Research

If you are a basic, translational, or clinical researcher, you will be continuously developing research ideas and applying for research funding. Your overall research portfolio is likely to be composed of several different research projects, each funded separately. The development of fundable research projects is a skill that will be critical to your success as an independent researcher. Here, we have outlined the steps required to develop and obtain funding for your research projects, along with some suggestions and resources that have been developed to assist you in this process. This information is intended to *supplement* (not replace) scientific mentoring that you set up with the help of your Division Chief, and grants management processes set up by your Division Administrator. Be sure to also get their input as you develop your research plans and grant applications.

> The National Institute of Allergy and Infectious Disease (NIAID) has a very good web site (http://www.niaid.nih.gov/researchfunding/grant/strategy) that discusses the overall process of obtaining funding. The emphasis is on NIH funding, but their suggestions are broadly applicable.

Step 1 – Identify Important Research Questions

A research question is a way of expressing your interest in a problem of phenomenon. You may have more than one research question for a study, depending on the complexity and breadth of your proposed work. Each question should be clear and specific, refer to the problem or phenomenon, reflect an intervention in experimental work, and note the target population or participants. Identifying a research question will provide greater focus to your research or clarify the direction of your investigation, whether the research is descriptive or experimental. A well-written research question will also shed light on appropriate research methods (i.e., specify the intended actions of the variables and how an experimental intervention might be measured). Characteristics of good research questions:

- Are specific
- Are clear
- Refer to the problem of phenomenon
- Reflect the intervention in experimental research
- Note the target group of participants

Step 2 – Gain New Skills as a Researcher

The development and maintenance of scientific research skills is a lifelong endeavor. The UVM-MC provides the opportunity to enhance research knowledge, gain hands-on experience and skills in a mentored environment, and access to cutting-edge core facilities. Listed below are suggested links to assist with the research skills development and refinement process.

Vermont Center for Clinical & Translational Science (CCTS)

CCTS Education, Training, and Career Development Opportunities

NIH Clinical Research Training On-Line

Step 3 – Identify Advisors and Potential Collaborators

The University of Vermont Medical Center (UVM-MC) offers the advantage of being at a highly collaborative institution. You will want to take advantage of this. This will include identifying mentors for your overall career, a topic covered in the DOM's Faculty Development section. This will also include identifying investigators that can advise, assist, and possibly collaborate with you on specific research projects. We underline strongly advise you to find such people. Investigators who attempt to "go it alone" typically do not do well. Fortunately, there are a number of resources available to help you identify people at UVM-MC with expertise in a given research area. Please refer to the Faculty Development Resources section for additional information on mentorship and career planning.

How to find investigators at UVM-MC with expertise in a specific area: The College of Medicine's **Research News** - a public directory of College of Medicine research initiatives and resources UVM's PIVOT Funding Searches by Category: a database to help identify all researchers at UVM-MC, searchable by keyword:

- See PIVOT Instructions **here**

- See PIVOT site **here**

- NIH RePORTer – a database of NIH-funded research grants. Search by Organization (i.e., University of Vermont) and keyword; results will show what has been funded in your area.

Step 4 – Identify an Appropriate Funding Mechanism

Possible funding mechanisms include NIH and foundation awards and industry-sponsored research. You should familiarize yourself with the specific **NIH award mechanism** most suited to your career stage. The NIH offers two basic types of awards: *solicited* and *unsolicited*. For solicited awards, the NIH publishes Funding Opportunity Announcements (FOAs) describing the specific research topic that they are interested in. These include both Requests for Applications (RFAs), which are typically one-time opportunities with dedicated money, and Program Announcements (PAs), which are more general. If your research fits well into a specific RFA, this will be your best opportunity to get funded, since you will compete only with other applicants for the RFA in a dedicated study section. PA applicants typically compete with unsolicited award applicants in the standing study sections, but receive a very slight funding priority. For unsolicited awards, the most common application type, you will suggest the specific topic of your research to the NIH and compete with similar proposals in one of the **Standing NIH Sections**.

You will want to stay abreast of all funding opportunities that are applicable to your research. Several databases and mailing lists exist to help you do this:

Research Opportunity Databases

- Funding Opportunities – UVM's Funding Opportunities website.

- NIH OER webpage – a listing of all active NIH RFAs and PAs. Importantly this can be searched by keyword. A list of all active NIH RFAs, sorted by institute, can be found **here**. A list of all active NIH RFAs, sorted by institute, can be found **here**.

- Grants.gov – Grant opportunities from 26 Federal grant-making agencies.

Research Opportunity Resources & Mailing Lists

- NIH Guide LISTSERV - a weekly listing of NIH FOAs. Subscribe [here](#).

- NIH Extramural Nexus (aka, Rock Talk) – Subscribe **here**

- UVM's Sponsored Projects Administration (SPA) Find Funding Resources – click **here**

- UVM's Sponsored Projects Administration (SPA) office provides training in methods and resources available for identifying specific funding opportunities. Contact: Hilda Alajajian, Grant Resources Specialist, 6-1322, email: **Hilda.Alajajian@uvm.edu** office: 340 Waterman Building

- Highly encouraged: contact the Program Officer for further information and opportunities

Step 5 – Identify Research Resources

The College of Medicine offers sophisticated/shared research core facilities that are available for use by all UVM investigators. These Core Facilities will perform specific research tasks, typically on a fee-for-service basis. Core facilities are physically housed and administered by COM departments and research centers.

- COM Core Facilities **-** A listing of College of Medicine Core Facilities.

- COM Research Centers, Programs, Faculty Labs

- Clinical Research Resources

- Review Award Details (PI, funding agency, project title, etc) of funded research projects at UVM by fiscal year; ask the PI if they would be willing to share their proposal (and any lessons learned) with you.

Step 6 – Develop Research Plan

Once you have identified a funding mechanism to apply for and tentatively identified the people and facilities you will be working with, you will need to develop a research proposal. Typically, this will involve formulating a research plan based on your preliminary data, your specific hypotheses, and what you wish to accomplish. We strongly recommend that you begin formulating your research plan early, at least 4 months before your grant deadline, by outlining your preliminary data, hypotheses and proposed studies. Do this before you start grant writing. Review this outline with experienced investigators who have expertise in your area of research or have been on the study section that is likely to review your proposal. This will help you identify any problems with your approach or gaps in your preliminary data or proposed methodology while there is still time to make changes.

To facilitate the development of your research plan, the department's Research Committee (Research Studios Concept – coming soon) offers "concept reviews" for proposed grants. In these reviews, you present your background, preliminary data, and tentative research plan to a group of experienced investigators. The group will provide you with feedback, identify potential problems, and offer you suggestions as to how the research plan may

be improved. This may include identifying potential collaborators or methods that may enhance your proposal. We strongly recommend that you take advantage of this internal review mechanism.

Step 7 – Write the Grant Application

Once your research plan is fully developed, you will write your grant application. If you are a new investigator, be aware that writing a major NIH grant, such as an R01, is not like anything you have done before. It needs to be great to be competitive. You will need to start writing several months before your submission deadline if you want to do it right. Trying to write grants at the last minute is the biggest mistake investigators make. You will need time to craft, review, and receive feedback on every aspect of your proposal. Fortunately, there are a number of mechanisms available in the College of Medicine to help you in this process. We strongly recommend that you participate in a general grant-writing course at your first opportunity. This will provide you with many of the skills that you will need. There are several other programs to guide you through the development and writing of your grant. Take advantage of these.

Step 8 – Submit Grant Application/ Investigator-Initiated Award

Work closely with your division's grant administrator to make sure everything is done correctly and on time. Review the budget carefully. The administrative parts of a grant (budget, justification, key personnel, biosketches, etc) need to be reviewed internally before submission to a funding agency – this can take time. But you can submit the administrative sections before you finalize the scientific sections.

Elements Financial Management

Sponsored research financial management falls into two categories: Pre-Award activities (i.e., the

proposal submission process) and Post-Award activities (i.e., the financial activities that occur after a

research award has been received).

At the institutional level, the Office of Sponsored Project Administration (SPA) and Office of Clinical Trials

Research (OCTR) support Investigators and administrators in the College of Medicine with both pre and

post award activities. Each Department of Medicine Division/Center has a Financial Lead and Research

Lead to assist faculty with research administration activities. These financial/research personnel should

be involved in the grant submission process, including the development of the budget and assisting the

Investigator with research award administration. Investigators are highly encouraged to establish and

maintain strong lines of communication with the Research Lead and Financial Lead supporting their area.

The following section provides more specific details on research administration categories.