Many opportunities are available during fellowship, including experience in basic science research. However, because of the lack of prefellowship basic science training, some fellows believe that success in the laboratory is not feasible. Our guest author, Dr. Rodney Newberry, will discuss how a fellow with little background in basic research can still complete a successful project, which, in turn, may launch a rewarding career in the basic sciences.

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Occasionally, fellows with little or no basic research exposure will express a desire to experience basic research. Typically, the limiting factor in obtaining basic research experience is not knowing how to approach a basic research career or project. In this section, I will give advice to help the interested fellow embark on a basic research project.

All research, basic and clinical, follows a similar process; however, the landscape upon which basic and clinical investigations are performed can be dramatically different. From a fellow's perspective, the largest difference is that they have a greater amount of familiarity and background information regarding clinical research projects. While this issue may appear daunting, it has been, and can be, successfully negotiated by fellows with little or no basic research experience.

The process of embarking on a basic research project:

• Choose a field. Fellows may feel overwhelmed by the array of potential basic research areas and wonder what advice can be given regarding choosing an area. In reality, this is a less important choice than choosing a mentor, because good research practices and techniques will translate across different areas. One approach to selecting a field is to choose a basic research area and a clinical subspecialty to apply the basic research. An example of this might include choosing to study Toll-Like Receptor function in hepatocytes; this choice would define an area of basic research, Toll-like receptors, and a clinical spectrum to apply this knowledge, hepatology. Reading articles and reviews from high-quality basic research journals should suggest possibilities for untapped research areas.

• Choose a mentor(s). The most important determinant of success for trainees in basic research is identifying the appropriate mentor(s). For fellows in a clinical field, such as gastroenterology, I would advise identifying two mentors, a basic science mentor and a mentor in gastroenterology. The basic science mentor will have the appropriate background to assist you in the design and the execution of the basic science project. A mentor within your subspecialty can help guide your basic research and move it toward a clinically relevant question. In the example given above, the basic science mentor may be a microbiologist or an immunologist whose laboratory focuses on the function of Toll-like receptors, and the subspecialty mentor may be a hepatologist. Combining the strengths of these two mentors may allow you to approach questions that would be nearly impossible to approach with one mentor alone, such as the role of hepatocyte Toll-like receptors in infectious hepatitis. Ideally, your basic science mentor should be able to interact with you individually to foster your understanding of the project and the field, this may mean avoiding laboratories that are too large and avoiding mentors who are continuously away from the laboratory.

• Choosing and working on a project. It is unrealistic to expect a fellow with little or no background in basic research to design a successful basic research project. It is appropriate that initial projects be identified, outlined, and designed by your basic science mentor.

Key points

• Choosing an appropriate mentor is vital for success.
• Narrow the project so it is feasible and relevant.
• Basic research projects progress slowly by nature; thus, do not become discouraged too quickly.
Do not be overly concerned about clinical relevance, work toward it. Many fellows may be turned off by a large number of research areas because they do not appear to have an immediate clinical relevance, often it is not that these areas do not have relevance but that we do not understand them well enough or have not investigated them well enough to appreciate their potential. Numerous opportunities await the discerning physician-scientist with an open mind.

Narrow the scope of your project. A common downfall of individuals who are uninitiated to research is taking on a project that is too large or is open ended. You should take on a project that is feasible and has a defined outcome that is relevant regardless of the result.

Continually discuss and research your project. No manuscript or grant is perfect on its first draft, and, likewise, your project will be imperfect at the start. The only way it will improve is if you continually revisit the hypothesis, questions, and design. This could be done on a daily basis by reading articles and by discussing your project with members of the laboratory, and on an intermittent basis with your mentor(s).

Be patient. Many fellows will feel as though their basic research project progresses slowly and will become disheartened when they see the clinical research of their colleagues progress at a more rapid pace. Basic research, by its nature, is prospective and directed toward discovering basic truths, and as such is time consuming.

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