

How to start in a new Lab - The Ultimate Newbie Guide!

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This document is for everybody who is new in a laboratory. The reason to write it is to prevent you from making the same errors and mistakes everybody does in the beginning. When I started I made most of them myself, too. I know, its a long document, but it should read easily. Also the things are not black and white as they are written here and most of them will not apply to you - but some things will get clearer for you - and if not, it should have been at least fun reading. It should also give you more confidence when strange things happen in a Lab.

The Supervisor

The first thing you should accept is the fact that you have a supervisor. He should be your guiding light, help you with all your problems and discuss your project in every detail. I guess most of the supervisors would like to do that, but it's impossible. Mainly because besides supervising you he has several other students, is working on his own projects or is writing a paper. You should respect that and before running into his room to ask questions check if he is deeply busy with something else and consider coming back later (of course not if you put the fume hood on fire and need some help to control the fire). But no matter how busy your supervisor is, you should not hesitate to ask him any question, no matter how stupid you think the question is (just try to work on the timing).

The Local Experts

In every Lab I have been, there are persons which I call local experts. A local expert is somebody who is expert in something (cloning, tissue culture or FACS) and knows everything about it. Most of these local experts know about their reputation and are proud of it. If you are new in the Lab, try to find out who they are and NEVER tell them that what you learned somewhere else is much better than what they do here. This will lead to hurt feelings and they will not help you in future because they think you should try it on your own. Try instead a question: "You do it here like that? That's strange - because in my last Lab we did it like...? Why do you think the way you do it is better?" If you ask the local expert for his opinion you show that you are interested to learn from him (flatters his ego) and he tries to help you. If you think he is telling you things that can't be true, consider being wrong - local experts work much longer on this topic than you and have much more experience. Don't try to do things on your own - these local experts solved most of the problems you run into now years ago themselves and can solve your problems in no time. Sooner or later you will be a local expert as well. If you did something several times in a Lab before and nobody in you new Lab ever did it - you're the local expert for that issue and people will come asking you for help (that's cool eh?).

Protocols

Most newbies run into a trap which I call the protocol survey. You get a protocol from your supervisor and while you are doing it, some things are not clear and you ask your neighbour for help. He looks at the protocol and says he does it differently! How can that be? You get his protocol and it's completely different! To make the decision which one is now correct you ask another colleague how he does it - and he gives you a third protocol which is different to the both you already have!! Which one is correct? Why did your supervisor give you a wrong protocol?

The truth is - there is not ONE protocol. Everybody has its own variety. Some people leave out steps, some people extended some steps and some people use a completely different method. The first thing you do is to keep cool. Try to understand what each step does and how the modification will influence the result. You can compare your protocols to the protocols on this page - I tried to explain what each step does and how it can be modified (If not - e-mail me!). But one thing is true - all these protocols will lead to a good result. So which one to choose? The one your supervisor gave you. Why? Because he might have a reason why he choose this protocol which the other people in the Lab (and you) don't know. And if you fail and he finds out that you used a different protocol, he will tell you it's because of that protocol (even if that's not the case) and you should repeat it using his protocol (read the superstitious section for more insight).

Here you can run into problems with local experts. They will tell you why what you are doing is wrong (and they are probably right) and how you should do it. ATTENTION: TRAP! If you do it as the local expert tells you, you run into the problem with your supervisor who doesn't like it that you are not following his protocol. If you follow your supervisor's protocol the local expert will be insulted and not help you any more. So how to solve the situation? Try to explain the local expert that you would like to first try the protocol you got by your supervisor and if it doesn't work you will try his. If he is not happy with that, ask him to discuss with you and your supervisor the optimal protocol! If he refuses to talk with your supervisor ignore the local expert's advice, he will respect your loyalty to your supervisor. DO NOT BE THE MESSENGER BETWEEN THEM! In most cases you would not be able to defend the protocol of the local expert in front of your supervisor (because you don't have the background of the local expert to answer all the whys).

Superstition

I guess that's the last thing you would expect to find in a Lab. The truth is, I think there is hardly any place were you find more. The reason is that in a Lab a lot of things can go wrong and you can spend month finding the reason why things did not work. Even more often things suddenly start to work again with no obvious reason (mainly because you run out of the compound which caused the problem and suddenly things start to work again using the new batch). To prevent things from going wrong, scientists try to do protocols always exactly the same way (something you also should do). That makes sense because you try to use always the same bottle of stock solution (if there are many, the good one). It does not make sense if you can't start a miniprep because you can't find your lucky yellow eppi-rack (I spend some minutes searching). The other reason is in the way of problem solving. If your protocols don't work, you repeat everything and change some steps. Most of the time not only one step, you change all steps which you think could be responsible. If then the things start to work again, you don't

know which of the steps is responsible for your success. Many times it is even none of them. Never the less, you will firmly believe that one of your changes is the reason why the protocol is working now. Because you already lost so much time on finding the error, you do not want to spend more time on unpuzzling which of the steps caused the problem. You just keep all changes for the future (this is the main reason why there is so much variation in protocols and why they get longer and longer going through many hands).

Problems

In a Lab it's quite common that things don't work. When I started as a newbie I was told that 80% of the things we try go wrong. After some years in science I think it's true. So how should you handle the problems which will come your way?

First - accept it.

Second - admit it.

It's very difficult to supervise somebody who is actually lying about his results. In the end it will always come out. Better inform at the moment it happens your supervisor about it instead of letting him find out in a later step. This is especially true if you do something for the whole Lab, like TAE-buffer. You can (with a comma-mistake) screw up the work of many days and of many people at once. Believe me, they will put some energy in to find the responsible person, and it won't increase your popularity in the Lab. So admit your mistake, let somebody help you if the things are difficult and everything is fine. The good thing is, nobody expects you to work without mistakes and will blame you for it! Of course if you forget to add RNase the third time after being told twice - people will get annoyed. So, be focused when you work! Accept that YOU could have made a mistake or forgot something. It happens to everybody (I already did some PCR's without polymerase and I guess there will be more in the future - it really reduces the yield). It is NOT the protocol which doesn't work, because many people before you did it and succeeded. So the first thing to do: Do everything again and FOCUS! If it still does not work you can be sure that you didn't screw up. You can also consider making stock solutions yourself instead of using what somebody who worked on you place made years ago. If you still don't get things going, discuss with your supervisor and ask the local expert for help. In most of the cases it means: Keep on trying and use Controls for each step! This is the only way to solve the problem. And remember: If you have problems, you can ask anybody in the lab for help (especially for: where do I find what?). If the question concerns the strategy of your project or how to do things - your supervisor is the person to talk to.

Property

In the Lab there is also something like private property. Also everything what you see from the moment you enter the campus belongs to the university or your employer, still people claim to own certain things in the Lab. So for example everybody has his own set of pipets or stock solutions. YOU SHOULD RESPECT THAT! Never go to somebodys freezer and search in his drawers for something you think he might have or use one of his buffers. ALWAYS ask the person first. Otherwise you run the risk that he makes you responsible for everything that he lost himself (and does not remember now any more). If you use something (including general stocks or instruments), BRING THEM BACK were you found them! Nothing is more annoying if you want to pipet something which takes 30 seconds and you first have to search for 5 minutes who took your pipets and were to find them. If you use the stock of somebody

and you empty it - ask him if you should make new stock for him. Some like to do it themselves (superstition - they don't think you can do it correctly) others are happy if you do it for them (they are more lazy than superstitious) - but everybody hates it to find an stock empty when he needs to use it.

Results

Don't expect too much. You won't be able to get a paper out of your work. It is true, there might be somebody who managed, but the chances are almost zero. An average PhD will get 2-3 papers out of his PhD-time, and he is already experienced and works more focused for a longer time. If you do good things a paper will come out, don't worry. You should not start on the wrong end thinking of a paper and then start doing the things.

Background

It is essential to read literature about your topic and read it early. You won't get around that. Sooner or later you have to present you work, write a report or a paper - at this point at least you will have to embed your work in the work of the scientific community. I know that it's difficult to reserve time for reading while you have so much pressure on doing your experiments. But if you read things early you can still change some of your experiments to answer a question somebody raised in a paper you read or you can find out that somebody else has already done what you are trying to. Or you find out that the mutant you are working on is actually a knockout of another gene that you are not interested in (responsible for the "interesting" phenotype). Reading the literature helps you to interpret your results and design your experiments! I guess the best strategy is to read a paper from time to time and keep doing it.

Time

In most of the Labs things don't go by the check clock. Meaning nobody cares in general when you come and when you go. You are responsible for yourself. Don't take this easy. If you are not in the Lab, you can't work. People realize very well when you come and when you leave and if you are hardly in the Lab. Try to adapt to the local habits. Arrive at the same time everybody arrives and leave when everybody leaves. Don't be late because you were on a party last evening. Nobody cares about that - If you can party you should be also able to get up early. If you know you won't be able to be in the Lab on some days, tell your supervisor some days ahead. Never just do not appear with nobody knowing where you are. In times of mobiles and e-mail there is no excuse for not giving any notice.

Appointments

If you make an appointment with your supervisor or somebody to discuss and/or to help you with something - Do everything you can to be in time. Maybe he reserved some equipment for you and if you are late somebody else is using it or you don't have enough time. You should also be aware that everybody has things to do. If you make an appointment this person will keep this time free of work to help you. If you are late or not showing up it can be that he can not do anything else and is really annoyed because you are screwing up his schedule.

Money

Running a Lab is expensive. You as an individual are shielded from that, because the things you need are available and if they are not, you tell somebody and new stuff will arrive shortly. But here is the truth: Everything costs money and you should care about it! Some things where you have only a few milligrams cost several hundreds of Euros. So making enough stock solution to use till the end of your life can be outstanding expensive. Of course you have to work and you should, but try to keep an eye on how much things cost. If you can, try to use less expensive methods and make your stock solutions matching your demand.

Knowledge

If you start in a lab fresh from the lectures - you feel like you know a lot. That's good and it should be the case at this level of education. But remember. The experts around you are working on the front line of research. They know what they are doing and they studied as you did. Do not tell them how to do their job, learn from them. In seminars or group meetings think if what you want to say really meets the point of discussion. If they don't go for your comments after you explained them a second time don't insist. Most of the times you did not understand that what you want to say is not applying. Just keep it in mind and discuss this issue with your supervisor later.

Fun

Working in a Lab should be fun. Don't take it to easy but also don't stress too much. Enjoy you time unpuzzling the mysteries of nature (of course to improve it afterwards!!!).

With best wishes for success,

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