Critical Transitions: Guidelines for a Career in Biomedical Science

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The critical choices that define your career: You’re not alone

- Mentors: College, thesis years, postdoc period
- The Boss: Theoretically, an automatic mentor
- Networks: Peers from all stages of training
- Colleagues: Scientists working in similar area
- NIH and other agencies: Peer review panels
- Professional Societies: Endo, Faseb, AACR
What are the key transitions? They are the critical choices that define your career

- College to PhD Program: Where? Which one?
- Didactic courses/rotations to thesis lab: Which one?
- Completion of PhD thesis work: What is enough?
- PhD to fellowship: Where? Which one? How long?
- Postdoc to independence: How will I know?
- Early faculty years: Develop a “name/topic” association
The critical choices that define your career: Predoc vs Postdoc Lab Choice

- The choice of a predoc thesis lab is critical
  - Training to become a rigorous, productive & fundable scientist is key
  - Seek out important questions and tractable model systems
  - Controls, controls and controls
  - Seek productive, demanding and supportive mentor with track record
  - It is not required for you to solve all of the questions in mentor’s lab

- But, choice of a postdoc lab will be career-defining
  - Most faculty work on science questions from postdoc, not grad school
  - Choose the most cutting-edge investigator in area of interest
  - Identify problems you can take with you to establish your own research
How to Optimize Your Thesis Years: Establish a Mentor/Student Compact

- Choose your Mentor carefully: S/he should be passionate, rigorous and a problem-solver, but should also teach/train you in all aspects of a science career.
- Choose PhD project carefully: It should be the best training project for you, not your life’s work.
- Take responsibility for and ownership of your Project: Read, analyze, think and engage, but be self-protective.
- Design many well-controlled experiments that address specific questions, plan for failure, be fearless of new methods, and keep meticulous records (back-up files).
- As soon as ~5 figs are replicated, write 1st draft of paper
- Outline thesis and start writing before formal approval.
Specific Questions Often Arising During the Thesis Years:

• How do I pursue an expt or scientific avenue that I’m convinced is the next best step, but that my PI feels is not?
• How do I convince my mentor that the “lab” method is not the only way, and that “kits” will save time?
• How do I resolve conflicts with other lab members (lab techs, other students and/or post-docs) that might arise?
• My boss has me working on a topic related to her/his company and I may be restricted from presenting any/all of the data. How do I deal with this and other conflicts of interest?
• My relationship with my mentor seems to be progressively getting worse as I progress to graduation and I’m worried s/he will not give me an appropriate letter of recommendation.
The Graduate School to Postdoc Transition

• Who determines when you are done with PhD?
  – 1st, the Student; 2nd the Mentor; 3rd, the Committee

• What determines when you are done with PhD?
  – A PhD is a substantive, scholarly and novel body of publish(ed)able work

• What impedes timely progression of thesis work?
  – Fear of new methods, experiments, writing, transition to independence; and poor choice of project &/or mentor
  – Comfortable with stipend, lab, location, friends & no career deadlines

• The goal is to finish ASAP with confidence in your training
  – PhD is training period, not indentured servitude to solve all questions
The Logistics and Impacts of Choosing a Postdoctoral Lab

- When do I apply? How do I choose a scientific area?
- Will I get a position in a top-tier lab in my interest area?
- Where do I apply for extramural support? Will I get funded? For how long? If not, can my PI support me?
- Will I get the “hot” project? Will I publish as 1st author? How many (Cell) papers can I get from this project?
- Now I belong to a lab, not a Program: I’m a lone-ranger!
- Can I take the problem and reagents with me?
Finding and Choosing a Postdoctoral Laboratory

• Most find postdoc mentors via personal contacts: current mentors, networks and scientific meetings
• Due diligence: “PubMed” potential mentors 5-10 years ago, and then “PubMed” those 1st authors now to see how they are doing to assess success
• Seek out a mentor with “scientific taste” that allows you to choose your own project and gives you independence
• Seek out a project that will expand your scientific expertise and pursue an area that you are willing to make your own
• Ask about terms of appointment, signed Compact, health benefits, leave policy, Institutional postdoctoral career opportunities (grant writing, career seminars & workshops)
Optimizing Your Postdoctoral Training Period

• Apply rules of success learned in PhD: Take ownership, be experimentally fearless, be creative, work hard, read, write, write

• Be self-reliant, pursue the most productive aspects of your project, be involved with several projects in the lab: write, write

• Establish intra- and inter-lab collaborations, be part of a multi-disciplinary team, learn how to publish with many co-authors

• Take advantage of all that the Program and Institution has to offer: Retreats, regional science super-groups, career workshops

• Communicate early and often with mentor regarding project and career goals: these often change during the course of training

• Be critical and realistic of your accomplishments and goals

• Don’t postpone a change in direction for the project or career
Switching Projects, Changing Labs and Career Goals

• Be critical and realistic of your accomplishments and goals: Discuss with mentors, peers and network
• Don’t postpone a change in direction for the project or career: The earlier the better and mentor should help
• If things still don’t work out, should you resign? Will you be asked to leave? Can you take the grant with you?
• When/why you should seek a second postdoc? Should you consider career alternatives? What are they?
• Few real teaching opportunities in research institutions
• How will these choices impact you and/or your family?
What are specific “hidden” issues in the postdoc period?

- **Equity and protection:** Explicit contract in offer letter; equity in salary & benefits for US and Non-US trainees; avoid “indentured” fee-for-service culture
- **Scientific/Mentor:** Authorship, conflicts of interest, project ownership, no committee for protection, University ombuds
- **Career guidance:** Variable efforts and levels of organization provided by institutions, programs and mentors
- **Key problem:** Postdoc classically defined as time of taking personal career responsibility, yet current expectations are that institutions take more responsibility
- **Oversight:** NIH is key task-master for grad programs, no such oversight for postdocs; Who is responsible? Why?
1. Institutions have established Postdoctoral Training Offices (PTO) that provide grant info, career guidance, protection and social/scientific networking opportunities

2. A single, key leadership faculty often is responsible for the activities of this office and the office often has $$$

3. All postdocs recruited should receive an explicit offer letter, including the AAMC Postdoctoral/Mentor Compact

4. All new postdocs should be required to register with the PTO and the PTO should track career outcomes

5. An orientation session should be provided to all new postdocs detailing benefits provided and PTO services

6. Seek out the PTO early and often, they are your Program
The Postdoc to Independence Transition

• Should you pursue academics, teaching, industry, Wall street?
  – Academics and/or teaching were main outputs, but now career paths are broader, including industry, writing, tech transfer, patents, Wall street, etc
  – Realistically assess personal strengths and pursue a career that fits best

• How will you know when you’re ready to become independent?
  – Publication “momentum” (pubs in solid journals), science topic/name association, identified “niche” and have realistic, creative ideas for funding

• What are the best approaches to land a job?
  – Start early: as soon as you feel the momentum and independence
  – Very carefully prepare 3-5-page document briefly detailing personal goals and strengths, past accomplishments and their significance, and the Background and Specific Aims for potential grant submission
  – Seek out personal and mentor contacts, network at meetings, answer ads
  – Accept all job interview offers, practice talk and interview skills, be patient
Hints for Successfully Establishing Your Own Lab

• Negotiate diligently for that which is critical to your success
• Be selective in recruiting techs and grad students
• Not best to start with postdocs, since you will have to give away best projects and compete with them
• Write your first R01 grant only when you have optimal data
• Focus, focus and focus: create name/topic association
• Establish disciplined schedule for writing papers
• Establish lab organization methods
• Use phone and email to stay in touch with colleagues
• Say no to most requests, until achieving tenure
How do I Choose Between Job Offers?

• Your immediate supervisor controls your fate- choose a trustworthy, selfless boss who cares about your future success
• Prioritize your needs: Is it salary, $$, space, equipment, parking, or season’s tickets?
• Seek out colleagues with whom you can collaborate
• Seek out school with momentum and increasing number of young recruits
• Ask about quality of graduate, undergraduate and medical students who might work in hour lab
• Do you need highly specialized, technical core facilities?
• Ask about local and regional funding mechanisms
• How does the community fit your family?
Obtaining Extramural Support as a New Investigator

• Don’t be pressured to write your first R01 application too soon
• But don’t be afraid to write local grants to get $$ and critical feedback
• Call NIH Program Directors and ask for advice
• Seek out NIH institutes with best pay line, and IRGs that have PI’s who will appreciate your science
• Write the first draft of your R01 ~ 6 months before and ask several colleagues to critically read it
  – It is not the amount of data, but the quality of data and of controls
  – The writing has to be very clear, to the point and emphasize significance
  – Craft the proposal extremely carefully (should be pleasing to the eye)
• Once written, submit to as many agencies as possible, some with less overlap so you can keep more grants
• Do not take rejections personally; learn for the critiques and re-apply
Negotiating The Early Faculty Years

- Seek-out senior faculty mentors inside & outside your Dept
- Know the promotion and tenure rules, review them yearly with the boss, and document agreements in writing
- Communicate and re-negotiate with the boss, based on current career trajectory - i.e., know what to expect
- Establish a collaborative network within your Institution
- Develop broader vision: write grants for large instruments, training, PPGs, Centers etc, that will advance your science
- Become more involved with the direction of the Institution, your Department and affiliated Graduate Programs
Career Resources

• Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty, 2005, HHMI

• See HHMI site for a variety of lab management tools: www.hhmi.org/resources/labmanagement/

• Enhancing the Postdoctoral Experience for Scientists and Engineers, NAS, 2000, see: www.nap.edu

• Bridges to Independence: Fostering the Independence of New investigators in Biomedical Research, NRC, 2005, see: www.nap.edu/catalog/11249.html

• AAMC Postdoc Compact 2007, see: www.aamc.org/research/postdoccompact/