Ellis Lab - Mission Statement

We aim to discover basic mechanisms that control gene expression and epigenetic reprogramming. We strive to apply this knowledge through manipulation of induced pluripotent stem (iPS) cells to model human disease and test potential therapies for personalized medicine. Our lab members will train in a collaborative environment and be mentored for future positions in the best institutions in their chosen field.

Expectations for Rotation Students

You need to demonstrate your strengths over the 5 week rotation period. Make it obvious that you are motivated and genuinely enthusiastic about the research topic. Show your ability to make scientific presentations and your critical thinking by doing Journal Club. Design the best experiments you can with the reagents at hand and available controls. Then don't wait - do as many experiments as you can and try to interpret your data realistically. It is essential that you work effectively in a team.

Week 1 - Complete Orientation, discuss project with James, read backgound papers, gather reagents for experiments, seek guidance from lab members for experimental details/protocols.

Week 2 - Present Journal Club at lab meeting and ramp-up experiments. Weeks 3-5 should be your major effort to acquire quality data and evaluate it, while thinking of ways to improve the approach and expand it into a graduate project.

Expectations for Trainees in the Ellis Lab

New Trainees to meet individually with James every week until projects well established.

New Trainees to give a lab talk describing the background to their project and proposed experiments within 3-4 months of starting.

"Flex time" is good for research but it is also important to interact with the rest of the lab and with James during the day. Please start work by 10 AM or so.

Show "good" and "bad" **data** and present your **conclusions** at lab group meetings (Wed noon) or to James directly. Welcome input from all lab members, and participate in evaluating their data too.

Read at least 3 papers a week - the more the better. Read "At the bench" Book.

Attend Talks: Dev Biol Group meetings (Mon 1 PM) and Mol Gen Student Seminars (Tues 2 PM). Many other excellent talks are regularly held (OIRM Stem Cell Rounds, Toronto RNA meetings).

Critically evaluate papers in lab journal club (Thurs 3 PM).

Teach/mentor new lab members on the best way to do their science.

Give a talk about your project at least once a year at SickKids or UofT. Once you have some publishable findings look for a conference to attend and give a poster/talk.

Keep a self-explanatory Lab Book in ENGLISH. I prefer to organize by experiment, not chronologically. Note down why you are doing each experiment and what your conclusions are - 2 years later it may not be obvious. Keep properly labelled paper printouts of all electronic files. You also need to keep a Methods Book with up-to-date versions of all protocols, and a Reagents Book with all your plasmid maps, oligonucleotides and cell lines recorded.

Lab books are the property of the lab - don't take them home, and leave them here when you move to another lab. Journals and patents require that lab books are archived - they are mandatory.

Think about your project details, especially how new papers affect your research - don't rely on others to think for you. Always define the Question first and then the best approach to answer it.

Be motivated. Science is not 9-to-5, you have to work hard to succeed.

Be determined to solve technical problems. You will get advice, but in the end it is up to you to make it work or to think of an alternative approach. It's your thesis/career on the line.

Set your career goal and talk about it with James, if it changes please discuss this openly.

Don't avoid doing the highest priority experiment. If James insists you try something, give it your best shot. You can always find time to try it your way too.

Before You Graduate (or leave for a new position)

Make sure your lab books are up to date and clearly labeled, that all data is backed up and a copy provided to James, and write drafts of papers.

To ensure that others can build on your results, clearly label all reagents in readable ENGLISH and put tubes in common lab boxes, record all reagents in lab databases, and update all your protocols in the lab methods book.

Personal Interactions

Always respect everyone in the lab - this means be friendly/courteous to everyone with no exceptions.

No one can complete a project by themselves. Help your labmates with their experiments, because you will need their support in return.

Make contacts outside the lab or at conferences - they can teach you techniques, or provide access to special reagents or equipment. Remember that some collaborations are initiated by trainees.

If anything cannot be resolved amicably, bring it to James' attention.

FRAGRANCE-FREE LAB - Many people are hypersensitive to perfume, cologne and other fragrances. Please be fragrance free at work.

Security - theft of equipment and personal valuables does occur at Sick Kids.

Respect the security entry points to the PGCRL. Sign in visitors at the Lobby desk.

Do not leave your personal valuables in plain sight.

Ask any person that you do not recognize for their ID badge, or if ask if they are lost. If there is a problem phone Security.

Make sure you run antivirus software on your own computers to prevent infecting the lab computers.

Lab rules

Give James documents to edit well before committee/exam/abstract deadlines. If there's less than 3 days for James to edit, then it will returned without comments.

Be safe - unsafe practices will not be tolerated. Read and sign the lab TC/radioactive safety form. Discuss any potential safety issues with other lab members. Report incidents (yours and others) to Peter.

Take care of the equipment and tell Peter about broken things and reagents that are low.

Be responsible about lab chores - do them, without being reminded.

Any new protocol that you develop/import from elsewhere must be described in detail in the Lab Methods book so others can use your proven technique and don't have to reinvent the wheel.

Enter any new plasmid you make into the plasmid book and create a sequence file on the computer.

Keep an extra stock of diluted plasmid DNA frozen at -80 as insurance against someone using up all of the tube in the plasmid box. If you see a tube in the plasmid box is low, make a new maxi.

Store frozen vials of cells in liquid nitrogen and use the Cryopreservation facility for long-term storage. Make sure that the location of each vial is accurately recorded.

Always use the proper full name in ENGLISH for each reagent on its tubes and in your lab book/protocols. If someone needs one of your cell lines or virus preps and the name on the tube is not the same, we don't know if it's the right thing.

If a reagent doesn't work or isn't the right thing, check with others to make sure, then throw it out and replace it.

Throw out contaminated tissue culture plates/flasks right away. If you are not sure ask for advice. Ask Peter to check your cells for mycoplasma regularly. Cells that grow poorly should not be used for experiments, and don't maintain ES/iPS cells for too long - they need to be low passage to give reliable results. Thaw a new tube instead.

When you go home at the end of each day, check to make sure that all lab fridge/freezers are at the correct temperature and the doors are closed, that water baths are topped up, and Bunsen burners are turned off. Freezer thaws are major disasters.

The hospital monitors all use of the internet and archives all e-mail. Keep this in mind - don't download questionable files for your personal use or send any confidential private e-mail.

Scientific Advice

Read background papers about your topic right away, but remember that not everything that is published is correct so be critical.

James has books to sign out on how to write papers/grants, give presentations, manage a lab, texts on chromatin/retroviruses/molecular biology etc, and even the philosophy of how science is conducted.

Sign up as a member of the Stem Cell Network and OIRM. Trainees are encouraged to network with each other and to attend the Till and McCulloch Meeting.

Think about the "big picture" to prioritize your experiments (what's the most important experiment to do?) and about "outside-the-box" ideas too, they might lead to good new research directions.

Have a risky/exciting project and a safe project, and work on them simultaneously - but recognize your limits to avoid mistakes. Figure out in advance the crucial experiment that will convince you that the risky project will work. Set a realistic time limit (6-9 months?), and if the crucial experiment has still not worked by then, drop it in favour of the safe project or to start up a different risky project.

Talk with other lab members about your results/directions, or about new experiments that could be done by yourself or together. Tell them about papers they should read for their own project.

Come in weekends to pass cells, start mini's, transform bugs, blot gels etc - a few hours then saves a day or more each week and adds up to much faster progress.

Double check all your reagents (are the iPS cells actually derived from the right patient? is an oligo sequence correct?) and protocols. Don't assume everything is what its supposed to be or is the best approach to answer the question.

Mixing aspects of different protocols into a single new method is risky and needs lots of controls. Its best to start with a version that works for someone else in the lab (check the lab methods book). Don't be shy to contact authors of papers to get their protocols or reagents.

Before you start an experiment, make sure the reagents are available - is there enough media, growth factors and plastic ware, or enzymes and DNA? If not, order or make what you need. Borrowing reagents can speed things up, but they may not be in perfect condition. Its best to make your own.

Always include a positive and negative control in experiments. You have to think of these before starting the experiment.

Make sure that every microscope image, gel or data set that you obtain is organized in a logical way and could be used as a figure. Visualize what gels will look like before you load them and think about a sample order (by increasing copy number etc) that makes the conclusions clear and easy to understand.

Document every result well (different magnifications, multiple exposures etc) because you never know - what seems unimportant at the time may become crucial later on. You don't want to repeat the experiment just to get a publication quality figure.

Have a backup plan for each experiment in case you run into technical problems or you need to do a different assay after seeing the first results. Its easier to freeze or pass left-over transduced or sorted cells for later use than to repeat the entire experiment.

Label all your raw data with the date, experimental details (cell lines and markers, probe and exposure time etc) and sample names, but make sure the labels are far enough away from bands that they will not interfere with making a figure.

Back up your data files onto the lab R drive, or a USB/external hard drive. If you have a lap top with the data on it - make sure you leave data backups in the lab if you take the laptop home.

Don't leave unimportant files on the lab computers - delete them after reading/printing PDFs etc.

Once you have the data, the greatest priority is to analyze it - don't wait. The sooner you get to conclusions, the faster you can redesign the follow-up experiments to take advantage of them.

Cross-check your data - try a different technique to confirm the result or compare data to two different controls to see if they agree. Cross-checked data is most likely to be correct.

Don't ignore results that don't fit your model/expectations - they might be the most important and you have to think of a way to explain them.

Set up an Endnote Library specific for your research topics as soon as you can. Use it for your first committee meeting report and keep building it up over time.