

For Residents and Fellows: What to Look for in a Laboratory Research Mentor

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Published online: 26 September 2015
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Abstract Preparing for a laboratory or research-based career in academic medicine involves learning and acquiring a broad set of knowledge, skills, and experiences that facilitate the transition from trainee to faculty member. It also involves identifying and cultivating solid mentor/mentee relationships in the laboratory environment. It is well known that different skill sets and mentoring approaches are necessary for those pursuing laboratory-based research as compared with those needed for clinical practice and patient-oriented research. Here, we discuss several key approaches to help mentees identify fruitful mentor/mentee relationships.

Keywords Mentoring · Graduate medical education · Laboratory · Research-based career development

The Need for Mentorship

Preparing for a laboratory or research-based career in academic medicine involves learning and acquiring a broad set of

knowledge, skills, and experiences that facilitate the transition from trainee to faculty member. Success as a laboratory investigator requires the ability to perform many tasks outside the formal curriculum of residency or fellowship training programs. For example, in addition to the ability to write fundable research grants, write manuscripts, and design and interpret experiments, the laboratory investigator needs to be able to hire, terminate, and manage laboratory personnel, develop and oversee a laboratory budget, comply with numerous regulatory requirements and documentation (e.g., laboratory safety, biosafety, animal use, institutional review board), and assume responsibility for the performance of those working in the lab. For most physicians, these skills and knowledge are in addition to those necessary for excellent clinical care. Preparing trainees for this path requires experiential opportunities and guidance.

In the laboratory environment, the principal investigator provides guidance and mentoring for the design, conduct, and interpretation of experiments, dissemination of results, and the processes necessary to obtain funding to pursue this work. Different skill sets and mentoring approaches are necessary for those pursuing laboratory-based research as compared with those needed for clinical practice and patient-oriented research [1, 2]. The knowledge and skills to be learned by a medical trainee are numerous and varied and typically require a team of mentors who play a variety of roles in the mentee's development.

Selecting a Mentor

Characteristics of an effective mentor are complex (Table 1). As the mentee's needs change, the mentor needs to be aware of these changes and able to respond by modifying what they offer to the mentee. The mentor often must take on several

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Table 1 Characteristics of an effective mentor

Good listener	Good observer	Ethical	Adaptable
Problem solver	Advocate / Sponsor	Willing to share	Facilitates network building
Demonstrates an interest in you as a person	Willing to put your needs ahead of theirs	Responsive to your needs	Finds time to do all of this

different roles, including that as an adviser, supporter, role model, tutor, sponsor, and advocate [3, 4]. The mentor should be willing to share not only their technical expertise but also their wisdom and life experiences [3, 4].

To be effective, the mentor should be a good listener and a good observer in order to learn what the mentee has accomplished and what they still need. Effective mentorship is provided by someone who takes a special interest in the mentee and is motivated by the mentee's successful professional development [3, 4]. This may include the mentor making sacrifices for their own advancement on behalf of the mentee's advancement; examples might include the mentor relinquishing prime placement of authorship on manuscripts, passing speaking opportunities to the mentee, and nominating the mentee for extramural committees [5]. The mentor should also be a broadly effective problem solver.

It is unusual for one person to be able to provide all that is needed for the career development of a mentee. In this case, it is reasonable to identify others who can fulfill the role of mentor for those areas where they have expertise. The mentor-mentee relationship functions best when bidirectional interaction occurs between the mentor and mentee. The mentor should provide oversight and guidance as they see appropriate. The mentee should provide feedback to the mentor on areas that they feel in need of more mentor involvement. The mentee should take an active role in their acquisition of knowledge, skills, and experience and not be a passive partner in this relationship. Both mentor and mentee should be proactively engaged.

Transition to a Faculty Position

As a mentee approaches completion of their residency or fellowship training program and anticipates advancing to an independent laboratory faculty position, it is ideal if the mentee's relationship with their mentor can continue. Ideally, the mentor and mentee can agree on what projects the mentee can continue to work on in their own laboratory (with the support of the mentor) and that the mentor will agree to review and critique grant applications and manuscripts for the mentee. The mentee is also encouraged to find mentors at their new institution (or elsewhere) in order to broaden their support network. Faculty at all levels of seniority benefit by having mentors and advocates that can be called upon for guidance, advice, and support.

The “Ideal” Mentor

On the surface, a laboratory research mentor appears primarily responsible for advising the mentee especially in graduate medical education training on how to identify and formulate research questions and hypotheses, how to design and perform experiments to answer the research question(s), how to interpret data and use that data to design additional experiments, how to write a manuscript that describes the research findings, and how to present the research findings at scientific meetings. However, an effective mentor is more than an adviser. When searching for a mentor, the mentee should consider the various skills and attributes needed in an effective mentor (Table 1).

Table 2 Recommendations for residents/fellows on seeking a mentor

Short term

1. Make a list of your research interests and goals. It is a good idea to develop this list with guidance and input from faculty who can serve as advisers for you
2. Identify which faculty members perform the type of research that you want to do. Inquire whether your training program keeps a list of faculty who have openings in their laboratory
3. Meet with the faculty mentors from your list and confirm that they have a position for you in their laboratory and if they are willing to take on the responsibility of being your research mentor. As part of your discussion, find other trainees who have worked in this faculty member's lab and what they are doing now
4. Find a research project that is of interest to you. You may need to work on the project in the evenings, weekends, and days off
5. Select your mentor with insight. Before committing to a laboratory and faculty member, talk to others in the lab about the mentorship skills of the faculty member
6. Talk to faculty and subspecialty fellow researchers for their advice on the type of research project that might be feasible as a resident/fellow. Research projects for a resident/fellow should be focused and finite in scope
7. Identify faculty and others to create a career development committee. This group should consist of individuals who can complement your research mentor's skills and should meet with you periodically to review your research and career development progress. They can also advocate on your behalf, where necessary

Long term

1. Plan periodic meetings with your mentor(s) to discuss career development progress, identify further needs, and discuss plans for reaching your career development goals
2. Periodically reevaluate the effectiveness of your mentor(s). Identify, or change, mentors if appropriate
3. Begin mentoring those less experienced than you (to develop your mentoring skills)

To assess the various attributes of a potential mentor, and to promote an ongoing mentee-mentor relationship, several actions are recommended (Table 2). By assessing multiple attributes of the potential mentor, the mentee will obtain a broader indication of the mentor's potential abilities to meet the mentee's needs.

Mentees should arrange to meet individually with potential mentors so that the mentee can interview and assess potential mentors for their mentoring abilities and their appropriateness and compatibility for the mentee. The process of identifying and selecting a potential mentor can be uncomfortable and intimidating for the mentee. The thought of critically evaluating faculty members for the purpose of assessing their potential for providing the mentee with the characteristics needed in a mentor will likely include recognizing that certain faculty will not serve the mentee well as a mentor and may require the mentee to decline a potential mentor's invitation to be the mentee's mentor. This process can be easier if the mentee has a faculty advisor who can help the mentee identify faculty to consider as their mentor and to provide someone for the mentee to talk to as their decision process proceeds. It will likely be easier for the mentee if they promote that the meeting is for the mentee and mentor to get to know each other to some degree, so they both can decide if they are compatible for each other. The mentee should also make it clear that they are meeting with several faculty in order to find the "best" research project and mentor for them. As long as both parties are aware of the intention of the meeting, there should be little discomfort when thanking the potential mentor for meeting with the mentee and informing them that they will be working with someone else. Of course, the mentee may identify additional mentors and advisors for their various career development needs in the process of meeting and talking with potential mentors.

The ideal mentor participates in a personal, professional relationship with the mentee. This relationship evolves over an extended period in response to the changing needs of the mentee and spans the breadth of knowledge, skills, and experiences that the mentee needs to pursue their desired career path. As the mentee gains experience and independence, the mentor is able to guide the mentee toward new opportunities and facilitates the mentee's growth. As a result, selecting the proper mentor is critical to the mentee's career success.

Funding/Support None.

Conflict of Interest This manuscript has not been previously published and is not under consideration in the same or substantially similar form in any other peer-reviewed media. All authors listed have contributed sufficiently to the project to be included as authors. To the best of our knowledge, no conflict of interest, financial or otherwise, exists.

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