Ten Simple Rules for Doing A Postdoc in Pharma: Pros, Precautions, and Preparations

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Abstract

Industrial research postdoc programs often offer great opportunities for personal and professional development, if you know what to expect and how to prepare for them.

Introduction

Ten years ago, after finishing the PhD study, I joined my company to work as a computational biologist in drug discovery. Since then I often get questions from both students and junior researchers in their first postdoc position. The most frequent one, except for those asking about salaries, is '*How does industrial research look like/compare with academia?*'. It is only closely followed by the relevant question: '*Would you recommend working in industry?*'. Because many pharmaceutical and life-science companies (including mine) nowadays offer temporary (mostly two-year) postdoc programs, the second question can be more specific: '*What are the pros and cons of working as an industrial postdoc?*'

These questions show that, despite huge investment in research and development by the pharmaceutical and life-science industry (some companies spend almost 20% of their income), industrial research remains mysterious for students and junior researchers (and probably even more so for the public). It is therefore not surprising that when students and junior researchers weight their career options, they are often not aware of the possibility of pursuing a postdoc position in industry. Even they know about this possibility, they may rank it behind other options, for instance pursuing a tenure track in academia, working for government or non-government organizations, or applying for a permanent position in industry. The fact that much fewer industrial postdoc positions are available, in contrast with the abundance of academic postdoc positions (though individual experience may vary here), also contributes to the limited awareness about them.

I believe that it is worth doing a postdoc in industrial research, both professionally and personally. If you have the opportunity to work with a good supervisor in a supportive team, particularly in a company that respects and values research, it can be a rewarding step in your career.

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I came to this conclusion by working with and learning from postdocs both in academia and in industry. They include academic collaborators, postdocs in the company that I have either worked with or supervised, and researchers who transitioned from academic postdoc positions to industry.

These postdoc fellows shared both success stories and frustrations with me. They confided me with their experience, feelings, and thoughts, many of which are valuable for but barely accessible to students and other researchers. It is my privilege to listen to and learn from so many enthusiastic, talented, and hard-working scientists. While great resources are available helping people make decisions between academia and industry, for instance the *Ten Simple Rules for Choosing between Industry and Academia*[1], a dedicated discussion about industrial postdoc positions, particularly in the pharmaceutical and life-science industry, has been missing in public forums[2]. Therefore, I feel obliged to synthesize my thoughts with many peoples' inputs on this topic and put them down.

Pros of doing a postdoc in industry

Rule 1: Consider professional benefits

There are many reasons speaking for doing a postdoc in industry, as long as it is aligned with your ethics and long-term goal. Can you imagine putting your scientific and personal knowledge and skills in an industrial setting? That is, do you consider it acceptable to perform applied research to turn discoveries and knowledge into product and profit?

I believe you should ask yourself this question before joining the industry. While some people believe that science is useless unless it serves the benefit of the mankind, other people argue that the scientific ideal of objectivity and truth-seeking is eroded by the pursuit of profit.

If you have thought about the question and your answer is 'Yes', doing a postdoc in industry is a good start. Compared with a permanent position, which can *not* be permanent in reality, at least because of reorganizations, acquisitions, and mergers, a postdoc position offers an opportunity to experience the working conditions in industry without being bound to them for a long time. The competition to get the position is fierce, among others due to the limited job offering and the benefits discussed below, but the reward is proportionally attractive. During the postdoc, you will enjoy both rich resources provided by the company, for instance the latest technologies and invited talks by top experts, and connections as well as collaborations with other researchers in the world. If you seize the chance to make discoveries that improve our understanding of human diseases and how drugs work (or not), many doors will be open to you after the postdoc, including those positions that require 'industrial working experience', for which fresh PhD students and academic postdocs are (sometimes unreasonably) not eligible.

You may have long determined to apply your capacities in industry. Your decision may base on various considerations: better benefits in general, more direct impact of your work, more respect for work-life balance, less emphasis on grant application and paper writing (and almost not at all on first-authorship), *etc.* A postdoc position offers a reality check: do the benefits match the

[1] David B. Searls, *PLOS Computational Biology*, 5(6), 2009

[2] A blog post by Derek Lowe, Do Industrial Post-Doc Positions Work? (last accessed on 2020.08.04), started discussions among the readers of his blog *In the pipeline*. A systematic analysis is nevertheless still missing.

working conditions? Is the expected impact realistic and reachable? Does the work-life balance meet your expectations? Are you satisfied with the fact that not all findings can be shared with a wide community in a timely manner, at least not without legal and intellectual-property considerations? The situation differs between companies and between research areas, and one person's experience differs from that of another one. Working as an industrial postdoc can either confirm your idea or challenge it, enriching your experience in either way. It is like a honeymoon: one is (hopefully) still under hormones, but at least some unrealistic expectations will be smoothed out, while unexpected joys and frustrations may bring new insights.

What happens if your answer to the question above is 'I do not know'? This is okay. After all, you may have no experience with industrial research, unless that you have worked there or have participated in academic-industrial collaborations. A postdoc position offers you both an opportunity to get first-hand experience and time reflect in order to take decisions.

Even if your long-term goal is to build your expertise and career in academia, and even if you have reservations about applied research, an industrial postdoc experience may pay off, if you are willing to give it a try. It offers you a comprehensive view of the practical side of your discipline and its connections to other disciplines. In industrial research, the chance that one discipline generating all research products, which later translate into revenues and profits, dwindles to near zero. Take drug discovery as an example: the list of disciplines that contribute to a new drug is long: biology, chemistry, pharmacology, toxicology, computer science, mathematics, statistics, engineering, *etc*. As a postdoc in industry, you are certainly expected to dive deep into your subject. At the same time, you will be inevitably exposed to other research areas that are at least as exciting and important as yours own. Being informed about the existence, importance, and problem-solving approaches of related fields, and about the unique contribution of your research, is an important plus for a postdoc position in industry. It helps you identify questions that really matter, and come up with solutions that are more likely to be practical and impactful. The success of many academic scholars who have had industrial working experience demonstrates that.

The major difference between industry and academia lies in the incentives: while industrial research puts return of investment at the first place and therefore values practical, applicable innovations that may turn into revenue and profit, academic research is sometimes deemed as 'pure', driven primarily by curiosity and novelty, and awarded mainly by publications, grants, and permanent positions. A complex and valued product is usually the outcome of extensive human collaboration - just think of the long closing credits following blockbuster films - and can hardly be delivered by experts of one discipline. In contrast, an immortal paper or a distinguished career as a professor can thrive on deep work in one area. Industrial research is thus born more collaborative and interdisciplinary.

Rule 2: Consider personal benefits

Besides as a means to achieve your professional goal, working as an industrial postdoc also creates, shapes, and expands your personal network in a different way than an academic career would do. The industrial network, thanks to the interdisciplinary nature, may consist of more diverse people with regard to their nationality, educational background, and life philosophy. It may provide only limited help when it comes to publications or grant applications, but does provide you alternative views of work and life, which can be refreshing or even thought-provoking. The benefit of such a network is also long-lasting: while the postdoc contract has an end date, the network persists when you leave the company or even the field of science. Having an active and

heterogeneous network may open unexpected new doors in later stages of your life.

In short, joining industry as a postdoc brings both professional and personal benefits.

Precautions about doing a postdoc in industry

Like freedom and responsibility, which cannot be separated, the pros of doing a postdoc in industry must be accompanied with precautions.

Rule 3: Be aware of the imperative of communication and collaboration

An industrial postdoc demands more than excellence in your own field: it requires that you communicate and collaborate with experts of other fields and even influence them. The primary goal is not confined to publishing papers (which is nevertheless often desired) or to getting grants (rarely so). You are expected to deliver convincing work that inspire others: scientists, managers, and even investors. Are you a computational scientist? You do not stop when you develop a new algorithm or model to explain things. You strive to make predictions that wet-lab biologists and chemists can test. Are you a wet-lab scientist? Your goal extends beyond describing and explaining what you observe. You put them into the disease context and suggest new therapies. Your work is judged not only by novelty, but also by universal applicability: does your method work? Is it robust? Does it improve the way how we discover new drugs? Can we make better decisions about what patients need next than we could have done without your research?

Your duty is to bring a research idea into life, which shall be taken up by colleagues in the company (or even those in other companies or in academia) to create products and value in the coming months or years. Therefore, you must take a professional attitude and put personal interests behind a common goal. It can be quite a challenge, especially for graduate students that are trained to work in a different way.

Rule 4: Be prepared to challenge yourself

Working in interdisciplinary teams may lead you to ask yourself: what is the point of diving so deep in my field? Some people may answer: well, not that much. They may find other jobs in the company or in other companies later. Other people will instead learn from the interactions exactly why their research is important, and get motivated to dive deeper. Yet other people will spot the needs and gaps on the interfaces between disciplines, develop new techniques and skills, and even create new research areas - these people challenge themselves and often become giants in the field.

Learning how to constantly learn and apply new things, how to solve complex problems under practical constraints of time and budget, and how to being both an respectable scientist and a team player is utterly important for a postdoc in industry. If you take the challenge seriously, you may constantly review your work critically and ask yourself: does my research matter? How can I make it matter even more? By asking these questions and searching for answers, I guess we may become better scientists and better people.

Rule 5: Watch out for social and structural pitfalls

Besides scientific work, there are structural and social aspects of doing a postdoc in industry. During the postdoc, changes may happen to the project or to the team. For instance, if a postdoc project studies a particular product and the company lost its interest in it later, the project may be stopped, however promising it may be. Or, in case of reorganization events, a postdoc project may also be down-prioritized or even phased out. It is wise to consider these risks before the project starts and to implement countermeasures, for instance setting up a project that will eventually benefit several projects, and defining a Plan B in case of structural changes.

Besides a stable environment, postdoc researchers needs regular exchange with their fellows. It is important for their mental health and development and vital for science to thrive. Unfortunately, such exchange does not come easy. Far fewer researchers perform their postdoc research in industry than in academia, therefore the peer group is generally smaller in industry. Communication between postdocs in a company and postdocs in other companies or in academia is often not only restrained by legal and intellectual property considerations, but also by spatial and organizational separations. This may make it difficult for industrial postdocs to exchange personal and scientific experience and perspectives with others. Luckily, though, there are more and more communities for postdocs and other junior researchers inside and between companies nowadays, so that an industrial postdoc does not mean working in isolation. Nevertheless, more can be done to promote exchange between industrial and academic postdocs.

Rule 6: A postdoc is not a permanent position

Though industrial postdocs have bright outlooks in general, it is a dangerous thought to think of a postdoc contract as a ticket to permanent employment in the same company. Experience suggests that while all postdocs find jobs when they finish, only a small proportion stay. The postdoc is probably best imagined as a room where you the kid are free to create, experiment, and invite friends over. It may be alluring to imagine it as a cradle in which you the infant seek comfort, feel safe, and fall asleep. The bitterness awaits when you wake up.

Since we are at the perspective: I have met students who worry that their experience in industry may bring them unpleasant questions in future job interviews, in case they return to academia later - '*Did you decide to join industry? Why do you now come back?*'. I think there are two aspects here. In many cases, the interviewer is just curious - after all, it is likely that she or he is also a scientist, who is at least defined by curiosity. Some students worry that the questions are not free of a scrutinizing undertone. I do not know how often this happens. I believe, however, that a capable scientist is welcome anywhere, whether she or he has stayed in academia or has switched between the sides.

In short, if you decide for an industrial postdoc job, be prepared for extensive communication and collaboration besides pursuing your own science. You will be challenged by yourself and by the environment a lot. Consider it well before you make up your mind.

Preparations once you have made up your mind

Rule 7: Find the right project and the right supervisor

When there is a job vacancy and you consider applying for it, make sure that it is about a clearly defined research project and a respectable supervisor will be supervising it.

An ideal research project have three properties: it addresses an important question in your field ('*What are the important problems in your field, and why aren't you working on them?*', so would the mathematician Richard Hamming ask), you resonate with it and believe that you can help solving the problem with your unique expertise and experience, and it can be executed within the given time and other resources. If case of any doubt or ambiguity, try all you can do to understand the last detail before you apply.

Your supervisor is ideally a competent scientist that is recognized both inside the company and in the scientific community. Beyond that, the importance of a caring supervisor who respects your ideas, gives you freedom, and supports your development cannot be overestimated. Sometimes, an industrial postdoc can have more than one supervisor or have academic co-supervisors. Make sure that you talk with them and try to understand what motivates them. To an extent, choosing the right people to work with is more important than where those people work, let it be industry or academia.

The same process of talking with and learning from people can be done for other team members. A mutual fit will increase both the likelihood of success of your postdoc project and the overall life satisfaction on both sides.

Rule 8: On-board by asking questions

Because the positions are limited and there are usually many outstanding candidates with matching profiles, it can happen that your application is rejected. Do not take this personal. Ask for feedback and suggestions if possible.

Let us suppose that you have convinced the recruiting team, received an offer, and you are determined to take job. How to prepare for it? You can get a mental picture of the work ahead by talking with your future supervisor(s) and team members and asking them questions. The questions can be about the project. For instance, what is the expected outcome in terms of publications, patents, *etc*.? Are there past experience and existing solutions in your or another team that can help with some part of the project? Where do they foresee the applications of the outcome? The questions can also be about personal and career development: what training opportunities does the company offer? Is there an ombudsman or ombudswoman whom you can turn to in case of conflicts? What are the possibilities after the postdoc? Do not be shy to ask questions. People were in your shoes not so long ago.

Be prepared to keep asking questions and upholding communications with your colleagues after you enter the job. It helps to orient yourself and to understand the team. You will soon have a fair idea how team members help each other, how willing they are to help you - which can be very valuable - and how you can help them in turn. Knowing the background, motivation, and unique skills of team members and collaborators will make you get help faster when you need it. The knowledge will also help you strengthen and expand your network by spreading the word to others who may need help.

Rule 9: Balance between staying focused and looking ahead

It is important to strike a balance between being focused and looking one step ahead. On the one hand, you must focus on your postdoc project and deliver results within defined time and budget. On the other hand, it is wise to cast a plan for the post-postdoc time, regularly review it, and adjust it accordingly: Are you on the right track with regard to publications, networking, *etc.*? What skills do you have to learn to make your next step feasible? Admittedly, it is challenging to keep the balance well all the time. It becomes less painful with exercise. Self-reflections and exchange with the supervisor or a caring team member make quite a difference, too. Do not worry if you struggle to find the balance: we all have to learn it all life long.

Rule 10: Keep your connections

Finally, joining industry does not mean cutting your relationship with academia. It is helpful to stay in touch with your peers, mentors, and collaborators. If you wish and if your current supervisor and colleagues support it, you can discuss your future plans with them. They may bring you new insights. You may even end up collaborating with them while being a postdoc in the company or even after that. As the Chinese put it, do not burn the bridge. Build it instead.

Finding the right project and the right supervisor, asking questions, balancing focus and perspective, and keeping academic relations, alas, do not guarantee a perfect start in your industrial postdoc position. I hope, however, that they help you survive the transition with fewer nasty surprises.

Conclusions, or, how should I decide?

You are welcome to use the list of considerations above to inform your decision. Gather more information by talking with family members and friends about your ambitions, questions, and worries. Listen to yourself. Make a decision. Go ahead.

Ten years ago, on my farewell party, a friend (in academia) told me his predictions: within two or three years, I shall be either back in academia, or starting looking for another job. When asked about his reasoning, he touched me with his reply: ‘Because you are always open to new problems and challenges, you will be very soon bored in industry.’

I am thankful that he was both right and wrong. There are more than enough problems and challenges, both in academia and in industry, by which I am excited. Luckily, the industrial research problems can be not boring at all. In contrast, they can be fun. An industrial postdoc position invites bright minds to tackle them.

Much luck and success with your decision!

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