David Polhemus

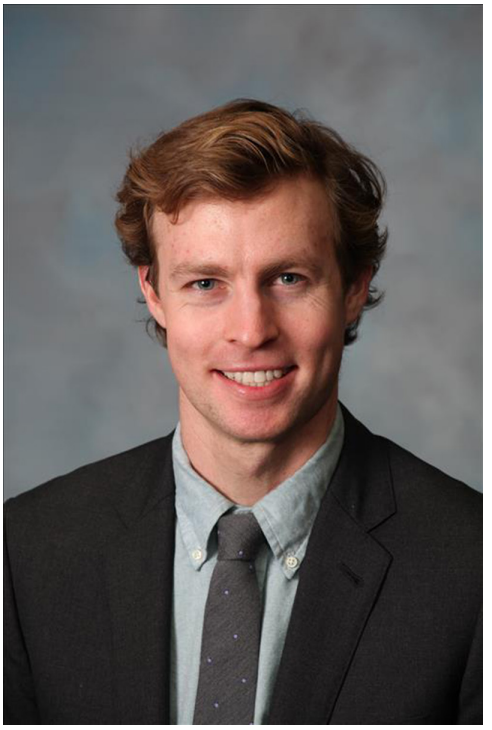
Every Strike Brings Him Closer to the Next Home Run

Pam Goldberg-Smith

Baseball aficionado, David Polhemus, is not one to let a strike avert a home run, nor does he allow a temporary setback in science prevent him from accomplishing the task at hand. David double majored in Chemistry and Economics at Emory University. He recently graduated with a PhD in Pharmacology and Experimental Therapeutics. David currently works in the Lefer lab at Louisiana State University's Health Sciences Center in New Orleans.

Tell Us About Your Background

I'm from San Francisco, California, born and raised. When I was young, what I cared about most was playing baseball on the street with my friends. I enjoyed sports and being outdoors. Neither of my parents had a scientific background; dad is in finance and mom works in human resources. My parents were incredibly supportive of my education and encouraged me to pursue my interests, not theirs. When I attended Emory University in Atlanta, Georgia, I studied economics for its practical applications, but also studied chemistry. My passion for science further developed during summer vacations when I worked in anesthesia and neuroscience labs as a student intern.



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What Led You to Study Cardiovascular Science in Particular?

I applied for a lab tech position in a cardiovascular research lab at Emory and I immediately fell in love with the field, so much so that a couple of years later I entered a PhD program within the same lab. I have an outstanding mentor, Dr David Lefer, whom I credit for my success. His love for science is inspirational. During my young career, I have had the unique opportunity to play a role in translating a discovery that we made in mice into clinical trials in humans. We found that in mice, hydrogen sulfide improves cardiac remodeling and function during heart failure. Currently, the same hydrogen sulfide drug that we tested in mice is being examined in clinical trials as a possible heart failure therapeutic. The translation of this discovery was unusually rapid, as our findings in mice were published in 2013 and the first arm of the clinical trial was published in 2015.[1–3]

What Can You Say About Your Current Project?

My dissertation work examines a minimally invasive procedure, called renal sympathetic denervation, for heart failure. The formation of this hypothesis was a combination of a collaborative effort within LSU (Louisiana State University) and gutsy open-mindedness of my mentor and myself. Our lab did not have much previous experience investigating the sympathetic nervous system. Meanwhile, a faculty member in our department was investigating the use of renal sympathetic denervation for hypertension. We then thought that this nonpharmacologic strategy may have an additional application in another poorly managed disease that is aggravated by overactivation of the sympathetic nervous system: heart failure. Current strategies for managing heart failure are pharmacologic, and they have limitations such as cost, unintended side effects, and patient compliance. This alternative strategy is not drug based but could, in fact, replace or supplement current therapies. The first half of this work was published in *Circulation Research* in 2016[4,5]; we're finalizing the second half now and plan to submit it soon for publication.

What Was the Most Exciting Moment in Your Career?

Publishing my first paper was exciting. That study examined the use of hydrogen sulfide for the treatment of heart failure.[1] These mouse studies showed that this gaseous signaling molecule protects the heart and improves cardiac function. The excitement for publishing my work hasn't faded over time. To me, publishing is a tangible accomplishment and reward. It's humbling because your work is publicly available for critique, but it motivates me to perform excellent work and to stand behind my work.

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What Has Been a Main Challenge for You, and What Steps Did You Take to Overcome It?

A major challenge was the relocation of our lab from Emory in Atlanta to LSU in New Orleans. A year after I joined the lab, the principle investigator accepted a new position in New Orleans and I wanted to move with him. Just as I was starting to get into my stride in the new lab, I was tasked with pausing all experimentation to pack up the lab. During this process, I assisted with equipment ordering, IACUC (Institutional Animal Care and Use Committee) protocol preparation, and new personnel training. The major challenge of this relocation was to be as efficient as possible with the transition as to maximize research productivity. Because I had never helped set up a lab before, I relied heavily on my mentor, who is the head of the lab, for advice and brainstorming ideas. I also sought out faculty members who had worked at the university for many years for guidance and information about how to tackle many of the ordering and animal protocol hurdles that existed within this new institution. As we were waiting on administrative approvals to begin our animal work, I used my time to help prepare manuscripts and grants that were already in the pipeline. It was a great learning experience to learn how to set up a lab for when I'm an independent investigator.

How Hard Do You Work?

I work hard and I feel fulfilled by working hard. I frequently work nights and weekends in additional to the traditional work day. One thing I have learned in my young career is that you should not be in science if you do not have a love and passion for it. If failure has a lasting negative effect on your hunger for discovery, this is not the right field for you. Biomedical research is riddled with negative results, experimental disappointments, and rejected grant proposals. I am motivated by failure and I find that it pushes me to work even harder.

What Qualities Do You Consider Important for Success in Research?

Having honesty and integrity in the field is very important, especially as competition for grants increases and funding decreases. Research is built on progress and work that was performed before us. Without honesty in science, the field stalls or takes steps back. This leads to another quality—not to be frustrated by the results you get even if they aren't exciting or match your initial hypothesis. During my dissertation work, my initial hypothesis failed. I was frustrated by the findings, but it turned out that what we thought were negative results instead led to more exciting results down the road. Lastly, don't be in this field if you don't look forward to going to the lab. This should not be a fall back career because you won't enjoy it, nor will you have a productive career.

What Would You Do to Improve Training in Research?

My training thus far has been comprehensive and thorough, and that is due to the selfless dedication of the research team at LSU, especially my mentor. As a result, I feel prepared for my next step in training on my way to becoming an independent investigator. With so many resources of training dedicated to acquiring essential scientific knowledge and developing the scientific method, not as much time is spent on the business end of running a lab. For example, how to manage personnel, how to appropriately allocate funds, etc. Running a lab in many ways is like running a business and that is a forgotten area that should be addressed better in training young scientists.

What Do You Like and Dislike About Research?

What I like most is when basic science discoveries translate and have an impact on health and human disease. One frustration is the lengthy publication review process. Oftentimes, taking 6 months to over a year to publish from the time of initial submission.

What Worries You Most About Your Future? What Is the Main Obstacle in Pursuing an Academic Career?

The majority of my fellow students are not going into academia and this is primarily due to the lack of funding. "Funding" sounds like a universal answer but it's a very real issue. That's certainly my biggest worry. Many young investigators' career advancement is linked to how many grants they get. With government administration changes comes uncertainty. It just depends on to what degree funding will be cut. I hope the federal government puts a higher priority on medical research and advancing health care. I believe our country still has interest in this.

How Do You Spend Your Time Outside of the Lab?

It's important for me to build time in my schedule to get away from work and clear my mind. My outlet is sports and being active. During my first 2 years in Cornell University in Ithaca, New York, I played collegiate baseball. I've filled that void by playing on a recreational softball team with friends. Additionally, my wife and I like to immerse ourselves in our community. We are very involved in our church and last Spring I helped coach a Little League baseball team. I am in my twenties so my relationship with kids is different than a dad who coaches; they listen to me differently than they would a father. Like my training in science, I had outstanding mentors as coaches and they gave me knowledge and training that I wanted to pass on to the youth in my community. I'll always remember the inspiration and positive impact mentors made in my life and hope I can have that same impact training scientists under me one day.

Disclosures

None.

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Anthology of Images

Raccoon outside of the window (Roberto Bolli). To have your photo considered for the Anthology of Images, please email it to CircRes@circreasearch.org

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