



Microbiology laboratory practice

The Student Hitchhiker's Guide to a Lab

Laboratory

- Keep it clean and neat and allocated to function.
- Follow the standard operating procedures (SOP) for where you work.
- Everything to use must be in their allocated place (especially molecular reagents!).
- Make sure you know how everything works, and what not to do for the reagents used.
- Make sure you know what things must be sterilized and kept sterilized.
- All made up chemicals must have a date, what it is (and who made them) on the containers. Same for microbiological media.
- Let your supervisor know WELL IN TIME when reagents and consumables are getting low.
- Ask and keep asking, investigate protocols and reagents used and why.
- Report any irregularities, check if things still work.
- Make sure any flames (gas or alcohol) is off when you leave the lab, even if you are just going out for 5 minutes, and especially when leaving for home.
- Be careful with ethanol close to the flames (and flames close to your hair or clothes!). Should the ethanol spill and burn, it is rather frightening (which is the least of the concerns). Turn off the gas immediately, close the burning container, and the ethanol burning on the laminar counter can be covered with fire extinguisher. For that reason, only work with burning flames at designated spaces and an organized working space.
- Mentor others, you were also confused once. And do not take or borrow from others without their permission.

Your work

- Surface sterilize before you begin, clean up after you are done.
- Keep your own things organized.
- Be considerate to others and follow rules.
- Don't let your work lie around, otherwise you lose your data...or even your project.
- Back-up, back-up, back-up.

Laboratory book

- This is the most important thing in your life. Have as many as you want!
- Every detail (especially variables) of lab work must be written down WITH dates, until it becomes routine (make sure you understand yourself later!).
- If you include lists of cultures or results, e.g. DNA sequence reactions, where you use different codes than original (even if using original codes), KEEP THEM SAFE, otherwise you did everything in vain.



- Paste in your results or put them in a folder (but best to keep everything together in one quick, referencing place).
- Write down your thoughts and ideas, and your conclusions from results or how to troubleshoot.
- It is a brilliant idea to make copies and keep them somewhere else (including computer data), supervisors are good places.

Cultural media

- Culture media should be stored in clean rooms, at room temperature or cool rooms (watch out for condensation) in their plastic bags, in containers (do not let them dry out or contaminate or worse....get mites!).
- Storage at room temperature shows contamination issues before you spend days transferring in vain.
- Mark the media well with your name, what it is and the date.
- You can sterilize the insides of bags and containers with 70% ethanol but make sure you dry them before closing (moist bags soon become contaminated or flooded).
- To keep out ants or mites that will inoculate your cultures with their own pet microbes, put thin layers of Vaseline around edges of containers (inside) or where your cultures stand (naphthalene balls also works, although you may not be so popular with other peers...), or you can use those dust removing aerosol cans (which will make your lab fragrant and more popular with other peers).
- Check your media regularly and remove contaminated plates. Some fungi can climb out of bags...

Cultures

- This is the goldmine of your study, without them your research will not be accepted, your supervisor's funds will be wasted, collaborations will be in jeopardy. So they must be well looked after to protect them from mites and drying out, and not misplaced.
- After growth are adequate (or the sporulation you were waiting for occurred) they must be stored at 4 °C, well sealed, and in containers marked with your name and date.
- If cultures are really not needed anymore, or you are sure your initial primary plates are not needed, sterilize and dispose of them.
- Old cultures in areas where others are grown attract dust,contamination) and MITES.
- Mark your cultures well with the date and isolate number (ALWAYS).
- Mark the container where your cultures are growing well with your name, the date and isolate number (and study or contract).
- Check them REGULARLY, and do not forget about them.
- Once the cultures are pure, invest your time wisely by immediately listing them in culture lists (if needed linked to original specimens) and preparing them (in duplicate) for the types of storage methods used in your labs. For examples of such list, look for the herbarium and isolates collection sheets on this page. THEN begin your lab work.....
- Keep your own working and back-up cultures, and then submit the important ones to the culture collection of your research group.



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- Since cultures can mutate during sub-culturing, try to have more permanent types of storage (e.g. freeze drying) methods or duplicates, and sub-culture as little as possible.
- Isolates can also die in storage (as early as 6 months sometimes). Look after your research project by keeping them alive.

Molecular work

- Upon receiving chemicals, mark them with the date and your supervisor's name and keep them where they should be (4 °C, -20 °C, room temperature).
- Sub-aliquote important things (stocks, original DNA, enzymes, buffers, primers, etc.) to minimize that everything gets contaminated or degraded in one go (even store them in different places).
- Mark chemicals that are made up clearly with its name, the date, and who made or stored them.
- For generally used chemicals and reagents ad let the responsible person know when things are getting low, because some may take WEEKS to arrive after ordering.
- Mark Eppendorf tubes with the date and specimen/isolate number in two different ways or places (alcohol always drops on the lids, never anywhere else!).
- Make sure you can link your stored tubes and experiments with your lab book.
- Do not use similar marking systems for experiments done around the same time...then you do not know what is what after storage....
- Underline numbers because a 6 and a 9 looks the same any way you look at it, 5 and 2 and 3 sometimes merge in form.....
- Keep your precious DNA, working chemicals, enzymes, precious PCR products and clean ups, etc., WELL marked with your name, date and whatever else, and safe in an organized system (little boxes or Ziploc bags in boxes work well). When someone moves your stuff you can find them and still know what is what.

There are many internet resources and You Tube videos to learn more from.

Lastly, enjoy your science, and enjoy the lab where wonderful failures, ecstatic successes, and lasting friendships are made....and sometimes some weird things may occur.

And talk to your supervisor or peers a lot to make sure you are on the right path and to solve problems.