THOMAS KOHL, M.D., ’92 IS SPORTING A CAREER IN MEDICINE

BREAKING BONDS: STUDENT-PROFESSOR TEAMS WORKING ON RESEARCH PROJECT

ALBRIGHT GRADUATES SHARE THEIR LOVE OF THE SCIENCES WITH THE NEXT GENERATION OF STUDENTS
It was his experience as a swimmer on his high school team that inspired Thomas Kohl, M.D. ’92, to specialize in sports medicine. “I had a lot of shoulder issues, and I spent a good deal of time with my athletic trainer at Reading High School,” Kohl said. “I spent time in the physical therapy clinic doing rehab, and sports medicine just seemed like an interesting field. Everybody who was involved in it seemed to really enjoy their jobs and what they were doing. As an athlete I liked what I saw from the outside. And I always liked science and math, so it kind of fit.”

Kohl had initially enrolled at The Johns Hopkins University, Baltimore, Md. But it wasn’t long before he realized it wasn’t a good fit. “I went there because they recruited me for the swim team,” he explained. “But I decided that I wanted something that was a little more intimate, where you could get to know your full professors. At Hopkins it was rare to actually be taught by a full professor. It was a lot of teaching assistants.”

So Kohl transferred to Albright College before his sophomore year. And he never looked back. “Hopkins has a wonderful name associated with it, a great reputation,” he said. “But Albright certainly has a great reputation as a premed school, and that was one of the reasons I didn’t feel like it was such a big deal to move. I actually gained a lot by getting to know some great professors who were there.”

As examples, Kohl cited Gerry Kreider, Karen Campbell and Freida Texter, all Ph.D.s. “It took three of Dr. Kreider’s courses,” he said. “They were wonderful, especially his genetics class and his immunology class that I took as a senior. That helped so much in med school, where so many people were lost when it came to those two subjects.”

“Dr. Campbell’s vertebrology class was awesome, and Dr. Texter’s biochem class really helped as well,” Kohl said. “We had a whole year of biochemistry in med school, and without any background it would have been a very difficult year. So those are just a few that come to mind.

“All in all it was great, and I was prepared extremely well for medical school,” Kohl said. “I had no trouble with my MCATs, no trouble getting accepted at multiple medical schools. Basically I decided where I wanted to go versus going where I could I get in.”

Kohl chose Penn State Hershey College of Medicine, where he enrolled after graduating from Albright with a bachelor’s degree in biology. He completed his residency at Reading Hospital and Medical Center, where he is now director of sports medicine. While he was still in medical school, Kohl signed up for a health professions scholarship with the U.S. Air Force. “It was basically a year-for-year agreement,” he said, explaining that he owed the Air Force one year of active duty service for every year of medical school they paid for. “My contract was three years of active duty service and five years of inactive duty service. When I was in medical school I was in the active reserves. I had to do active duty time once a year. Some of that was basic officer training, some of it was medically related.”

He completed his three years of active duty service at Langley Air Force Base, Hampton, Va., from 1999 to 2002. He then joined a group practice in Wyomissing, Pa., where he worked for two years before leaving to start his own practice in 2004. About five years later, in 2009, he sold his practice to the Reading Hospital and became part of their medical group.

Since then, he’s been practicing both family medicine and sports medicine. On the sports medicine side of things, Kohl is the team physician for five Berks County high schools, Reading Area Community College, and the Reading Express arena football team. “We see the injured athletes from the schools and the teams that we take care of,” he said. “I also see recreational athletes, as well as club and youth athletes when they have injuries that don’t require surgery.

“Also, I try to focus my family medicine practice either around having active patients who prefer to have a doctor who’s used to taking care of active people, or trying to get my inactive patients to see exercise as a means to help control and treat their chronic disease.”

For Kohl, the most satisfying aspect of working with sports-related patients is being seen as part of the team. “I like helping the athletes see the fruits of their labors and helping them get back and be the best they can be,” he said. “Not only from the standpoint of treating their injuries, but also training to help them improve performance and prevent further injuries.”
During his sophomore year, Robert Richards ’12 realized that it would be good to get some experience conducting experiments outside of a controlled classroom environment. Because Ian Rhile, Ph.D., was his professor for freshman chemistry, Richards approached him to see if there was anything he needed help with.

As it turned out, Rhile, assistant professor of chemistry and biochemistry, was in the midst of a multi-year research project funded by a grant from the American Chemical Society-Petroleum Research Fund. He thought it would be the perfect fit for Richards, a chemistry major from Mount Bethel, Pa. So Rhile invited Richards to join his team, which has been working on removing the hydrogen atom from a carbon-hydrogen compound so they can replace it with another type of atom, such as oxygen.

Rhile explained that one of the biggest challenges in organic chemistry is to make molecules do what you want, and changing the carbon-hydrogen atom to some other type of atom would be very useful in that regard.

“All organic compounds—and a lot of other compounds as well—have a specific type of bonding called covalent bonding, where their electrons are shared between atoms,” Rhile said. “Carbon-hydrogen bonds are among the most common in organic chemistry. Oftentimes, you want to put other types of atoms where the hydrogen atoms are to make the compounds more useful for industrial or pharmaceutical use. And if they’re pure carbon-hydrogen bonds they can be difficult to break.”

The first step in the process, called concerted proton electron transfer, is to introduce a receptor compound that will accept the hydrogen atom to make room for its replacement in the original compound. Such compounds exist in nature, but they’re much too complex to work with in the lab.

The simpler compounds the team needs aren’t off-the-shelf products they could buy from a chemical catalog, so they had to design a synthesis to perform in the lab. “Part of the research has been figuring out the synthesis of these molecules,” Rhile said. “Some we knew about in the literature, for some we had to come up with our own procedures based on literature procedures. We have made the molecule we want and observed the reactivity we expected. Now we’re doing some control experiments and other tests.”

While Rhile and his team have been experimenting with the compounds in the lab, Jeffrey Wolbach, Ph.D., and a separate team of student-scientists have been modeling the chemical reactions in their computer.

“We want to know the mechanism by which the hydrogen atom is being transferred,” said Wolbach, assistant professor of chemistry and biochemistry. “With the analytical instruments you can measure what you have to start with and what you have at the end. But it’s hard to measure how it gets from the beginning to the end.”

The advantage of using a computer program, Wolbach said, is that it can model characteristics of the reaction that can’t be observed experimentally. In this case, his team is interested in observing the transition state.

“When you get two molecules reacting there’s a point when you have something that both resembles the reactants and looks like the products, but it’s really neither,” Wolbach explained. “You have a bunch of atoms glommed together, and that’s notoriously difficult to isolate experimentally.”

But they can be isolated computationally. “We can draw the reactants and we can draw the products, and the computer will find the transition state and tell us what it looks like,” Wolbach said. “It enables us to look at the transition state and come back with ideas of where we might be able to change the reactants to make the reaction go faster or better.”

“One of the goals of the project is to develop a step-by-step description of how the chemicals are reacting,” Rhile added. “That’s what Dr. Wolbach is doing on the computer and what we’re trying to do experimentally.”

For Richards and the other students working on the project, it’s a chance to get experience they wouldn’t normally get in the classroom.

“In classroom settings you’re working on a lab that was designed to work so you know you’re going to get results,” Richards said. “Here we don’t know if our reactions are even going to work. It’s what we’re trying to figure out as part of our research. We’re going to get results, but we don’t know if they’re going to be what we want. We’re also using various instruments in the department but don’t often use in class,” Richards added. “So we’re getting much more training on a lot of the instruments. And we’re using various organic synthesis techniques that I wouldn’t learn until advanced organic chemistry my senior year. Plus, we’re working a lot more independently than we would be in the lab.”

Brittney Tiley ’12, a chemistry major from Pottstown, Pa., who worked on Rhile’s team, presented her work at the National Conference on Undergraduate Research held at Ithaca College, Ithaca, N.Y., in April. In early June, Rhile presented at the National Organic Symposium at Princeton University, Princeton, N.J.

The student-professor teams are continuing to work on their research during the summer months by experimenting with an expanded menagerie of compounds.
Albright Alumni Keen on teaching

Albright graduates who have gone on to pursue careers as secondary school teachers share their love of the sciences with the next generation of students.

This is the first in a series of profiles featuring some of these dedicated professionals. The first three subjects have at least one thing in common: they all teach at Muhlenberg High School in Lauraldale, Pa. They often see each other during department meetings and data team review sessions, and they are always together on in-service days as well.

JARRA (RUSHOCK) DIENZIS graduated from Albright in 1998 with a bachelor's degree in chemistry. She received a master of education in educational leadership from Lehigh University and a master of education in technology from Wilkes University. Certified to teach chemistry and physical science, she currently teaches college prep chemistry, honors chemistry and advanced placement chemistry. She teaches grades 10 through 12 and has been teaching 12 years.

What's your favorite part of teaching? Interacting with teenagers. It keeps me young!

What’s most rewarding about teaching? As a teacher you truly do not know who you will reach and when. My first year of teaching was tough and I had a pretty challenging last period of the day. I thought I did a terrible job teaching chemistry until I had a student from that class return two years later to thank me for such a wonderful experience. I would have never thought I reached anyone in that specific class, so you just never know what impact you are making!

What’s the most challenging part of teaching? Each student is different on any given day and as a teacher you need to be sympathetic to that. Teenagers are getting their first taste of independence, hormones are raging, and they are trying to figure out their futures. As teachers, we compete with all of these things and so it is a challenge every day to reach them.

How would you describe your experience at Albright? I had incredible science classes and my professors were awesome, so they gave me the knowledge base to teach the chemistry/science content. My education professors prepared me for the classroom. My professors at Albright were caring, concerned and challenging, and they pushed me not only to be a good student but also to learn how to pass this love of science and passion for learning onto my students. Dr. Artz, Dr. Texter, Dr. Scheirer and Dr. Campbell took an interest in me not only as a science student but also as a person, and I try to do the same for my high school students. Dr. Fuchs and Dr. Yanworth taught me the importance of understanding our country’s educational system (imperfections and all!) and gave me the tools to succeed in the classroom.

What’s your favorite part of teaching? Observing when the students finally understand. It is like a light has gone off. I can see it in their faces, and I know that they have comprehended the concepts and can now solve the problem(s) without my help.

What’s most challenging about teaching? Knowing that I am making an impact on the students’ lives. I would love for all students to enter either a chemistry- or physics-related field in their future but I know that that is not realistic. Therefore, if I know that I helped them to become more responsible, or better organized, or to be a more conscious student, I know that I have made a difference in their lives.

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How would you describe your experience at Albright? I was well-prepared for the content in both chemistry and physics. In addition, I feel that the education program had me well-prepared for both background knowledge for the PRAXIS test and the field experience for the actual classroom experience.

I thought that one of the most enlightening experiences was during the student teaching semester when you had to teach the methods class about your subject. In my case, it was waves. It was certainly a wake-up call when I realized that everyone else in my methods class knew nothing about waves and I had to start from the very beginning to explain it to them. I also know that Albright now does methods for the specific disciplines, like science, and I think that is a great idea!

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AUDREY (SHELZTER) SCHWAB graduated cum laude from Albright in 2002 with a bachelor’s degree in chemistry. She received a master’s in education from Gratz College and a master’s in science education from Lebanon Valley College. Certified to teach secondary biology and human anatomy, he currently teaches human anatomy and physiology, advanced biology, and environmental science. He teaches grades 10 through 12 and has been teaching nine years.

What’s your favorite part of teaching? Interaction with students each day.

What’s most rewarding about teaching? When students sign up for my class that is an elective, and I have three sections of it.

What’s the most challenging part of teaching? The laziness and idea that everything is owed to the students, that they don’t have to work hard to achieve their goals.

How would you describe your experience at Albright? Albright was AWESOME! I was over-prepared in the realm of content for biology and very adequately prepared for the actual classroom.

Albright was the perfect setting for learning the intense content needed to feel confident in the classroom. Albright’s small class sizes made it possible to receive any type of remediation necessary. The atmosphere was also conducive for participating in athletics. I would recommend ANYONE to apply to Albright, it was great.
BRAIN TEASERS

Time to brush up on your knowledge of biology. The first 10 readers to submit correct answers to the following questions will receive a prize! The answers will be provided in the next issue.

Q. Which two elements are found together in nature, are notoriously difficult to separate, and are named for a Greek father who stole from the gods and his prideful daughter?

Q. Howard Hughes set off a rush for what element by commissioning a special ship, the Hughes Glomar Explorer, in an elaborate ruse during the Cold War?

Q. The liquid in a fever thermometer looks like mercury but is not, since mercury may no longer be used for this application. What is this material and what is its composition?

Q. What metal is the hardest metal element, not the hardest material, not the hardest element, but the hardest pure metal on the Brinell scale of hardness?

Answers may be e-mailed to rshade@alb.edu or submitted via the Albright web site at www.albright.edu/fusion.

Brain Teasers Answers, Fall 2010

Congratulations to Bryan Wilson '11, the winner of the fall 2010 Brain Teasers quiz.

Q. What element is over-absorbed by the intestine and then oxidized to the point where it poisons body tissues in individuals suffering from hemochromatosis? Iron

Q. Diabetes insipidus can result from the failure to secrete what hormone? Antidiuretic hormone (ADH)

Q. Where in the human body would you find muscles called “lumbricals”? Hands and feet (one to each finger, except thumb, and each toe, except hallux)

Q. What is the function of atrial natriuretic peptide (ANP)? Reduces blood pressure and blood volume by promoting salt excretion.

Q. What region(s) of the digestive tract are retroperitoneal? Ascending and descending colon.

Q. What’s a gomphosis? The fibrous peg-in-socket joint by which teeth are embedded in their sockets.