



Paths and Places FOR GI RESEARCH SUCCESS

This issue marks a year since *Cellular and Molecular Gastroenterology and Hepatology* started the Paths and Places for gastrointestinal (GI) Research Success column. Devoted to providing researchers with advice tailored to different research settings and career paths, Paths and Places complements the basic and translational science focus of *Cellular and Molecular Gastroenterology and Hepatology* and, we hope, fosters the research of a diverse group of American Gastroenterological Association members.

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Oh, the Places You'll Go: A Year of Practical Advice



Over the past year, we have highlighted successful scientists who perform GI research in different places. Our columnists come from a variety of settings, including academic medical centers (Mark Donowitz),¹ universities without medical schools (Pamela Tuma² at a private teaching-intensive university and Naomi Ward³ and colleagues at a large land-grant university), the pharmaceutical industry (Joshua Friedman),⁴ veterinary schools (M. Sawkat Anwer),⁵ and laboratories within laboratories (Jennifer Noto).⁶ Although these authors emphasize 6 common and perhaps unsurprising general principles, it is notable that they approach these in unique and deliberate ways, targeting their strategies to the resources and limitations of their specific institutions.

The Many Roles of Mentors and Mentoring

Mentorship plays different roles in the careers of different investigators. Drs Noto⁶ and Donowitz¹ specifically identified mentorship as critical to career success. Their relationships with their mentors, however, were different. For non-tenure-track scientists such as Dr Noto, the laboratory mentor defines the broad shape of the research, nonresearch responsibilities, funding, and publication, whereas for academic medical center faculty such as Dr Donowitz,¹ mentors ideally are a source of inspiration, involved more in the breaking of boundaries than the structuring of a career. For many scientists, providing rather than receiving mentorship is a particularly important

component of success, yielding research as well as career dividends. Overall, our columnists approached mentorship with clear, although often different, goals in mind.

Collaborations Bear Varied Fruit

Collaborations are critical to performing successful, efficient, and exciting research, regardless of the setting, but the specifics of successful collaborations will vary depending on the nature of the research institution. In the pharmaceutical industry, collaborations fall under the heading of large-scale organizational dynamics, and are an integral part of the enterprise. On a different scale, collaborative work—with mentors, mentees, and peers—is essential and, indeed, a key component of the job, for non-tenure-track research scientists working in larger laboratories. For Drs Parker, Gigley, and Ward³ in semirural Wyoming, access to mouse models and human samples would have been impossible without a collaborator at a large academic medical center. Similarly, veterinary researchers who collaborate with physicians often find that knowledge from human studies transfers to their animal experiments and that highlighting the relevance of their diseases to human medicine enhances funding.

Collaborations can have important impacts on a laboratory's efficiency and bottom line. For researchers such as Dr Tuma² at small, teaching-oriented institutions, collaborations (both academic and fee-for-service) enable investigators to save time and money on assays and animal experiments that would take months or years to establish in the laboratory; similarly, databases and sample repositories can serve as de facto collaborators. Within an institution, collaborating with senior investigators who provide access to equipment that would be prohibitively expensive to purchase is an effective way to extend a start-up package.

Finally, Dr Donowitz¹ highlighted ways in which collaborations are important for senior researchers, suggesting that setting up large centers and working groups is a way to “pay back” an institution for its investment in you as well as to develop new intellectually exciting research and training opportunities.

Tailor Your Attempts to Obtain Financial Support

How to generate funds to support your research varies according to location. Although the National Institutes of Health (NIH) R01 is the bulwark of GI research funding, it is absolutely essential to identify other sources. These can include other NIH mechanisms such as R15 awards for investigators in non-research-intensive institutions, career development awards for junior or non-tenure-track scientists, larger grants for senior scientists putting together collaborative groups, and institutional awards such as IDeA and INBRE grants. Non-NIH federal funding sources, including the Department of Defense, National Science Foundation, and, for veterinarians, the US Department of Agriculture, may be appropriate. Depending on the setting,

private funding may prove significant; this is particularly true in veterinary research, in which there are a plethora of foundations and grateful clients. Working with institutional development offices and other internal resource centers is time consuming but essential for identifying funding outside the realm of the R01.

Be Practical in Choosing a Research Niche

As much as researchers would love complete control over their research directions, the reality can be very different. In some cases, as when working as a research scientist within a larger laboratory, investigators face the challenges of identifying independent projects they are passionate about yet still mesh with the larger laboratory focus. Performing research in industry is even more restrictive, with corporate priorities often determining, and re-determining, one's research focus. Even in other settings, however, research directions are not *carte blanche*. Certain kinds of experiments may be impossible without infrastructure, whereas for researchers at veterinary schools, identifying research questions that are broadly relevant to multiple species (ideally including human beings) is necessary.⁵ Even in academic medical centers, the specifics of obtaining external funding dictate to some extent the kinds of research that is performed. The overall message is that the unknown is vast—investigators should identify projects that both interest them and are well suited to their specific research environment.

Invest in Your Laboratory Personnel

Although GI fellows and postdoctoral candidates are standard laboratory staff in academic medical centers, they may be unavailable or difficult to recruit to other institutions. Tapping into graduate student and undergraduate labor, tailoring their projects and responsibilities carefully, and establishing a culture of training in the laboratory is essential to success in AREA-eligible institutions and other universities without medical schools. Identifying graduate students who are able to take on high levels of responsibility in a laboratory is one strategy for laboratory staffing; in other cases, having a research scientist who performs independent research, maintains continuity, and provides teaching in the laboratory is an effective way to manage and maximize the productivity of inexperienced or junior personnel.

Keep Your Balance

Almost all of the Paths and Places columnists highlighted the need to actively work at keeping research as their top priority. Their advice, however, was institution-specific. For Dr Friedman,⁴ who works in industry, the opportunity to focus on GI research, without distraction from clinical duties, teaching, or grant-writing, was the reason he left academia. For Dr Ward and her colleagues,³ a heavy teaching load is part of the job description, and requires staffing the laboratory with unusually independent

students. Dr Tuma,² who also has a heavy teaching load, schedules meetings and teaching in blocks to maximize uninterrupted time in the laboratory, and leverages her nonresearch commitments to identify collaborators, recruit students, and, even in some laboratory courses, perform laboratory work. In clinical settings, well-focused patient care, teaching, and committee responsibilities can be beneficial to research, and, in the case of veterinary schools, even provide experimental models, but it is important to set boundaries and take on nonresearch responsibilities judiciously and selectively, especially when first setting up a laboratory. The key overall advice is to approach non-research obligations thoughtfully, aiming for those providing benefits that carry over to laboratory work.

Beginning in the next issue, Paths and Places authors will move from a focus on places and instead provide advice on how to be successful at different stages of GI research. We plan columns on how to up a laboratory as a junior investigator, the decision as a senior investigator to maintain a laboratory or focus on other academic pursuits, how to take a successful sabbatical, how to move your laboratory, and whether to take on an administrative role. We look forward to the next year of this column, and always welcome comments and suggestions for topics.

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Conflicts of interest

The author discloses no conflicts.

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