Careers in Neuroscience / Career Paths: Pharmaceutical Research

In a nutshell: The advantage of working in pharmaceutical research, for either a large company or a small startup, is that the research endeavors are collaborative. As a team, you are working toward a useful, practical solution to a problem. But industry is in a period of flux right now, with different models emerging. Large companies are using contract research organizations (CROs) for specific tasks or partnering with academic institutions in the U.S. and abroad. As a result, the number of on-site researchers is declining, resulting in a highly competitive job market.

Focused on Solutions

One of the major differences between academia and industry is that the latter applies existing knowledge to develop treatments and therapies, while the goal in an academic setting is to create new knowledge that can serve as a foundation for building new understanding. As a result, in industry, the work tends to be very focused on finding a solution to a specific problem. The hope is to develop a product that can make it through the discovery phase, where targets, such as receptors, are screened to find compounds with affinity for the target. In the development phase, the compound is initially tested for safety and toxicology before entering clinical efficacy trials. In total, the development compound needs to complete at least three phases of clinical trials successfully, along with regulatory approval, before it can become a product sold in the marketplace. It is extremely difficult for a drug to complete this full cycle, particularly in disorders of the central nervous system (CNS), where biological uncertainty of disease processes remains high. In recent years, the diminishing success of developing novel therapeutics has prompted pharmaceutical companies to reshape the research and development (R&D) model.

An International Enterprise

The global economy has meant that it is easier for pharmaceutical companies to collaborate on common goals. This has resulted in international partnerships that take different forms. One way is for pharmaceutical companies to partner with a lab or hospital overseas or at home so that the company funds research that is conducted at the partner institution. In most instances, both parties agree on the project before the work is started. One example of this type of arrangement is between a lab in a German hospital conducting research on stroke and a global company with headquarters in France. The partners share ideas and decide what experiments to do. "It is a true collaboration, a meaningful exchange of ideas," notes an executive for a pharmaceutical company.

Another strategy is to hire a CRO to conduct a particular phase of research. Because CROs tend to be specialized, multiple companies may be hired to develop a complete research package for a larger company. For example, a pharmaceutical company may hire one CRO in China to conduct chemistry studies, a second in the U.S. to work on electophysiology studies, and a third in Asia to conduct clinical trials--a good strategy for companies looking to build new markets overseas. Scientists serve as managers, and fewer are needed at the home office to monitor the work under contract, but conversely, scientists in CROs have the opportunity to work on assigned research projects. This approach is fairly new, so it's too early to say whether it will prove to be viable in the long term.

Work Description

A neuroscientist in pharmaceutical research usually starts out as a bench scientist in a lab as part of a team working in R&D. During the research phase, the team might be looking for a specific molecule that interacts with a protein in a certain way to form an effective therapeutic agent. This phase lasts several years and involves many experiments, largely in isolated cells and animal models, aimed at demonstrating the therapeutic efficacy of the potential treatment. Once a suitable drug candidate is identified, the team moves into the pre-clinical development phase. This is when the product is tested for safety and toxicity. If all goes well, then an Investigation New Drug (IND) application can be submitted to the Federal Drug Administration (FDA), bringing the product closer to clinical trial.

During a typical day, a bench scientist will be busy implementing the research agenda. Either a lab head or a team leader supervises the group. The main role of the lab head or team leader is to identify the best assignment for each member of the team. To accomplish this goal, the team leader may have one-on-one meetings with team members as often as necessary to ensure that they are contributing to the overall project objectives. Scientists in leadership roles also conduct such tasks as reading the scientific literature, analyzing data, writing internal reports, and writing and reviewing papers for publication in scientific journals. At the director and vice president levels, neuroscientists are involved in designing the company's portfolio strategy, which encompasses deciding on the focus of research programs, monitoring the portfolio's progress, determining strategic partnerships, and engaging key opinion leaders and advisory board members.

Place(s) of Employment

Within the pharmaceutical research world, there are different kinds of settings. Some companies are large, global companies, the result of multiple mergers. These companies tend to be conservative in deciding which products to pursue. Smaller companies, some of which are startups, have more of an entrepreneurial spirit and may be willing to take more risks in their

research program. But in any company, the time period from research and development to the market with a new product takes about 10 years.

In recent years, large pharmaceutical companies have been experimenting with different operating models. One company has divided its research program into units focusing on current areas of concern, such as vaccine development, tissue repair and protection, and aging. These are broad topics and cover many types of research. For example, in the aging unit, scientists are concerned with CNS issues, muscular problems that relate to frailty, and changes in hearing with age. The unit also looks externally to other companies and institutions globally that are working on projects of interest. When appropriate, the company reaches out to these other entities and works out an agreement, resulting in a collaborative arrangement.

Smaller biotech startups have a more focused approach to research. They are trying to answer a specific question, and they are often experimenting with an innovation, such as a new platform to detect biomarkers for a specific disease. CROs also tend to specialize in a particular area, such as electrophysiology or clinical trials. In these settings, scientists may have been hired because of a specific expertise, such as knowledge of a type of equipment or laboratory technique. Because the staff tends to be small, scientists may have little technical or administrative support and will be expected to perform those functions.

In recent years, some academic institutions have been moving in the direction of translational research and drug discovery. The result has been the formation of centers or institutes dedicated to this work. Examples include the Broad Institute of MIT and Harvard and the Scripps Research Institute, which has a molecular screening facility at its Florida campus. Some national labs, such as Brookhaven, also have research opportunities for neuroscientists.

Personal Characteristics

Neuroscientists in industry must work well with people and enjoy collaborating as part of a team. They also must be able to look at research through a practical lens and see the point where scientific and commercial interests intersect; it is at this juncture where their work will most likely take place. For example, if the lab is looking for a specific molecule, the team must have the patience and tenacity to see it through until the right molecule is discovered. Similarly, scientists must be able to switch to new research areas if the company undergoes a reorganization, which has been happening often in recent years. Scientists can also take advantage of opportunities in interdisciplinary research.

As scientists move up the company ranks, different strengths are required depending on the career path. High-level scientists must have a vision for the research program and know how to find projects that will help move the company toward this goal. This can be accomplished through networking at meetings, contacting former mentors, staying current with science, and

reaching out to scientists doing work of interest. If scientists move into a new area, such as business development, they must know how to spot innovative science research and development opportunities and be able to negotiate business deals effectively. Training is sometimes available to assist upwardly mobile scientists within a global pharmaceutical company.

Education/Training

Typically, individuals on this career path will have trained in neuroscience for several years. As an undergraduate, they may have majored in a related area, such as math, computer science, physics, chemistry, or experimental psychology, but will then go to graduate school in neuroscience or a related field, completing the coursework for a PhD. Following the PhD, the expectation is that researchers interested in industry will receive postdoctoral training for two to seven years. If the researcher knows at this juncture that he/she would like to move into industry, it makes sense to look for a postdoc at a facility established by an academic institution to do translational work (such as the Scripps Research Institute); with an academic institution collaborating with a company; or with a CRO. But if the desire to make a switch comes after spending some time in academia, and the neuroscientist is interested in having a senior scientist or managerial role within the pharmaceutical industry, it is best to reach the assistant or associate professor level before transitioning. It is very difficult to move up the ranks with little experience in academia and none in industry.

Employment Outlook

The industry has been going through active change. Under pressure to show stronger profits, and with few new products in the pipeline, most companies have cut budgets--and staff. According to Luke Timmerman, who writes a biotech blog, 24 biotech and pharmaceutical companies have recently advertised for a total of 3,357 jobs, but only 357 were in research. Furthermore, research goes through cycles; during some periods, the focus may be on cancer, then switching to another condition, such as Alzheimer's disease, depending on the demands of the market.

Neuroscientists interested in industry should be aware of this trend, but they should not be overly discouraged either. There are still some research jobs in industry. A good first step is to look for bench scientist positions at CROs. Another approach is to broaden the job search to include related areas, such as writing, regulatory affairs, and business development. And the value of networking cannot be overstated. Networking at meetings, such as the SfN Annual Meeting, is an excellent way to make contacts. Potential employers such as CROs have a strong presence at the meeting. Scientists should keep in touch with new contacts and call on them for advice when needed.

Another strategy is to develop strong relationships with senior scientists at the current work situation, whether it is a lab or an academic institution. Building such relationships during early stages of the career can pay off down the road. More experienced scientists can become advocates for rising scientists, making a strong case that they should be hired for a specific job. Advocates are hard to cultivate but invaluable; most people have only two or three throughout their careers.

Finally, scientists looking for a job in industry should be aware of the value of the PhD. The rigor involved in getting the degree, along with postdoc training, prepares scientists for work in industry. With a lot to offer the job market, scientists should always be looking for new opportunities, even when they are gainfully employed. Having additional options gives industry scientists more leverage in moving up the ladder in their current job.

Salary Information

Industry researchers typically earn a salary and a bonus. Big pharmaceutical companies usually offer stock options only to senior level scientists, but stock options may be offered to more junior scientists in startups and biotech companies. As expected, those with more education are paid more. According to industry experts, a scientist with a bachelor's degree receives a starting salary between $30,000 and $35,000, with the median income at about $45,000. Scientists at this level receive about a 4%-5% bonus. A PhD, however, starts at about $75,000, with the median income at about $100,000. These scientists can expect a bonus between 6%-8% or higher.

What You Can Do Now

> ***Undergraduate Student***: It is never too soon to begin doing research. A good way to start is by volunteering in the lab of a professor at your undergraduate institution. Between the junior and senior years, students may apply for internships at government agencies such as the NIH. Pharmaceutical companies also have summer interns, an excellent way to find out more about this kind of work. If a student is interested in taking time off before graduate school, the NIH also has a post-baccalaureate program that offers new graduates an opportunity to work with NIH scientists. If a rising neuroscientist can publish a paper or speak at a conference before applying to graduate school, their application becomes that much more attractive.
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> ***Graduate Student***: Throughout graduate school, it is important to continue honing skills that laboratories find attractive, such as expertise in a novel technique or with a type of equipment. Graduate students should continue to network at the SfN Annual Meeting and look for publishing opportunities.

Early Career: Although it is recommended that neuroscientists complete a postdoc, it is possible to get a job without this training. But much can be learned during a postdoc, especially one targeted to a career in industry. For example, postdocs are available at institutions with a translational research institute or one with a partnership with industry.

Mid-Career: If a scientist has been in academia but would like to change career paths, this is the time to do it. The individual has gained enough experience to have skills to offer a pharmaceutical company. If a scientist is already in industry, it is important to be flexible and aware of new opportunities. These include leading drug discovery programs; becoming involved in interdisciplinary drug discovery or biomarker discovery; taking on a role in business development; managing external collaborations; and becoming involved in regulatory affairs.

Retirees: Retired scientists could consider serving on a company's advisory board or board of directors. They also can work as an adjunct professor or serve on an institution's Institutional Review Board (IRB). Retired scientists can contribute to the field by attending the SfN Annual Meeting and mentoring rising scientists.

For More Information

Society for Neuroscience: www.sfn.org

Luke Timmerman's blog: http://www.xconomy.com/national/2012/10/01/looking-for-biotech-to-catalyze-u-s-job-growth-keep-looking/#

Salary.com: http://www1.salary.com/Biologist-I-Salary.html

Life Scientists Salary Survey 2012: http://www.the-scientist.com/?articles.view/articleNo/32918/title/Life-Sciences-Salary-Survey-2012/

The Scripps Translational Institute: http://www.scripps.edu/research/tri/index.html

Broad Institute: http://www.broadinstitute.org/