Neuroscience in Brief

On the Move from Academia to Industry:
Established Neuroscientists Who Have Made the Transition from Academia to Industry Are Finding Different Rewards in a New Environment

Contributed by Laura Bonetta

In 1997, neuroscientist Frank Walsh was asked by Peter Goodfellow whether he would be interested in leading the neuroscience division at SmithKline Beecham Pharmaceuticals (now GlaxoSmithKline) in Harlow, UK. Goodfellow, a well known geneticist, had joined the company from the University of Cambridge a few years earlier. Although Walsh, then research dean at Guy's Hospital in London, and head of a well-funded research lab, was not looking to move, he started thinking about the opportunities created by working in an industrial environment. "I was working in a large medical school on diseases. But I had a limited ability to impact on human health. That is just the nature of how an academic institution is set up," he says. In addition, SmithKline was "a very academically oriented company. The science came first. It was not a factory-like mentality," he says. So, that year, Walsh left academia to join SmithKline Beecham.

Walsh is one of several academic scientists who have chosen a career in industry after spending many successful and rewarding years leading an academic lab. Although values and environments vary greatly from one company to another, a common refrain among scientists who have made the switch to industry is that it gave them an opportunity to directly impact human health through the development of medicines and treatments. In addition, many biotech companies have invested in cutting-edge technologies and instruments that are out of the reach of most academic institutions, thus allowing for more efficient and faster-paced research.

These opportunities also appeal to a growing number of junior scientists. Few of them, however, may be familiar with how science is conducted within an industrial setting and what skills are most valued by their employers. This week, five neuroscientists spoke to the *Journal of Neuroscience* about their experiences in leaving academia for a biomedical career in industry.

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Access to resources

At SmithKline, Walsh was put in charge of a group of ~150 people working in different research areas in neuroscience, but he was also able to maintain his own lab. Here, he tackled a research problem that had long interested him: the role of adhesion molecules in axonal growth and regeneration. "The nice thing about a senior position in industry is that you have a lot of freedom in what research to pursue," he says.

At the time, SmithKline had invested heavily in genetics and genomics, technologies that were not available in most academic medical schools. Walsh took advantage of those new tools to advance his own research. "One of the main differences between industry and academia is the availability of resources that you can only dream of in an academic environment," says Walsh. "We have only so many years to do science; in industry you can do it faster. We have a trained workforce, whereas in academia we are training it. Also the funding is a bit more stable in industry."

In 2002, Walsh left SmithKline to take on "a bigger job and appointment" at Wyeth Research in Pennsylvania, as executive vice president for discovery research worldwide. At Wyeth, a company that has several blockbuster drugs in the market, including the antidepressant Effexor XR (venlafaxine), drug discovery depended mostly on a large chemistry effort and on broad interactions with colleagues. "As a biologist, it is typically difficult to gain access to chemistry. It is very pleasing to have chemists to work with on projects," says Walsh.

Looking for change

Unlike Walsh, when Richard Scheller left academia, he was actively seeking a change. He had been a professor at Stanford University School of Medicine in California for 19 years, as well as a Howard Hughes Medical Institute investigator for part of his tenure. "Stanford was a wonderful place, and I really did not have problems. I had a terrific life," he recalls. "But I wanted to challenge myself." So he and his wife, Stanford Professor and Neuroscientist Susan McConnell, visited a few biotech industries. At first, none of the job prospects seemed appealing, until a professor at Stanford suggested that he speak to Arthur Levinson, the chairman and CEO of

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California-based company Genentech. He did and joined the company in 2001 as senior vice president for research.

"The science was absolutely terrific. It was different from what I was doing, so I could challenge myself by shifting fields," says Scheller, who up until that time had been studying the mechanism of synaptic vesicle exocytosis. "And if I was going to have a boss, which I never had before, it would probably be okay if that person was a scientist." (It is rather unusual for a company the size of Genentech to have a CEO who is, like Levinson, a PhD scientist.) What immediately grabbed Scheller's attention was that at Genentech, he would have an opportunity to help with medical needs more directly than he had done before and "to really begin to do human biology," he says. "It was a terrific challenge to try to discover new medicines."

Although the focus on translational research appealed to Scheller, it may not be a good fit for everyone. "At Stanford, I had totally independent goals and projects. I was just expected to do great things. Here, everyone is expected to do great things, but some of them have to be involved in translational research to help with the development of new drugs," says Scheller. "If your goals do not overlap with the goals of the company and if you are not interested in translational work, you should not come here. But if the goals overlap, then you are better off here than in academia."

Home away from home

Genentech is somewhat unique among biotechnology and pharmaceutical companies because it is in many ways a cross between industry and academia, a characteristic that appeals to many academics. "Genentech was a good fit. I would have not moved to a company if either the philosophy or leadership did not mesh with my personality," says Scheller. For one thing, scientists hired to work at Genentech have the option to take discretionary time to pursue their own interests and have access to postdocs to do basic research.

"For me it was essential to continue to do basic research. I would not have considered a position without that."—Marc Tessier-Lavigne, senior vice president for research drug discovery, Genentech.

"Since its inception, Genentech has encouraged scientists to maintain a basic research focus, and combine that with a translational and drug discovery focus," says neuroscientist Marc Tessier-Lavigne, who joined Genentech a couple of years after Scheller. "For me, it was essential to continue to do basic research. I would not have considered a move without that."

However, it can be a challenge to devote enough time and focus to both activities. "It has required me to organize myself. After I came from Stanford [University], I became more disciplined about how I spend my time." What helps to maintain both a basic research lab and focus on drug development is that Genentech is set up to facilitate this dual role. Researchers have access to core facilities, support staff, and funds. So the challenge is there, but it is facilitated," says Tessier-Lavigne.

Although a career in industry may not be for everyone, Tessier-Lavigne thinks Genentech is a great environment for postdoctoral fellows, because they can focus on basic research, as they would at a university, but with greater resources and access to colleagues with diverse expertise. "At the same time, you get a sense of what it is like to be in a company and to focus on developing medicines," he says. "The postdocs who came with me from Stanford say the move has opened their eyes to more opportunities." When they leave Genentech, postdoctoral fellows take positions in either academia or industry.

Tessier-Lavigne started his career studying the basic mechanisms of brain wiring. In 1994, he became well known for the discovery of netrins, a family of proteins related to laminin, which attract axons to the neuronal target cells that secrete them. He again made a splash in 2003, when he joined Genentech to become senior vice president of research drug discovery, overseeing >500 researchers working in areas from oncology to medicinal chemistry.

"My scientific interest in understanding disease had grown, my fascination to take on complexity had grown, and my need to translate knowledge into medicine had grown," he recalls. "When I was approached by Genentech, the timing was perfect." In addition, the company was just going through tremendous growth; by joining, Tessier-Lavigne could help drive this growth and help decide what medicines to produce in the next decade. "It was a convergence of my personal career goals and the company's growth," he says.

"When a drug company is working well, it is a very collegial environment and well organized. You could come up with an idea on Monday and have the money for it on Friday."—Jack Price, professor of developmental neurobiology, King's College London, and principal scientific consultant, ReNeuron.

From academia to industry and back again

After heading a research group for 8 years at the National Institute for Medical Research at Mill Hill, London, Jack Price became director of molecular neuroscience at SmithKline Beecham Pharmaceuticals. He accepted the position because at the time he "could not see much wrong with it," he recalls. SmithKline was setting up a new department in Price's area of research, where he could have access to great facilities and a lot more money for his work, as well as a free hand within a certain scope. He was asked to pursue a novel question: whether the cause of schizophrenia has its roots in cortical development. "Contributing to an area of disease seemed like a great proposition," says Price, who up until then had been studying basic mechanisms of cortical development. "I was attracted by the idea that my research could have practical benefits."

But the deal Price made with SmithKline soon collapsed. His area of research was "killed," something that often happens in industry when a project is deemed too risky for yielding a usable drug. Price was then faced with the decision of having to switch research fields or leaving the company. He decided to switch.

Price became heavily involved in genomics, identifying genes involved in

different neurological diseases, and enjoyed the environment for about the next 2 years. "When a drug company is working well, it is a very collegial environment and well organized. You could come up with an idea on Monday and have the money for it on Friday," says Price.

Although it is not uncommon for an academic scientist to pursue a major research project for a significant portion of their career, projects in industry tend to be more short-lived. And if a company is undergoing change, project goals can switch from one day to the next. "We started to reorganize and the focus kept changing. Then there were changes in upper management and we reorganized all over again. I don't think I got anything done the last 6 months at SmithKline," explains Price. Whereas some of his colleagues weathered the storm, Price decided it was time to leave. "You just have to put your head down and reemerge at some later date, but I could not do it. It is not part of my temperament," he says.

After leaving SmithKline, Price joined the management team of ReNeuron, a start-up company founded in 1997 to commercialize a technology to generate genetically stable neural stem cell lines discovered by scientists working at the Institute of Psychiatry, Kings College London. At the same time, he took a permanent academic post at Kings College. The joint appointment seemed like a good compromise for Price. "It is difficult to start an academic group again from scratch, without grants, equipment, or people," he says. But it also presented a challenge. "It is also a compromise; while working with ReNeuron is very rewarding and enjoyable, it means I cannot give 100% to my academic research," he explains.

Different rewards

For nearly 20 years, Steven Paul was a researcher at the National Institutes of Health. For the last 5 of those years, he was the scientific director of the National Institute of Mental Health. His laboratory studied the effects of drugs, such as the benzodiazepines and alcohol, on the brain. "It was a wonderful place to do research. We had a lot of freedom to pursue whatever science we were interested in," recalls Paul. But it became clear to him that opportunities for discovering and developing new medicines were lacking. "Taking a new drug from the bench to the bedside so to speak is impossible in academia," he explains. "It takes a different set of resources and skill sets to develop drugs, which, for the most part, only exist in industry."

"You still get to do very exiting science in industry. I have fewer publications than when I was in academia, but that means that I can focus more on quality."—Steven Paul, executive vice president for science and technology, Eli Lilly and Company, and president of Lilly Research Laboratories.

The realization led Paul, in 1993, to join Eli Lilly and Company, the company that brought the world Prozac. "It was impressive for me to have access to such cutting-edge resources, and this is true at most pharmaceutical companies," says Paul. His mission at Lilly is to develop the next generation of psychiatric drugs to target depression, bipolar disorder, and schizophrenia, as well as neurological diseases like Parkinson's and Alzheimer's disease. Paul, who began his career at Lilly leading CNS drug discovery, the company's most successful therapeutic area, now leads the entire research and development (R&D) efforts, comprising >8000 scientists and nearly $3.0 billion in annual funding. "Although I oversee all of R&D here at Lilly, I still have a small research lab focusing on Alzheimer's disease and we have, together with our collaborators, discovered a novel new agent now in phase I clinical trials," says Paul. Colleagues sometimes ask him why, despite such administrative responsibilities, he continues to do research. "The answer is simple," he says. "I love it and believe it is adding value, but it also keeps me contemporary."

According to Paul, research in an industrial environment has many rewards, some of which are different from those in academia. For one thing, scientists who do well in industry are rewarded by making contributions to a team effort. Young investigators in academia usually have an incentive to work independently to ensure that their contributions are widely known in the scientific community and especially to the tenure committees. But essentially all research in the industrial sector is done as part of a team, because of the complexity and cross-functional nature of drug discovery. "The discovery of a drug requires a large team of people from basic researchers—who might include geneticists and bioinformaticians to medicinal chemists, pharmacologists, and toxicologists—to product development and manufacturing scientists, as well as legal and regulatory experts," says Paul. "It literally takes a village to discover and develop a drug."

Another area in which the industrial and academic reward systems differ is that of publishing scientific results. In academia, scientists have to publish or perish; in industry, they do not have the same kind of pressure to produce papers. However, scientists working in industry say that the difference is not as pronounced as many outsiders may think. At Genentech, for example, a strong publication record is part of the tenure decision. Other companies also encourage their scientists to maintain an active publication effort. "At a conference I was introduced as 'a scientist in industry who has not disappeared,' but it is a misconception that you stop publishing in industry," says Walsh. "At SmithKline, we had a metric that you had to have two publications per year, and some in high profile journals."

"You still get to do very exiting science in industry. I have fewer publications than when I was in academia, but that means that I can focus more on quality," says Paul, who since joining Lilly has published well over 50 research articles, most in top-tier journals, on the pathogenesis of Alzheimer's disease, genetic mouse models of the disease, and new therapeutic approaches.

As the careers of scientists like Paul, Walsh, and others demonstrate, it is possible for academic scientists to make a successful transition to industry. What's important, say the experts, is to make the move for the right reasons. "You have to come because you are passionate about the discovery of new drugs and because you are passionate about translating fundamental science into something useful. Someone who can see those kinds of possibilities will do well in industry," says Paul. "If you want to just pursue pure fundamental research, however, this is probably not the best environment. I have seen very fine academics come to industry and struggle because of this. But if you want to discover a drug for a major disease, like schizophrenia or Alzheimer's disease, this could well be the best place for you."