustrating day of another gel not working, it was often a relief to get back to the hospital, where I could slip into well-practiced routines. Moving between the two worlds came easily as the bridges were well established at our institution.

As a faculty member, the mix of research, clinical work, teaching, and administration made for constant variety and stimulation. Life and work were never boring. And yes, it is possible to do biomedical research, practice clinical medicine, and still have a life. You need support, to be sure, and even so, things can get rocky with family issues including very young children or sick parents. But babies eventually grow up and don't require 24/7 hands-on care. The second shift at home does get easier.

Still, a confluence of events led to my leaving my faculty position in 2006. Looking back, what do I wish that I had done differently? Early on, I underestimated the importance of and my need for mentoring. I also overestimated my own capacity to multi-task and never learned how to say no when I needed to. There are enough things that pull you away from the lab after you become a junior faculty person, without the distractions of medical directorships or committee positions. Physicians have a hard time asking for help, as if the act of asking is an admission of weakness or failure. It is also hard to ask for help when it seems that you are the only one who is struggling. But running a productive, independent lab requires lessons not provided during the usual medical and scientific training. Furthermore, the path of a physician-scientist has become much more difficult over the last decade. When I started my fellowship, I was single with little debt. And, as I mentioned, I was fortunate to have trained in an institution where there was a critical mass of like-minded physician-scientists in training. The greater challenge today is, of course, whether the medical and scientific communities can fix the bottleneck that threatens to choke off long-term career opportunities for aspiring academic physician-scientists (4).

But the journey has not been a waste. Do I regret the years I spent as a physician-scientist? Absolutely not!!! Perhaps the ultimate question is, however, "would I do it all over again"? Absolutely, without hesitation. It was a great job. Every time I describe a new drug therapy to a patient or explain the difference between, say, emphysema and asthma, I am reminded of my roots and what I have learned about basic principles regarding airway epithelial cells and inflammation. My scientific training adds a richness to my new life in practice, especially as I have been able to keep up with advances in genomics and molecular biology that are poised to revolutionize clinical practice. Furthermore, scientific training does

not limit one's opportunities. The ability to think critically is an asset. *It opens doors*. Academia is no longer the only professionally prestigious venue available for physician-scientists. Private institutions are increasingly interested in promoting research ventures as a means of enhancing their prestige. Other methods of funding laboratory work, including contracts, are becoming increasingly available. Collaborations or careers with bio-pharma provide a fascinating entree into the world of drug discovery and development. The path of a physician-scientist remains one of opportunity and reward.

References

1. Kaushansky K. Physician-scientists: preparation, opportunities, and national need. *EBM* 2003;228:1258-1260.
2. Austin J, Ulane R. The M.D/Ph.D. career track. American Association for the Advancement of Sciences; c2008. Available from: [http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2590/the_m_d_ph_d_career_track/\(parent\)/](http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2590/the_m_d_ph_d_career_track/(parent)/)
3. Hapa. Wikipedia, The Free Encyclopedia. Available from: <http://en.wikipedia.org/wiki/Hapa>
4. Benderly BL. Taken for granted: help is on the way (for some). American Association for the Advancement of Science; c2008. Available from: [http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2008_04_04/career_credit_a0800052/\(parent\)/](http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2008_04_04/career_credit_a0800052/(parent)/)

Dr. Wang is staff physician, Division of Chest and Critical Care Medicine, Scripps Clinic, San Diego and Clinical Associate Professor of Medicine, University of California, San Diego.