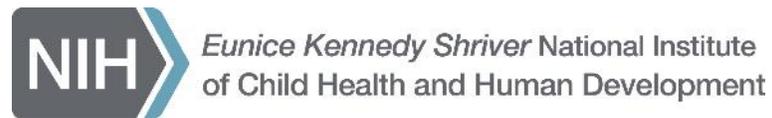


# How to Establish a Successful, Safe, and Ethical Research Team

Todd Macfarlan, Ph.D.  
Senior Investigator NICHD



# Step 1: Hiring Your Team

- Hiring the right people is probably the most important decision you will make
- How do you achieve this?



# Step 1: Hiring Your Team (continued)

- Make some decisions about the makeup of your lab
- Do you want a specific makeup of the lab?
  - Technicians
  - Students
  - Postdocs
- Or do you want the applicants/talent to drive the makeup?
- Learn what resources are available to you at your institution
  - Is there a free platform for advertising positions?
  - Are there Grad student meet and greets? Or PI talks/chalk talks?
- NETWORK.....NETWORK....NETWORK
  - Scope out candidates at conferences
  - Reach out to colleagues and collaborators
  - Directly contact candidates



# “Who will do the experiments?”

- You will have at least one excellent postdoc in your new lab – yourself. Make sure you give yourself time to do enough experiments to move your program forward.
- Don't rush to hire. It is essential that your trainees have the talents and experience needed to succeed in your lab. If they don't, you are creating a big mess by hiring them.
- Be realistic. As a brand new investigator, many applicants will be rightfully cautious about joining your lab. But you also have some real advantages to promote. For example, you can be very attractive to a recruit who wants a lot of hands on training.
- Maintain a situation where both you and your trainee can succeed.



# Step 1: Hiring Your Team (continued)

How do you know whether somebody will be productive in your lab?

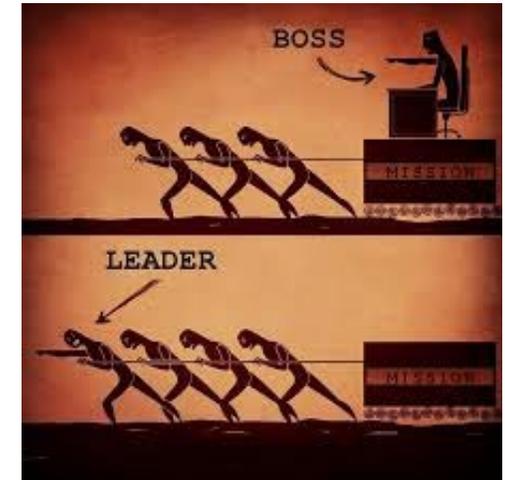
- Look for evidence of past productivity
  - Previous relevant work experience?
  - Did they publish a paper?
- Ask for references...and call the referees!
- Schedule an interview (and if possible a trial period, like a rotation)
- Are they capable of working independently?
- Will they be collaborative?
- Are they naturally curious?
  - My favorite question to ask on an interview is “What have you read lately?”



# Step 2: Getting Your Team to Execute Your Vision

## Set Expectations

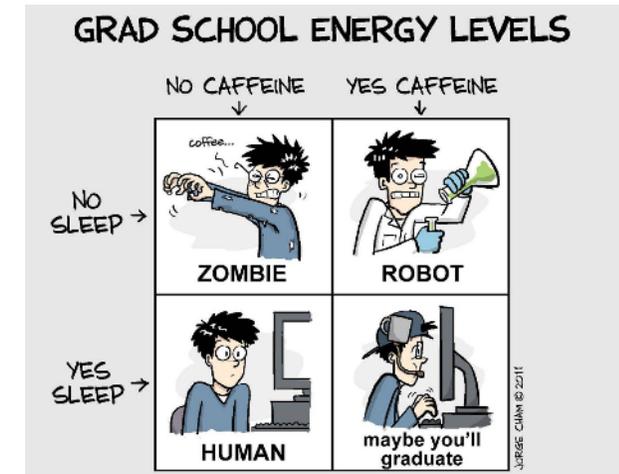
- Provide a welcome letter with expectations written clearly out
  - I shoot for high/realistic expectations
  - Time spent in the lab
  - Attendance at specific meetings
  - Keeping lab notebook
  - Organization
  - Regular written reports
  - How will authorship be decided
- Lead by Example
- Encourage people to share their triumphs and their failures (mistakes) regularly
  - We have a wall of shame of western blots
  - This creates a “medium” pressure environment
  - In my experience, happy fellows are more productive and less destructive



# Step 2: Getting Your Team to Execute Your Vision (continued)

Ensure expectations are being met

- Establish and hold regular lab meetings
  - Encourage critical constructive feedback of colleagues
  - Think about the right format for your group
- Establish regular 1:1 meetings and allow for many informal interactions
  - Strive for low intensity, highly focused interactions
- Assimilate into existing interest groups/larger group meetings
- Establish or join journal clubs
  - Encourage your team to submit papers for consideration
  - Encourage them to send you interesting papers they've found



# Step 3: Avoid Common Hurdles that May Get in Your Way

## Personnel Hurdles

- Make sure more senior people have distinct projects (even if they overlap)
- For collaborative projects, discuss authorship early and often.
- If you spot issues, don't let them fester. Tell people if they are not meeting expectations and why.
- Consult colleagues and even Ombudsman if necessary



# Step 3: Avoid Common Hurdles that May Get in Your Way (continued)

## Administrative Hurdles

- Try to pick and choose your administrative duties where possible, so you can focus on the research
- Learn how to say no to things that will take too much time and provide little benefit



# Step 4: Raise Your Profile

- You cannot wait around for people to recognize your team's achievements (you might have to wait a long time 😊)
- Be proactive to get recognized
- Get invited to meetings (I contact meeting organizers a year in advance)
- Get to know your competitors and make them frenemies
- Get to know all the PIs in your field (even the biggest egos usually make time to discuss science)
  - Send notes after they publish a paper you admire and look for common interests
  - Introduce yourself at meetings
  - Set up SKYPE calls to discuss common interests
  - Set up collaborations (but do so carefully)
- Work with your supervisors to “self nominate” for awards
- Encourage your team to network as well





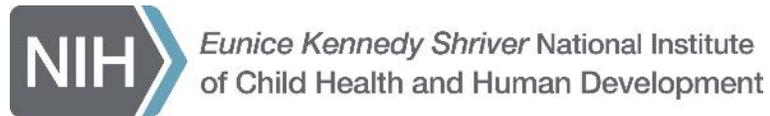
# Setting up a Safe Lab

# Quality Science Done Safely: Hazard Awareness is Key

Niamh X. Cawley, Ph.D.

Staff Scientist, Section on Molecular Dysmorphology, NICHD

Chair, NICHD Safety Committee



# The Nature of the Danger

- Physical
- Chemical
- Biological



# Physical

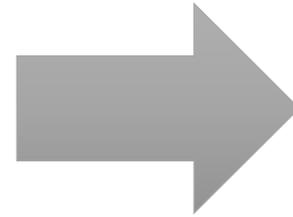
- Fire
- Pressure
- Electrical



# An Old, Forgotten Gas Cylinder Explodes



# Compressed Gas Cylinders are Potential Torpedoes



# Physical Take Home

- Understand the equipment you use
- Have them serviced regularly by experts
- Train yourself and your personnel on their use
- Do a hazard analysis



# Chemical

- Fire
- Burns
- Fumes



# Intact Flammable Cabinet after the Fire



# Protect Yourself from Accidental Spills in the Lab

## Don't Wear

- Flip-flops or sandals
- Shorts or skirts

## Do Wear

- Lab coat
- Gloves and close-toed shoes



**NOT COMFORTABLE ANYMORE**

From NICHD Health and Safety Committee



# Chemical Take Home

- Understand the material you use
- Store and dispose of the chemicals properly
- Wear the appropriate PPE
- Do a hazard analysis



# Biological

- Disease
- Illness



# NICHD Safety Awareness

Working with human blood, fluids or tissues?

- How about getting the Hepatitis B vaccine?
- **IT'S FREE!**



# NICHD Safety Awareness (continued)

Recapping needles by hand?

- It happens and so do injuries.
- Don't do it; **use the sharps container.**



Think Safety

NICHD Health and Safety Committee



# Biological Take Home

- Understand the material you use: Biosafety level
- Register your material where appropriate
- Wear the appropriate PPE
- Do a hazard analysis



# Summary

- You are responsible
- Ensure your personnel are properly trained
- Wear a lab coat
- Become aware of the hazards in the lab
- Be proactive
- Use your safety department
- Do a **HAZARD ANALYSIS**



# Lab Research and Model Organisms

NICHD Clinician Scientist Investigator Meeting

Karl Pfeifer



*Eunice Kennedy Shriver* National Institute  
of Child Health and Human Development

# Vertebrate Animals

## Step 1: What Kind of Facilities are Available?

- Find a colleague knowledgeable about the animal facilities and your kind of research.
- What kinds of experiments will you routinely perform with live animals and who will do them?
  - Husbandry (this may be key in who you first hire).
  - Behavioral tests
  - ECGs
  - Advanced imaging
  - Surgery
  - Keep in mind that it is common that animals cannot move freely between facilities
  - or between holding rooms and laboratory spaces outside the facility.



## Step 2: Meet the Animal Program Staff

- Someone in charge of administration/space allocation.
- Someone in charge of veterinary care. This person might be a great asset to your research. They may be interested and enthusiastic about participating in some aspects – hopefully you can get help with weaning, ear tags, and and tail biopsies. But maybe they can also help with blood draws, surgeries, etc.
- IACUC chair



# Step 3: Prepare your Animal Study Proposal (ASP)

- All PHS sponsored research must be evaluated by two separate groups
  - Scientific Peers must evaluate the scientific merits and incidentally review animal welfare (Is this the right species? Are the numbers appropriate? Are there alternative methods?)
  - Animal care and use committee must evaluate care and use of animals with incidental review of scientific merit (Is this the right species? Are the numbers appropriate? Are there less invasive methods? Does the ASP describe an important goal? Is the research repetitive?)



# Justification for Scientific Merit in ASP

- There will be a short section where you describe the value of your research to medicine and/or basic knowledge. This is one of two sections of the ASP that will likely be read by general public (animal rights activists, science activists, congressional staff)
- Make this section clear and concise and NON-TECHNICAL.



# Sample Justification

- In humans, mutations in the CASQ2 gene cause cardiac arrhythmia. Even the best available treatment protocols do not work for a significant fraction of patients. Thus many children live very restricted lives with a constant risk of sudden death. We have made a mouse model for this disease. Using this model, we will identify exactly which cell types in the heart are relevant to the disease phenotype. We will also identify the impact of development and aging on disease progression. With this information, we will work with clinicians to develop novel therapies.



# Besides This Brief Summary of Scientific Merit, What Goes into an ASP?

- An ASP is not primarily a description of a scientific research plan. (Only about 50% of IACUC members are scientists).
- Rather it is primarily a description the how the research will affect animals
  - 2,000 animals will be generated by breeding
    - 1,000 will not be useful genotypes
    - 500 will be sacrificed for tissue biopsy
    - 200 will undergo a series of behavioral tests and will then be euthanized
    - 200 will be injected with tamoxifen and then analyzed by ECG and echocardiography, and then euthanized
    - 100 will undergo surgery to implant pacemakers\*\*



# **\*\*Specific Justifications are Required for Animals Undergoing Pain and/or Distress**

**These requirements are NOT intended to discourage important experiments.**

Look at the required justifications as an opportunity to reconsider the importance of the scientific question and for re-evaluating whether alternatives are available.



# Get Help Writing Your ASP – Word-for-Word Copying of an Approved Protocol can be an Excellent Idea

- Is there another investigator (with the same IACUC) who is doing similar research? Get their protocol – cut and paste.
- Ask the veterinarian for facility standard operating procedures (SOPs).



# Experimental and Humane Endpoints

- You must define when will your experiment will end.
- Your veterinary staff (or NIH Intramural guidelines) can help.

<https://oacu.oir.nih.gov/animal-research-advisory-committee-guidelines>



# Sex as a Biological Variable

- Your ASP must indicate that you will independently analyze male and female cohorts OR it must provide a justification.
- This requirement applies to primary cell lines.
- This requirement is part of NIH drive to maximize reproducibility.



# Keep Your Perspective

- Animal research review is intended to address concerns of many kinds of people.
- Successful animal research demonstrates that animals are often like humans



## **Step 4: Once the ASP is Approved, Follow It Closely; Amend as Needed and Do Not Do New Experiments until the Amendment Is Formally Approved**

- Most journals now require a statement that experiments on live animals were pre-approved by the the relevant IACUC. Make sure you can make this statement!



# The End

