Perry Lab Manual

Revised 8/14/22, R.J.P.

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Introduction and Mission Statement

Welcome to the lab! We are glad you are here. We are a group of scientists across many stages of training (and even some across the world) who are committed to doing good science, communicating it to the wider scientific community and to the public, mentoring our future colleagues, and addressing the many inequities and barriers that have existed throughout the history of science and medicine. Broadly, our lab studies metabolism and the intersections between systemic metabolism and physiology and pathophysiology (e.g. sepsis, cancer, aging). We believe that science is fun – most of the time – and that we can make a positive contribution with it.

We are committed to fostering an environment in which all ideas and identities are valued. Therefore, we welcome and respect members of any age, sex, sexuality, nationality, religion, and (dis)ability. We strive to maintain an environment of honesty and professionalism at all times and agree with the ethics standards spelled out in the Yale GSAS Code of Conduct: https://gsas.yale.edu/resources-students/conduct-professional-ethics-reporting-misconduct.

Mentorship

There is a reason I am starting with mentorship. Research is a rare career where we are *always* both mentoring and being mentored. As we advance, the ratio of mentoring to being mentored will likely increase, but there should never be a time we are without mentors. Therefore, it is important to optimize our roles as both mentor and mentee.

Please share with me your career goals, expectations for the lab, and feedback on how your experience in the lab is going. I recognize that the existence of something of a power differential between us may make this difficult. Therefore, we have set up the following venues for providing feedback:

- In person during a scheduled or informal meeting (more on those below)
- By email or text
- Via the anonymous lab survey I will send out twice yearly

You can expect from me the following:

- A commitment to helping you achieve your goals (not mine, although it's great when they converge), and/or define them
- Providing each lab member, regardless of stage, with a solid grounding in the scientific process, experimental design, data analysis, and writing
- Concrete steps toward this; for instance, supplying letters of recommendation that reflect your performance in the lab, connecting you with informal mentors at Yale or elsewhere, in your field of interest or with other characteristics that are helpful to you, finding opportunities for you to practice the skills you are interested in developing for the next stage of your career (e.g. science communication, teaching, laboratory procedures, etc)
    - Performance does not mean publishable data; most of the time, experiments don't turn out as we expect!
    - It does mean scientific curiosity, intellectual engagement (e.g. thinking about and optimizing your experiments, reading papers and bringing them to my attention, presenting in lab meetings, etc)
- Timely and specific feedback on your performance. I meet weekly with grad students and postdocs, and monthly with high school and undergraduate students. This document (http://www.avasthilab.org/2017/03/14/what-to-bring-to-a-meeting-with-your-advisor/) provides good tips on making the most out of 1:1 meetings, although I don't feel it quite as important to protect my time as the writer. After all, what more important job do I have?!
- Openness to receiving feedback. Lab dynamics evolve over time depending on the personalities and needs of lab members, and that's great!
- Encouraging each trainee to write up their work, and submitting manuscripts in a timely fashion. There may be times I may encourage you to publish sooner or wait longer (to do

more experiments), but this will be done in a collaborative manner wherever possible; there are very few times I will insist on the scope of a manuscript
- Making sure everyone gets credit for their work in public presentations, manuscript authorship, and "talking up" those on the job market with colleagues at other institutions
- Opportunities to co-write literature reviews and/or paper reviews if you wish (this is not a requirement)
- Supporting your attendance at national and international meetings (more on that in the "External Presentations" section)

1:1 Meetings and Individual Development Plans (IDPs)

We will meet regularly, one-on-one. We will choose a standing meeting time together, and I will block it off on my calendar and ask you to do the same. Of course there will be times when an inevitable conflict comes up (family responsibilities, illness, travel, important meeting that can't be scheduled at another time), but I will minimize these to the greatest extent possible.

For graduate students and postdocs, we will go over an informal Individual Development Plan (IDP) every six months. At our first meeting we will discuss your career goals and what concrete steps we can take to position you ideally to move toward them. I will also ask you to come with 2-3 goals for the next 6 months, and 1-3 things you think you could stand to work on. I will do the same, and we'll discuss these at our first IDP meeting. Then, at subsequent meetings we will review progress in the last 6 months, and whether any aspect of our approach needs to change. At the rest of the weekly/monthly meetings, we will discuss progress since your last meeting, any issues (technical, logistical, or personnel) that have come up, and your next steps. These will be informal meetings – no slides are required, though you're encouraged to show me data in Excel or Prism format – but I would ask you to come with a list of things to discuss, and I will do the same. These meetings are not intended to replace informal meetings in the lab in any way; those remain very important (and a lot of fun), but we have the standing meetings so we have a dedicated time to discuss your project on each of our calendars indefinitely.

Trainings

Because of the work that we do, there are certain trainings that are required before beginning work in the lab. They can be accessed at www.yale.edu/training (VPN is required if you are accessing the site off-campus). The trainings are as follows:

Biosafety
HIPAA Privacy and Security Training
HepB Acknowledgement

Lab Chem Safety
Patent Policy Acknowledgement Agreement
Radiation Safety for Unsealed Sources
Tetanus-diphtheria Immunity
HIPPA Security Attestation
Bloodborne Pathogens
Medical Surveillance for Animal Handlers
Regulatory Training for Animal Care and Use

They can be taken out of order. The last two courses are required before I submit the form to add you to my animal protocol, so please let me know when those have been completed. The medical surveillance will take at least a few days (if not longer) to be finalized because Yale Health will have to sign off on your having had the required immunizations, so I am well aware this can't be done immediately, but I recommend starting with the last two courses so these things (which aren't fully in your hands) can be completed while other trainings are in the works.

Roles in the Lab

Please see the table below for a description of the roles that are filled by people currently in our lab. If/when we have lab members in other positions (e.g. technician), the table will be edited.

Role	Overall goals (in addition to shared tasks, p. 5)	Typical time breakdown (%)*
PI	Obtain funding, mentor, teach, communicate results, onboard	Writing grants/papers (40), admin (27), mentoring** (20), teaching (8), benchwork (3), reading (2)
Postdocs/ instructors	Develop increasing independence, do experiments, mentor, write	Benchwork (70), writing (15), mentoring (10), career development (5)
Graduate students	Learn to lead a project and communicate results, do benchwork	Benchwork (65), writing (15), mentoring (10), career development (5), classes (5)
Undergrad students	Benchwork, learn to present your and critically analyze others' science	Classes (80), benchwork (15), career development (5)
High school students	Benchwork, learn to present your and critically analyze others' science	Classes (90), benchwork (8), career development (2)

* This is my estimate of an average; certainly these percentages change at certain times (e.g. just before a grant deadline, during exam week, etc)
** When I am able to reduce my administrative duties, I hope and plan that mentorship will account for a much more significant percentage of my time

Lab Citizenship

As a lab member, you're a key part of our team in the Perry lab. Everyone's role is important. We do not have an autocracy in the lab, nor a full democracy. I steer the ship overall and provide most of its fuel, as it were (grants), but I am eager to have each lab member, regardless of role, drive a component of its operation. Depending on your stage of training, you may play a greater or lesser role in steering your project; we will work together to drive in a way that works for you and for the lab writ large.

I expect all lab members to treat each other with respect and professionalism at all times. We do not tolerate harassment of or by any of our lab members based on race, religion, gender, gender identity/expression, sexual orientation, age, physical appearance, or disability. If you are concerned about anything on this list, please feel free to approach me, our department chair and neighbor Dr. Michael Caplan, the Directors of Graduate/Postdoctoral Studies as appropriate (Dr. David Zenisek and Dr. Biff Forbush/me, respectively, although since I am one of the two Directors of Postdoctoral Studies, that may be less helpful), the Yale School of Medicine

Associate Dean for Gender Equity (Dr. Cindy Crusto), or the Deputy Dean and Chief Diversity Officer (Dr. Darin Latimore), and we will do everything in our power to fix the issue. Please understand that as your supervisor, I am a mandated reporter in cases of sexual misconduct or assault as defined by the university, and therefore I am required to report issues that fall under this umbrella if they are shared with me. However, except in extremely rare cases where there is an immediate threat to personal safety, I can – and will, unless you prefer otherwise – do this anonymously.

Science is collaborative. I expect that lab members will be willing to help with others' projects, whether it be teaching a new lab member a technique, troubleshooting data together, or helping bleed during a mouse clamp. in which mistakes are owned up to and resolved (I could go on all day about mistakes I've made in the lab – it happens!), and in which we all pitch in with regard to shared duties (putting new orders away, ordering shared supplies in a timely fashion, dropping off and picking up biohazard bins, etc).

Shared Tasks

To keep our work running smoothly, there are certain communal tasks assigned to each full-time lab member. They are as follows. If you identify other tasks that you think should be shared, please tell me. They may be assigned to someone who joins the lab in the future.

Xinyi: ordering
Ngozi: monthly swipes
Stephan: mass spec maintenance
Andin: inspections (radioisotope, animal, controlled substances)
Zongyu: carcass disposal

Everyone is responsible for the following shared tasks:

- Receiving orders that arrive and sending a message to the lab slack and/or the person who ordered it to let us know that they've come
- Obtaining biohazard bins from the ice room in the basement and dropping them off there when they're full
- Cleaning up communal spaces (mouse bay, radioactive/weighing bay, centrifuge bench) after you use them (if you need to rush to another experiment, please leave a sign letting people know you will clean it later)
- Reordering supplies before you use them up. Particularly during this endless pandemic, certain supplies take weeks or months to receive, so we need to know we're going to run out of something well before we do

Local Experts

We are fortunate to have local experts on multiple important protocols in the lab, and often they are not me. For questions that arise on the following procedures, you are always welcome to ask me, but you will likely be better served by consulting the local expert (this doesn't mean others may not also know how to carry out these protocols as well!):

Exercise: Xinyi, Ngozi
Protein assays: Ngozi
Mass spec: Stephan
Cell culture, SC/IP injections in mice: Xinyi
FACS/flow cytometry, qPCR: Zongyu

Ordering

Upon your arrival in the lab, we will give you access to the Google doc used for ordering supplies. When you need to order something, first look around the lab and ask lab members or me if they know if we might already have it. If we do not have it, please fill out the Google doc spreadsheet with all the information requested: date, your name, description, company, and catalog number of the item needed. We cannot place orders without all of this information because of the requirements of Yale's online ordering system. **Orders are placed on Tuesday mornings**. The only planned exception to this will be when I am traveling or otherwise busy all day and night on a Tuesday. If this is the case, I will give you at least a week's notice. It is necessary to place orders once a week to save on shipping: we pay $45-80 for shipping for every order, regardless of its contents. It is not unheard of to shell out $80 in shipping for a $22 order. Therefore, I am highly motivated to group orders together in order to avoid paying shipping. If you find yourself in a situation where not having an item would prevent you from being able to do an experiment on the timeline planned, particularly if this would affect rodent care, please bring the issue to me and I will decide whether it's possible to make an exception to the "orders on Tuesdays" rule, but please assume that we will not be able to make an exception and plan weeks ahead.

When we place an order, we will add the requisition number and ordered date to the Google doc. After it passes through the process of approval by various people in the business office, it will be assigned a purchase order (PO) number, which I will place in the Google doc. I typically stop thinking about orders after I place them, but if there's something you need urgently, I will stay on top of it and nudge approvers to approve. This is something we need to do sparingly because depending on the cost and type of order, there are 3-6 separate approvers and I'd like to avoid having to contact each of them sequentially, but I will do it if needed. Once there's a PO, if you are looking for a status update, you can call the company directly and give them the PO number, and they can give you an estimated ship date, tracking number, and estimated delivery date.

Reimbursements

For cases in which a credit card is needed, rather than a university PO (e.g. purchasing food for lab meetings or feeding animals, travel, conference registration, lab meals), we can either use the lab's pcard (a MasterCard which I keep but which is for lab use), or you can put the item on your credit card and I will make sure you get reimbursed. There are pros and cons to each option. When using the pcard, obviously you aren't out any money initially, but there can be a delay, because the card has a $1500 monthly limit (total). We can get a temporary increase, but that takes days. If you wish to use the pcard, I will give you the number over the phone so as to prevent any concerns about emails getting intercepted and our information being stolen.

If you wish to use your personal credit card, please give me (or send me a photo of) the receipt as soon as possible. I will submit a reimbursement request on your behalf (and CC you).

Items that can be reimbursed include, but are not limited to:

- Travel to, registration for, and reimbursement for meals ($60/day maximum, NIH policy) at conferences where you are presenting your work. The lab policy is to send each trainee to 1 meeting per year where they present their work. If you have your own travel funds (e.g. from a grant or the graduate school) you are welcome to use them however you'd like, but please discuss the data you plan to present with me beforehand.
- Supplies purchased for lab work (e.g. organizational or office supplies for the lab, sucrose or peanut butter for rodent motivation)
- Supplies for lab gatherings. If you purchase supplies or food or other such items, please bring the receipt back to me so I can charge the costs.

Communication

Issues may come up at all hours of the day. We are not, nor should we be, tied to our emails or phones all the time, and that's perfectly expected. But we need to have a way to contact each other if need be, and it works better if it's a redundant system. I recommend for quick issues (or amusing memes) you text the lab text thread, and I encourage you to start one without me as well, if you would like. Our lab Slack can also be used for communication, although most do not check it as regularly as their phones. I have invited all in-person full-time lab members and undergraduate students to join the Slack; if you have not received it or have any concerns, let me know. Feel free to make new channels wherever they would be useful.

Please know that when it comes to email, I send messages at all hours of the day/night. With a young child and a spouse whose work in the hospital also requires odd hours at times, I keep an inconsistent schedule (although I am in lab 8:30-5:30 just about anytime I'm not traveling). Any of us may send emails during non-work hours, but you are not expected to respond outside your normal work hours. I do generally expect to hear back if I contact you with a question or specific issue within 24 hours if it is during the work week, but there is no expectation to be tied

to your email during the weekends and vacation. I will let you know ahead of time if I am taking vacation or am traveling for work and will be unreachable.

That said, if you have an ongoing animal experiment which requires monitoring or special diet/water, it's your responsibility to take care of those animals, including outside of work hours if we get a call about an issue (for example, if diet runs out on the weekend). If you are traveling, please coordinate with a lab member (not me) to be the backup person to handle any issues that may arise with your animals. Please let me know who this is beforehand, so that if/when I get calls about the animals, I can direct them to the backup person. We'll all need both to rely on and to serve as backup at some point!

Team Building

In times without a global pandemic, we get together as a group informally twice a year, sometime in the late spring (usually at my house, significant others/families more than welcome) and before the December recess (out to lunch with our lab). In addition, we celebrate lab birthdays several times a year, and big accomplishments (grants, papers, positions lined up for the future, life events, simply getting over another major hurdle) whenever they arise. If you have any dietary or religious restrictions that may affect your participation in these events, please let me know in advance so I can make sure they are as inclusive as possible.

Leaving the Lab

For postdocs, if you plan to become an independent investigator in academia, it is important that you have something "to take with you" – a project for which you gained experience in the lab that you can bring with you as an independent investigator. We will discuss this early and often, to ensure that you have the greatest chance for success and that there are not ownership conflicts down the road. If you are writing a fellowship as a postdoc, it is important that you (and I) clearly define where the line falls between my research and your future research, and it is beneficial for there to be a clear split, so we should discuss this long in advance.

Lab notebooks are, by university policy and U.S. patent law, the property of the lab, so they must be left physically in SHM B121. The same goes for samples, although folks are usually less interested in putting them in their suitcases. You are welcome to make copies or take photos of any pages in your lab notebook so you continue to have access to the data after you leave. Please be sure to leave contact information (email at least) with me. I will contact you periodically to check on your current profession; I will need to provide a table of former trainees from the lab and where they are now whenever I submit a training grant, so this information is much appreciated.

Project Definition, Evolution, and Ownership

My goal is that each lab member will have his/her own project. The size/scope of this project will depend on the trainee's position, experience, and interests. I encourage trainees at all stages to work with me to develop projects. There are just three requirements for projects in the lab: (1) the trainee leading the project is excited about it, (2) I am excited about it, (3) we have funding and expertise to support it/it is within the broad mission of the lab. Typically when new lab members enter the lab, they work under the tutelage of/supporting a more senior lab member, and over time, with mutual agreement between new lab member and PI, they increase their independence. I expect trainees to read about their projects and be the local expert in their area of interest. I will certainly also read and think deeply about these topics, but with ~5-10+ lab members at any given time, I simply cannot become a real expert in each topic. Because I know you can lead – and it's important as a training experience that you do – I would like to get to a point where you are leading your project. However, I am always here to discuss data, next steps, and optics – this is the best part of my job!

The reality of science is that projects evolve, and hypotheses are frequently (more often than not, really!) proven wrong. For this reason, I guarantee that the paper we eventually submit will not be the paper that's eventually published. My hope is that projects will be published, or at the very least submitted for publication, before you leave the lab. If that is not possible, we will identify someone to take over the project after you leave. Please help make the transition as smooth as possible by supplying all data and protocols to the new project leader.

Data Integrity

There is <u>never</u> an excuse for manipulating/fudging data or for plagiarism (including self-plagiarism). These actions are wrong. Editorial staff routinely feed submissions into a plagiarism detector, and plagiarizing previously published work (even if you wrote it) <u>will</u> be caught. The exception is in theses: it is perfectly acceptable to copy sections directly from your papers into your thesis (or vice versa). Any relevant papers should of course be cited in your thesis, but quotations are not needed.

Because of the variability of *in vivo* studies, there is a common policy to exclude data points that fall outside of 3 standard deviations away from the mean as a way of accounting for physiologically irrelevant biological outliers. We follow this policy in all cases (we do not cherry-pick data sets when we apply this policy and when we don't). If you have any concerns or anything is unclear about these policies, please ask me directly. I am always happy to discuss these issues to achieve our shared goal of making sure the data that comes from our lab is as high quality as possible! Ultimately, I take responsibility for every piece of data that comes out of our lab (that doesn't mean I take sole or even primary credit for it, but the onus ultimately lands on the PI's shoulders), so please understand that if I'm asking you about data management, it's not

because I don't trust you, but rather so that I can comfortably and confidently take responsibility for the fact that the experiments were done carefully and honestly when sharing our results with the wider scientific community and the public.

Lab Notebook/Data Management

Per university and NIH policy, lab notebooks and data are the property of the lab. Lab records must be kept carefully so that someone not familiar with your data could replicate your experiments if they came in. I recommend designating a few pages at the beginning of your lab notebook and turning them into a table of contents so if you need to find a piece of data, you can go back through it quickly. Pages cannot be torn out of the lab notebook; however, if you scrap an experiment, lose samples, throw out data because an experiment was done wrong, etc, you can always put a large X through the page (so it's mostly still readable) and write a note as to why this was done. It's fine to write on random sheets of paper not in a lab notebook (sometimes this is easiest during mouse experiments or while weighing out tissues), but they must be taped into the next page of your lab notebook or uploaded/saved on your computer with a timestamp. This is not because I think anyone would manipulate data but because we need to keep careful records just in case there were ever a question or dispute.

While it's not likely, it's always a possibility that there could be an audit of your work unrelated to issues of possible scientific misconduct (for example, I had my lab notebooks audited during my PhD when there was a patent dispute between my then-PI and another PI, and outside lawyers wanted to look at my lab notebooks and the collaborator's student's to ascertain to whom the patent belonged).

Therefore, the lab policy is that we have a folder on our computers that syncs to a Box folder in which I will ask you to store all data from this lab (can of course also have subfolders). This allows me to easily grab data for grants without bothering you, and provides a backup so that in case of computer demise, everything will still be intact. Although I will rarely do this, it also allows me to peep at what's been going on, and potentially help troubleshoot issues early.

We have a shared external hard drive which is usually kept in the lab but can be taken home for short periods of time if you need it to bring data home. We also have three desktop computers in the lab which are for everyone's use and can be used to store data. Finally, as mentioned above, the Yale Box offers substantial data storage space. If these options do not work for your needs, please let me know and we will find an alternative. I am very committed to making sure our data storage is as seamless and transparent as it possibly can be.

Preprints/Raw Data Uploads

At the moment, we do not have an official lab policy on preprints. Typically we do not post preprints because we are generally doing work that, while it could be scooped (anything can be scooped), it's unlikely, and there's a great deal of variation in terms of how preprints are viewed by reviewers (generally not negatively, but also not hugely positively). However, if we are doing a study that needs to get out there quickly, or if you need a citation for a fellowship application, this is certainly a discussion we can have.

Raw data is another story. An increasing number of journals require that raw data be uploaded to their server or another data repository. This is always the case when generating new genomic data. So please store your data in a way that makes it easy to obtain if this is needed. One easy way to do this is by putting individual data points into your Prism file as you're building the figures; this way you can copy and paste the data from one Prism file into a single spreadsheet or onto a website, without having to open up dozens of spreadsheets to pull everything together. But as long as the raw data is available, any way you do this should be fine.

Lab Meeting

Lab meeting is currently held at 3 pm EST on Wednesdays, on days that do not conflict with Shulman lab meetings. Every lab member (including the PI) participates, presenting in a rotating schedule. My expectation is that you attend unless you have a conflict that is unavoidable (e.g. a class or another scholastic commitment) or unexpected/rare (e.g. illness, family issue, religious holiday, etc) conflict. If a regularly scheduled conflict comes up, please let me know and we may be able to adjust the schedule to move the lab meeting to a different time (if not, we can have lab meetings scheduled at a time you can make outside of our normal slot for the times you are due to present – this is no problem). I will make the schedule, but you can trade weeks with others if the timing works for both lab members' schedules. The format of the lab meeting varies; recent topics have included:

- Data blitz (20-30 min update from a trainee on his/her project showing data collected since the last lab meeting presentation with minimal background; very interactive)
- Full project presentation (60+ min showing background, hypotheses, results, future directions; more formal but still interactive)
- Journal club (discussion of a paper chosen by the trainee with or without my input)
- Methods talk (presented by someone who's an expert on that topic and later shared within the lab as a group resource; recent topics have included paper writing, mass spec, and FACS/flow)
- Practice talk (these are scheduled when a group member has an important talk coming up, e.g. a qualifying exam or defense, or a talk at an outside meeting)

The format of the lab meeting is always up for discussion and we typically change things up a couple times a year. Please let me know if you have any ideas for new ways we can structure lab meeting.

Active participation in lab meeting helps both the presenter and the listener. It is painful to present to a silent room (especially on Zoom, though I understand the awkwardness of this) and a fun back-and-forth makes for a better learning experience for everyone. Please don't worry about asking a "stupid question." One of our goals needs to be to present to scientists with knowledge in the field but without our specific knowledge of the subject. Each person is the expert on his/her own project and should present in a way that those who've taken far fewer classes and done far fewer experiments in the field can understand.

In addition, we regularly present at my former mentor/current collaborator Dr. Jerry Shulman's lab meetings (also Wednesdays at 3). These presentations are more formal, 60 min long, and designed so that you have an opportunity to present to a friendly audience with knowledge in the field, but people who are not intimately acquainted with your project and may question why you did what you did.

Finally, I encourage you to attend other PIs' lab meetings if you would like and if your time permits. Of course, discuss with the other PI first, but please feel free to branch out. It's important that we be able to engage with the wider scientific community and this is one way of doing that, and making other contacts in your field of interest!

External (Outside the Lab) Presentations

There are two kinds of external (by the current definition: outside the lab) presentations: at Yale and outside of Yale. I will discuss them separately here. Regardless of the venue, when you are presenting to an audience that includes researchers or members of the public outside our lab, you are representing yourself and the Perry lab to that audience. Please discuss with me before you submit an abstract for presentation at an external meeting so that we can work together to ensure that you have an exciting story but are not sharing easily scoopable data. I will do whatever I can to help you prepare to put your best presentation (abstract, then poster or talk) out there. Please plan to send me your abstract, slides, or poster draft at least a week before it must be submitted so that we have a couple days for me to review it, and a couple days for you to make changes based on my feedback (and potentially a couple rounds of this).

Presentations outside the lab (and the Shulman lab) typically fall into the category of departmental and special interest group research in progress seminars, and national or international meetings. University events include Physiology Department research in progress (30 min talk annually, beginning in your third year [for PhD students], second year [for MD/PhD students], or at any time we agree upon [for postdocs]), Endocrine Section research in progress (45 min presentation, approx. once in your tenure with me), MD/PhD research in

progress (30 min presentation every 1-2 years), obesity and cancer interest group or cancer metabolism interest group seminars, which are inexplicably two different groups (60 min presentation, totally optional), YMSM research in progress talks (30 min presentation once during your time with me) and poster presentations at the annual Physiology Department retreat. I organize the Endocrine Section's RIP, so it is very likely you'll be invited and requested to do this at some point! These can be very useful events as they allow you to present to PIs who are not me or Jerry and get feedback from that audience (broader interest group). They also take a lot of time. We will work together to decide on the number of these talks you will give. It is very important to me to balance meeting (and exceeding) your training requirements and desires, and protecting your time not only for your research, but also for your outside interests and family commitments.

External presentations include oral and poster presentations at national and international meetings. I aim to send each trainee to one meeting per year to present an abstract. This means that students typically begin to attend meetings often in their second or third year in the lab, when there is not a global pandemic. It is a real honor to be selected to give a presentation at a meeting and we will definitely schedule practice talks/poster presentations so that you are as comfortable as possible before presenting. Even when presenting a poster, it is important that you have prepared a 5-6 minute spiel on your results, typically following the format 1 sentence background → research question/hypothesis → methods and results, intermingled (e.g. we used X technique and found Y), during which time you point to the graphs on your poster that show the results you're describing → conclusions → 1 sentence implications. We will look into whether we can obtain departmental funding for your attendance, but if not, I will cover the costs. Meetings that lab members often attend include those of the:

- American Diabetes Association
- American Association for Cancer Research
- American Physiological Society (including the Experimental Biology meeting)
- American Society for Clinical Oncology
- Keystone

However, if you see a meeting that you are interested in attending, please let me know and I will do what I can to make it happen!

Work Schedules

I do not enforce a specific work schedule. One of the great benefits of academia is that we can work in lab (and some out of lab) on a schedule that works for us, and I have no interest in enforcing a 7 day work week for our lab. As mentioned before ("Communication"), I email at odd hours, but there is no expectation that you do the same. Some work better in the morning, some later in the day, and I encourage you to follow the schedule that works best for you.

Because of the realities of science and the demands of academic research, this means that some weeks you'll be working less than 40 weeks, some weeks perhaps substantially more. It is important that there be some time that you overlap with other lab members in lab (for those physically in New Haven, of course) so that we can all periodically touch base informally, but it does not have to be a traditional M-F 8-5 schedule.

I encourage lab members to take vacation. In addition to the last week in December, when the university is closed, Yale graduate school policy is to take 2 weeks vacation, and I encourage this (2-3 is fine with me). With the understanding that all vacation requests will be approved except in very unusual circumstances and this is a formality, please coordinate with your labmates and let me know 3-4 weeks in advance if you plan to take more than one day off. It is very important to coordinate coverage during all of our absences, and I will help with that, but I need to know in advance.

Short-term absences due to illness, family responsibilities, religious holidays, snowstorms, etc. are not subject to this policy and coordination beforehand is not required. Please do let me know if you are staying home on a day that you typically work so that I can ensure that issues that arise with your animals, etc, are taken care of, but I will not be keeping track of these and strongly encourage you to stay home when you are unwell or the issues mentioned previously arise.

Attendance at departmental seminars is strongly encouraged (particularly if the speaker is invited by me). Physiology Department seminars typically occur on Thursdays at 4pm, Endocrine Section seminars on Fridays at 1pm, and YMSM seminars (which I organize) on Tuesdays at 11 am.

Collaborations

There are times that other PIs at Yale or externally approach us wanting to collaborate. This is overall a good thing, as it exposes all of us to a new topic, creates contacts in the field, and potentially puts ourselves out there in talks/publications that we wouldn't otherwise have had the opportunity to be involved with. Often collaborators who approach us to help them with one project may also be willing to help us on another project for which we ask them for help. The down side, of course, is that some collaborations take a lot of time and often (but not always; specific examples provided upon request) they can't result in a first author paper for Perry lab trainees.

Typically the way collaborations come about is that another PI approaches me and we have a 1:1 meeting (by Zoom these days), after which I confirm in writing with them that if we do the study and the data are published, that the Perry lab member who leads the studies is included as an author, then I discuss with the trainee(s) I think may be most appropriate to complete the study, and circle back to the PI and trainee in his/her lab to plan the details. Collaborations are a part of life at all stages (including as a PI, and I do do benchwork for collaborative studies), but I

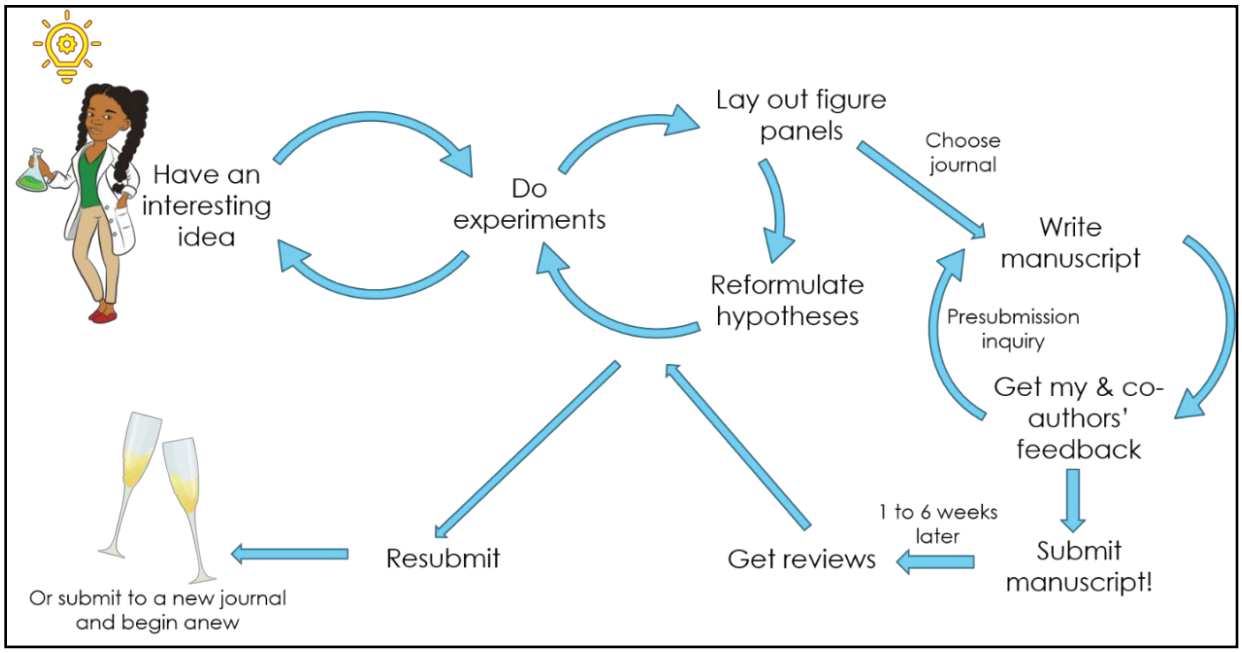
don't plan to hand down collaborative studies without discussion. If you are concerned that your plate is getting too full, please tell me and we will discuss whether or not adding a collaboration makes sense. If you are approached by a potential collaborator, that is great! Please just discuss with me before proceeding.

Scientific Writing and Publications

Ultimately we cannot make a contribution in science without adequately communicating our results to the public. In addition, papers and grants are the currency of science – so it is to everyone's benefit to maximize the impact and the number of papers we publish, provided they're comprised of rigorously performed and reproducible research.

Writing your first (or even your tenth) research paper can be intimidating, and that's okay! One of my goals is that each lab member become more and more comfortable with scientific writing during your tenure in the lab, through my and other lab members' feedback and simply through practice. In addition, you may want to consult what I believe is an excellent book on the process of scientific writing, *Essentials of Writing Biomedical Research Papers* by Mimi Ziegler. I have a copy in my office which you are welcome to borrow.

The process of writing a scientific paper is iterative. Nobody sits down and hammers out an entire paper in a day. Typically the process goes something like what is shown in this figure:



I recommend laying out figures for upcoming papers as soon as the manuscript has a direction. You don't need all the experiments done to know what the story is, and once you lay out the figures, you often identify additional experiments that need to be done, which can be worked

into the rest of the data analysis as you're finishing up. Of course, we can't be wedded to our initial hypotheses; often they are proven wrong!

The process of choosing a journal is often challenging. The first question is whether we aim to target a general interest high-impact (Cell, Nature, Science, JCI, PNAS, Nature Medicine), a field-specific journal (Cell Metabolism, Nature Metabolism, Cancer Research, Cancer Discovery, Cancer & Metabolism), or a general interest but lower-impact journal (FASEB Journal, JBC, AJP, PlOS One). Generally speaking, the distinction between a field-specific and a lower-impact general interest journal is based on the depth vs breadth of the story. A deep examination of a single process is best suited for a field-specific journal, whereas a broader but less deep story is better for a lower-impact general interest journal. We will discuss the likely target of the story before you begin writing, because there are formatting requirements that are journal-specific. While the most important question when choosing a journal is where is the best home for the manuscript, I also need to consider whether our lab also has other papers under consideration at that journal, because it is never a good idea to have multiple papers from the same group at the same journal at the same time (I have never heard of a situation where this didn't cause at least one to receive a "desk rejection" (i.e. a rejection without review).

Authorship

We have an inclusive authorship policy in the Perry lab. If someone generates data or makes it possible to generate data (e.g. bleeding mice for numerous ITT/GTTs or clamps) that is included in the publication, and/or makes substantial intellectual input (e.g. they designed an experiment that did not provide the expected result and therefore is not included, but they provided feedback/interpretations of data at multiple stages), they are offered authorship. This is true regardless of whether they are undergraduate or graduate student, postdoc, technician, or a trainee from another lab.

One tool that can be used, but is not required, to help determine the order of authorship is the ICMJE authorship tool. I have tweaked it for our lab (as it does not appear to have been written initially for biomedical research settings); please feel free to ask me for the latest version if it would be useful. This can be used to help think about relative contributions and inform the final discussion with me about authorship (if it's not 100% crystal clear, which many times it is). The order of authorship may change as a manuscript goes through the revision (and sometimes resubmission) process. I will have a discussion with trainees about project leadership when projects commence and when we begin writing papers, but authorship order is not final until the paper is published. If a trainee graduates/leaves the lab and there are still substantial experiments remaining upon resubmission of a paper, it is possible that they may not retain sole first authorship.

Money

Unfortunately, we cannot do science without money. When welcoming a new graduate student to my lab, I am cognizant of the costs associated and will not invite a new lab member to join us without decent confidence that he/she (and his/her work) will be supported with no trouble throughout the trainee's tenure with us. That said, I strongly encourage everyone to write grants. This is in part to reduce strain on the lab's finances, but even greater considerations are that 1) it is a great chance to practice grant writing, a skill that is very important if one decides to go into academia or industry, without the pressure that you will have once you are an independent scientist and expected/required to fund your lab (Yale will not allow a graduate student to go without salary/benefits because the PI runs out of money), and 2) it's a really strong line on your CV to be the PI of your own fellowship. This is more difficult for those who are not U.S. citizens and are therefore ineligible for NIH grants, but (when not in a financially strapped year with a pandemic), ADA, AHA, JDRF, and other foundation awards are sometimes – but not always – open to those who are not American citizens.

If you are writing a great, please discuss your aims with me 6-8 weeks in advance. This sounds like far longer ahead than is necessary, but it's because we will want to spend several weeks on just your aims page. Poorly thought out aims can tank a whole grant, regardless of how good the research strategy is. For the time being, we will also need to find you a co-mentor for your training grants, because I am a junior PI. This will change as time goes on, and we can spin it as a positive thing: you'll receive hands-on training from me, and senior mentorship from the other co-mentor. We will discuss your co-mentor 6-8 weeks in advance as well, and make sure to clear it with him/her from the get-go.

Keep in mind that your grant will be reviewed by and need to be submitted by the Grants & Contracts office before submission. Our preaward manager is Shilpa Shukla (Shilpa.shukla@yale.edu), and the person who handles the grants for graduate students in C&M Physiology is Ashley Marro (Ashley.marro@yale.edu). A month before submission, please email Shilpa or Ashley with the title of your grant to get it on her radar, and when you have all the materials pulled together, you can send Shilpa or Ashley for submission (at least 5 working days before the grant deadline). The exception to this is for MD/PhD students, for whom F30s are submitted through the MD/PhD office; however, Ashley can serve as an additional resource to answer questions you may have.

A great resource to obtain additional support to further the career of those eligible is the NIH diversity supplement. These are reviewed administratively, but scientific novelty is not required. NIH intends these as a means to provide candidates additional training that will position themselves as a strong candidate for future NIH funding (F, K, R, etc). If you are interested, we will discuss, and write it together. Here is a link to the guidelines, including eligibility, for diversity supplements at NCI: ds-guidelines.pdf (cancer.gov).

Animal Work

The majority of our research in the Perry lab is done in *in vivo* models (mice and rats). Working with animals is a privilege, not a right. In order to be allowed to work with rodents, I submitted a lengthy (>100 pages) animal protocol, which went through 5 rounds of revision, and was finally approved in late 2019. Every three years, we will need to renew our protocol, update our approved experiments, and re-justify our use of animals. If we have animal care and compliance blemishes on our record, this makes it much harder to get re-approved. Even a single egregious incident of lack of care for a rodent could cause us to no longer have approval to work with animals. Therefore, it is critically important to follow all approved policies and procedures.

Further information on animal work is redacted from the public lab manual, but will be provided to anyone who rotates in or joins the Perry lab.

Animal Protocol Amendments

The general structure of animal protocol amendments is as follows. (Please see Appendix A for a detailed list of the information I ask you to provide me before submitting an amendment.) We need to provide a paragraph describing what we will do, followed by a sequential description of elements of the protocol, drawing each from a dropdown menu. There is now a form in our shared lab Box folder that contains the information required for an amendment; please fill it out and send to Rachel. An example appears in the *in vivo* lab manual, but has been redacted from the public version of the manual.

Radioisotopes

We use radioisotopes for a small subset of our studies. They can be a useful tool to assess uptake of substrates or flux through a metabolic pathway, although with less specificity than stable isotopes because they do not allow differentiation between metabolites for analysis (i.e. we measure disintegrations per minute after treatment with a radioisotope tracer, but we don't know what metabolites account for those counts). Like animal work, radioisotope tracer work is covered under a separate protocol that I applied for and had approved, but it can be revoked. The process of a radioisotope experiment is as follows:

1. I order radioisotope tracer and let lab members know when it is expected to arrive. Someone must be present when it arrives (I will ensure this) and must do swipe tests on several components of the order:
    a. Outside cardboard shipping box
    b. Inside shipping box
    c. Outside plastic container surrounding vial
    d. Inside plastic container surrounding vial
    e. Outside vial
2. Once those swipe tests come back without contamination, put the tracer away in the radioisotope fridge in the mouse bay and the log sheet that comes with the tracer in the radioisotope binder. Be sure to note the vial number on the log sheet.
3. When you obtain radioisotope from the stock vial, be sure to log what you take. Empty containers can be tossed in the dry waste bin (be sure the volume is marked down to zero on the log sheet and move it to the "used vials" tab in the radioisotope binder.
4. When doing a radioisotope experiment, be sure to cover surfaces with bench paper at all times and double glove so you can easily change your outer gloves as needed. As always while doing experiments, a lab coat is also required.
5. The number and species of radioactive carcasses should be written on the outside of the carcass bag (e.g. "3M") and on the log sheet on the carcass freezer. Radioactive carcasses are stored in a plastic storage container in the carcass freezer, separate from the other carcasses. An EHS pickup must be scheduled (currently, Stephan is responsible for this) to take away the radioactive carcasses, in contrast to the non-radioactive carcasses which can be dropped off in any of the YARC freezers at any time.
6. At the conclusion of the experiment, clean with 70% EtOH/water and perform swipe tests on all surfaces used, as well as the floor, infusion pumps if appropriate, and the experimenters' lab coats and shoes.
7. If there is a spill, block the area off using radioactive tape and clean immediately. Then call the radioisotope office (David Dicks, safety advisor: 203-737-5671 if during normal business hours; if outside of normal business hours, call the emergency number: 203-785-3555) for advice on the next steps. They may send someone to decontaminate. Do not worry about calling this number; they are there to help us. If there are repeated issues, that might eventually become a concern to them, but do not let this concern stop you in the moment. The most important thing is containing the spill and making sure everyone stays safe.

The isotopes we currently have approved are ^{3}H and ^{14}C glucose and insulin for *in vivo* and *in vitro* studies. If you plan to use a new radioisotope, that is great! Just fill out the radioisotope protocol modification form (Appendix B) and send to Rachel. Please give this 6 weeks lead time: the radioisotope approval committee meets monthly, so it can take up to 4 weeks to get the amendment approved, and 1-2 weeks after the amendment is approved to order the isotope.

Controlled Substances

Controlled substances are used in certain circumstances for euthanasia and for analgesia. More specifically, during flux experiments we euthanize mice with IV Euthasol, and after catheterization surgeries where the IP cavity is opened up (for instance, to catheterize the renal artery or the portal vein), we give buprenorphine (a narcotic) and carprofen (an NSAID). Due to the risk of addiction, controlled substances are carefully managed by the state's Drug Enforcement Agency (DEA). Controlled substances are kept in a locked drawer in the lab. Per DEA requirements, the PI and one lab member (currently, Brooks) may have a key to that drawer; please coordinate with me or Brooks in advance if you will be needing controlled substances for your experiments. Euthasol is diluted 1:5 in saline; 50 ul are injected IV for euthanasia in mice, 300 ul in rats. It is critically important to log use of controlled substances. If there is a spill, call our controlled substance advisor Linda Mouning: 203-737-2121 (landline) or 203-410-5415 (cell) to report it. As with radioisotopes, they don't want to see this happening repeatedly, but it does happen and we will not get in trouble for 1-2 instances.

Safety

We must never let our desire to get an experiment done compromise our ability to adhere to all safety guidelines. I expect all lab members to follow to all safety guidelines, both for general lab and chemical safety. Make sure you personally understand the risks inherent in the research you do as well as the appropriate measures to mitigate those risks. Talk to me and/or other lab members (and/or your doctor) if you have any questions. Anyone with special safety requirements, e.g. due to disability, allergy, or pregnancy, please talk to me to make sure that arrangements are in place to accommodate your needs. I will keep personal health information revealed to me confidential unless your safety is at risk. Safety violations may result in re-training requirements or suspensions from lab work.

Per university requirements, open-toed shoes and bare legs are not allowed in the lab. Pets are not allowed in the lab, nor are children under age 16 (and if age 16-18, parental permission must be given in writing). No food is allowed in the lab. I have a fridge in my office and there is one in the Physiology Department break room; feel free to use those to store items. During COVID, there are additional safety requirements for social distancing and mask wearing; it is imperative that you adhere to these as well.

In the event of an accident, first, take care of yourself/your lab-mate. There is an eye wash station located right outside our lab, just outside the door to the Caplan lab nearest us, as well as what I think may be an eye wash instrument at our middle sink, although I admit I am unsure of how to use it. A first aid kit is kept in the drawer of the desk in the mouse bay. If any supplies in the first aid kit are running low (Bandaids are usually the first to go), let me know and I will reorder.

If you have an acute work injury, go to urgent care at Yale Health (if you are a Yale Health member) or the YNHH emergency room (if you have other health insurance). You can also call Occupational Health (203-785-6434) to assess your options and receive advice on the appropriate next steps (e.g. if you are unsure whether you should go to an emergency appointment). If you go to Yale Health, tell them that you are there because of a work injury and you should not receive a bill. If you go to the emergency room, you may receive a bill, but in both cases do not pay it. Worker's compensation will cover this. When time permits, please inform me about the issue and I will help initiate the process of filling out a worker's compensation/work injury form. There are certain parts of this form that only the employee who suffered the injury can complete, but I will do as much as I can to reduce what is on your to-do list.

As a person with very tightly controlled (insulin-dependent) type 1 diabetes, it is always possible that I might have an acute hypoglycemic event (low blood sugar). This could result in me becoming confused (often repeating the same thing that doesn't make much sense over and over or even having difficulty walking, swaying back and forth). This is not your responsibility or your job to fix. However, if you feel comfortable, suggesting that I eat something or consume a tube or two of glucose gel (on the desk in the mouse bay) helps. (Honestly, this is far more likely to help in an efficient way than calling an ambulance.) However, let me reiterate that this is not your responsibility and hopefully we will never encounter this issue in the lab!

Conclusion

This handbook is intended to be a dynamic document; if you see something missing or think something could be explained more completely, tell me! As with everything else in the Perry lab, we will hone this and improve it together. It is the greatest joy and privilege of my professional life to have the opportunity to work with and steer this ship with you, and I remain committed to doing whatever I can to make sure we can do the best science we can together, while setting you up to reach your goals.

Appendix A: IACUC Protocol Modification Details

Please provide me the information described in this appendix: that found in the section just below that is needed for all modifications, as well as the information under the category of amendment you need. If you have any questions about the information needed, don't hesitate to ask me!

The following information is required for all protocol modifications.

1. Species
2. Paragraph describing what will be done and why (scientific justification)
3. Each step of the protocol, including drugs and procedures that will be used at each stage (see example on page 22)
4. Expected or even possible adverse effects
5. Numbers of animals planned
6. Pain class. Breeding is class B, GTT/ITT/bleeds/injections are class C, surgery is class D, tumor studies/hypoglycemia/forced exercise are class E. If pain class E procedures or death as an endpoint studies are proposed, the explanation of the **justification** and **benefit** of the studies (i.e. in knowledge gained), as well as **why analgesics cannot be used** must be extensive.

Adding a new drug (non-hazardous)

1. Species in which it will be used (mice and rats need to be input separately)
2. Drug
3. Whether or not pharmaceutical grade drug will be used; if not, we will need to justify (which is fine, we do it all the time)
4. Dose (mg/kg or similar unit)
5. Administration method (IP, IV, gavage, mixed into food or water, etc)
6. Possible adverse effects (yes, we need to put this into the drug information and separately into the experimental protocol)

Adding a new drug (hazardous, including radioisotope)

If there's any question about whether a drug is hazardous, please consult our Safety Advisor, David Dicks (david.dicks@yale.edu).

1. Species
2. Drug
3. Dose (uCi/animal for radioactivity, mg/kg or similar unit for everything else)
4. Half-life (an estimate must be provided – please look it up online and provide citation)

5. Route of excretion (urine, feces, other; often it's impossible to find and "unknown" is ok)
6. Percent excreted (this is often hard to find; default is 100% and we can write in that we're unsure)
7. Administration method (IP, IV, gavage, mixed into food or water, etc)
8. Possible adverse effects

Tumor studies

1. Tumor type: solid vs. disseminated
2. Palpable (e.g. subcutaneously injected) vs. non-palpable (e.g. colon cancer that arises spontaneously because of a genetic mutation in the colon)
3. Is the tumor implanted (i.e. injected) or induced?
4. Known biology of the tumor including expected onset, nature of clinical signs, and expected adverse effects.
5. Does the tumor metastasize? If so, where? (Include adverse effects at metastatic site; for instance, if a tumor is known to metastasize to the lung, include that the mouse could have difficulty getting adequate oxygenation.)
6. What is the expected growth rate of the tumor (i.e. doubling time)? You can find this by looking up models in which tumor growth curves are shown.
7. Does the tumor ulcerate? Is cachexia expected?
8. Provide the scientific justification with tumor burden limited to the minimum required for a valid scientific outcome (note that 1 cm^3 is the size allowed without special justification, but we push it to 2 cm^3 with justification: "In order to obtain sufficient tumor volume for the metabolic studies proposed, tumor size will need to reach 2 cm^3. (Otherwise, if 1 cm^3 were the size limit, twice as many mice would be needed.)")
9. Cell number injected
10. Route and site of injection (e.g. subcutaneous injection, left chest)
11. Monitoring plan. This is our typical monitoring plan (note that monitoring at least twice weekly is always required); if you plan to deviate from this, you can with justification

Parameter	Monitoring Frequency	Experimental Endpoints
Tumor volume	2x/week	Tumor volume >2cm^3
Weight changes	2x/week	Loss of >10% body weight in 1 wk
Ulceration	2x/week	Any ulceration

Behavioral studies

1. Pain category (again, we need to put the pain category of the procedure here and the pain category of the whole experiment in the experimental block)
2. Details of study, frequency, and duration of monitoring sessions
3. Size of monitoring device (if relevant)
4. SOP for cleaning the monitoring device each day or between animals
5. Intra-procedural monitoring plan

New deviation from standard care (housing density, food, water, fasting)

1. One-sentence description of deviation
2. Animal room(s) where this will be performed
3. Two contacts (name and phone number) – yourself and one other lab member

Appendix B: Radioisotope Protocol Modification Details

An amendment must be submitted every time your planned experiment does not fall under all of the following categories:

1. Model: *in vivo* in mice or *in vitro* in cell culture
    a. Single bolus or continuous infusion for up to 2 hours
2. Tracer: ^{14}C or ^{3}H glucose or fatty acid
    a. We do not state the max duration of incubation
3. Radioactive animals are kept in restrainers, not cages
4. Waste is discarded down the sink, with copious water run after it. Radiac Wash is used to wash restrainers and benches after experiments.

If you wish to perform a procedure outside of these confines, that is fine! We just need a few sentences describing the new procedure, as well as the expected usage in uCi per week, month, year, and in 3 years (and the numbers need to balance out). Radioisotope protocol amendments are far easier than IACUC amendments (remember, though, that if the modification is for a new radioisotope tracer to be used in *in vivo* studies, we need to submit both an IACUC amendment and an EHS radioactive materials amendment.

Appendix C: Helpful People and Places

Below is a table of helpful people's names and email addresses. If you think of anyone else who should be on the list, please let me know and we'll add them!

Way(s) They Can Help	Who?	Email Address (Phone #)
Animal ordering	I will place orders, but for questions: Valerie Manzari	Animal.order@yale.edu
TAC LL67 (rat room) room tech	Meghan Heafy	Meghan.heafy@yale.edu (203-500-0231)
TAC LL12 (mouse room – long term housing, breeding) room tech	Dyan Rizzo	Dyan.rizzo@yale.edu (203-217-9777)
Rodent surgeon	Wanling Zhu	Wanling.zhu@yale.edu (203-645-6610)
Mouse breeding colony management	Tom Nuzzo	Rodent.services@yale.edu
Printing special instructions stickers	YARC Operations	Yarc.operations@yale.edu
ID access to YARC space	Regulatory Services	Regulatory.services@yale.edu
IACUC protocol	Shri Balakrishna, PhD	Shrilatha.balakrishna@yale.edu
IACUC compliance questions	Brandon Dorry	Brandon.dorry@yale.edu
IACUC certification (e.g. gavage)	Layne Ochman	Layne.ochman@yale.edu
Mice in quarantine	Kirk Donegan and Penni Rose	qstaff@yale.edu
Rodent health concerns that you wish to escalate	Peter Smith, DVM or Jim Macy, DVM	Peter.smith@yale.edu James.macy@yale.edu
Mouse relocation	Place request online, for follow-up: Patty Cirillo	Patricia.cirillo@yale.edu
Animal charges and IACUC protocol access	Erin Bailie	Erin.bailie@yale.edu
Research histology core	Amos Brooks	Amos.brooks@yale.edu (203-785-5879)
Yale Cancer Center irradiator	Ravinder Nath	Ravinder.nath@yale.edu
ID access, questions about Physiology Dept resources	Joe DePonte	Joseph.deponte@yale.edu
Physiology Dept technology/ network, access to Skedda scheduling system, random questions	Duncan Wong	Duncan.wong@yale.edu
Physiology Dept microscopy core	SueAnn Mentone	Sueann.mentone@yale.edu (N.B. she works part-time)

Orders	Marie Suppa	Marie.suppa@yale.edu
Grants prior to submission	Uma Raman	Uma.raman@yale.edu
Grants after they've been funded	Dave Wanciak	David.wanciak@yale.edu

Below is a table showing where key resources are located.

What?	**Where?**
Mouse surgery	LSOG S33
Housing of mice before/after mouse surgery	LSOG S23
Mouse metabolic cages	LSOG S23A
Housing of mice not undergoing surgery (including breeding)	TAC LL12
Rat surgery	TAC LL50
Housing of rats before/after surgery	TAC LL67
Non-radioactive carcasses	Freezers in TAC or LSOG YARC space
Ice	SHM BE35
Biohazard bins	SHM BE35
Dry ice	SHM B102
Liquid nitrogen	SHM B108
Cold room: short-term, small volume	Across from our lab
Cold room: long-term, large volume	SHM BE20
My office (you're welcome to use for lunch, fridge)	SHM BE36B
Research histology core	CB-568
Mice after arrival from a commercial source, prior to housing in LSOG	LSOG sub-basement hall
Mice after import from another institution	SEAMCO