



Identifying Grant Funding: Mentored Career Development and Transition Awards

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NIH Career Development Awards are designed to provide outstanding, clinically trained professionals with salary support and protected time to pursue a course of intensive, mentored research experience necessary to achieve full scientific independence. The ideal candidate for a career development award is a

health scientist nearing the completion of post-doctoral training or in the early years of a faculty position. The K series of NIH awards provide several options for mentored training that are appropriate for investigators interested in laboratory or clinical investigation in the biologic and medical sciences.

Why Should You Consider a Career Development Award?

The transition from post-doctoral training to the status of an independently funded faculty investigator is one of the most critical, and vulnerable, phases in the career of a health scientist. Increased specialization of both laboratory and clinical based investigation as well as the highly competitive nature of current peer-reviewed research funding combine to establish an environment where the majority of junior faculty will benefit from access to additional training and experience prior to applying for an independent research award. Multiple obstacles may jeopardize the time commitment required to pursue this training and establish a competitive record. These barriers may include: financial obligations associated with the repayment of student loans or family life; the growing demands and complexity of clinical responsibilities in academic medical centers; and teaching, administration and other service obligations associated with a faculty position.

The NIH has acknowledged the challenges that confront clinically trained professionals in the pursuit of a research-focused career path, and responded by establishing a number of funding mechanisms targeted to meet the career goals and training needs of clinical professionals at different career stages. Career development awards are designed to provide up to 5 years of funding to outstanding candidates in support of intensive, mentored training and research experience. The ideal candidate for a career development award is an individual with a clinical doctoral degree nearing the end of post-doctoral fellowship training or in the early stages of a faculty appointment. The candidate must demonstrate evidence of a strong commitment to a research-focused career as well as the need for additional mentored training and experience before achieving scientific independence. A career development award will provide the successful applicant with salary support for the

duration of the award, and the guarantee of at least 75% protected time to pursue an individually tailored training and research plan under the supervision of an experienced faculty mentor or mentorship team. At the conclusion of the award, the recipient of a career development award should have accumulated a portfolio of specialized skills, research hypotheses, preliminary data, and publications required to prepare a successful independent grant application.

Pursuing a career development award is an early investment in the long-term success of an academic career. For many health scientists, applying for a career development award may represent their initial foray into the realm of peer reviewed funding. The skills and discipline required to prepare a successful application, coupled with the perseverance and hard work needed to productively execute that plan over the course of the funding period, collectively establish an invaluable foundation for subsequent efforts to obtain peer-reviewed funding.

How to Plan for a Career Development Award Application

Select a mentor

The selection of a mentor is one of the most important decisions you will make in the early stages of your career. Career development awards are mentored funding mechanisms, and the application will be judged in part on the experience and commitment of the mentor to the career development of the applicant. Your mentor will play a critical role in developing and revising the application. While there is no single paradigm, the ideal mentor for a career development award will have a strong record of peer-reviewed funding and publication in the field of study; documented experience as a mentor; and a well-articulated plan for the training, supervision and career development of the applicant. If your mentor is relatively junior, or lacks the exper-

tise to supervise some aspects of the career development plan or research plan, the recruitment of one or more co-mentors with the necessary skills may be helpful. In many situations, it may be appropriate for an advisory committee of senior faculty to assist the primary mentor(s) in the implementation of the career development plan. If you elect to include co-mentors or advisors external to your institution, be certain to carefully justify their role in the career development award and how they will interact with you during the funding period.

It is critical that your mentor assumes an active role in the development of the application. Weak applications often indicate limited involvement of the mentor, and reflect poorly on both the applicant and the mentor. Ascertain that your mentor has both the desire and time to commit to this process. Plan to provide your mentor with a draft of the award application well before the deadline, and anticipate that there may be several rounds of revision before a polished grant is ready for submission. If you do not receive the necessary support and input from your mentor, be prepared to identify a new mentor and move on.

Define your career objectives

It is difficult to succeed in academia without focus. Your milestones to independence will be easier to identify if you clearly define where you want to make your impact. Are you interested in patient-oriented research? Will your niche be in laboratory-based or clinical investigation? Do you envision your primary focus as the study of basic aspects of biology; characterization of drugable pathways implicated in human disease; the development and testing of new targeted therapies in preclinical models; and/or the translational evaluation of new treatments and predictive/prognostic biomarkers in clinical trials? Will you emphasize research in a specific disease? The funding mechanism that you select, and the career development proposal that you submit, should reflect these self-defined objectives.

Critically evaluate your strengths and weaknesses

With the assistance of your mentor, catalogue your current strengths and weaknesses as an investigator at this stage in your career. The benchmark is competitiveness for independent peer-reviewed funding in your chosen area of research. This exercise will reveal individualized gaps and needs that should be directly addressed in an application for a career development award. The appropriate response to these self-defined needs may be focused didactic training; greater facility with quantitative research tools and biostatistics; mentored laboratory or clinical research experiences; and/or improved conversion of research efforts to peer-reviewed publications. You need not wait until receiving the award to begin your training and career development plan. Evidence that these gaps are being prospectively addressed will be viewed favorably by reviewers.

Identify a funding mechanism that is appropriate for your specific needs and career focus

There are multiple potential funding mechanisms for training and career development. Your specific needs will vary at different stages of your career as defined by your current goals, training and experience. While the focus of this discussion is federally sponsored funding mechanisms via the NIH, multiple professional and disease-focused organizations sponsor a range of career development awards that should be also be considered. This is a partial list of these organizations and their websites:

- American Association for Cancer Research (AACR) (www.aacr.org)
- American Society for Clinical Oncology (ASCO) (www.asco.org)
- Leukemia and Lymphoma Society (www.leukemia-lymphoma.org)
- National Hemophilia Foundation (www.hemophilia.org)

Detailed information about NIH career development awards is available on the NIH website (www.grants.nih.gov/training/careerdevelopmentawards.htm). The Career Award Wizard is a useful tool that can help to define the best option for you. For investigators with a focus in basic science and/or laboratory-based research, the K08 funding mechanism is a good option. The K23 award should be considered by investigators with a focus in patient-oriented research. Finally, the K99/R00 mechanism is a transition award for more mature investigators, closer to an application for independent research funding. Each award is discussed in greater detail in the section below.

Define a timeline for submission

Establish a realistic timeline for submission of a career development award with your mentor. You will have only three opportunities to submit your application for review, so it is to your advantage to submit a strong initial proposal. For some candidates with less experience or focus, there may be a strategic advantage to deferring the application while building a stronger record of publications, investigator initiated clinical research, etc. that documents a commitment to and potential for a research-focused career path. If you and your mentor believe you are prepared to submit a competitive application, set aside sufficient time to prepare the grant proposal. Solicit the critical input of your mentor(s) and experienced grant writers at your institution, and ask them to review drafts of your proposal. Plan to present them with an initial written draft of your proposal at least two months before the application due date. In addition to the advice of your mentor, you will need to budget time to collect a wealth of supporting documentation (letters of reference/collaboration, IRB approval, animal use approval, etc.). A general rule of thumb is to set aside at least three months to prepare the proposal.

What Type of Career Development Award Is Ideal for You?

The NIH has developed several career development award mechanisms targeted to meet the needs of aspiring investigators with different career goals and training requirements. Detailed information on the NIH K series of Career development awards is available at www.grants.nih.gov/training/careerdevelopmentawards.htm. Work closely with your mentor to select the funding mechanism that is best suited to your career objectives and the institute to which you will submit your proposal.

It will be very helpful for you to contact the NIH Health Scientist Administrator (HSA) assigned to oversee the award mechanism at the NIH institute you have selected. The HSA is an advocate for the applicant and is committed to helping you develop a competitive proposal. Consult with the HSA to confirm that your career goals and research topic are appropriate for the funding mechanism. Discuss your mentor, career development plan, and research proposal. Solicit tips or guidelines that may be of help in the preparation of your application.

The following sections provide additional information regarding the K series of Career development awards relevant to individuals with a clinical doctoral degree pursuing a research focused career in hematology.

K02 funding mechanism

Independent Scientist Award (K02)

The K02 mechanism is supported by multiple NIH institutes including NHLBI. The Independent Scientist Award provides support for newly independent scientists who can demonstrate the need for a period of intensive research focus as a means of enhancing their research careers. The K02 is intended to foster the development of outstanding scientists and to enable them to expand their potential to make significant contributions to their field of research. In general, candidates must have a doctoral degree and independent, peer-reviewed research support at the time the award is made, and must be willing to commit a minimum of 75% (or 9.0 calendar months) of full-time professional effort conducting research and relevant career development activities during the period of the award. Complete details of the K02 funding mechanism are available at <http://www.grants.nih.gov/grants/guide/pa-files/PA-06-527.html#SectionII>.

K08 funding mechanism

Mentored Clinical Scientist Research Career Development Award (K08)

The NIH K08 program is supported by multiple NIH institutes with a programmatic interest in hematology, including NCI, NHLBI, and NIDDK. The K08 provides up to 5

years of support and protected time to individuals with a clinical doctoral degree for an intensive, supervised research career development experience in the fields of biomedical and behavioral research, including translational research. Individuals with a clinical doctoral degree interested in pursuing a career in patient-oriented research should consider the NIH Mentored Patient-Oriented Research Career Development Award (K23). Complete details of the K08 funding mechanisms are available at <http://grants1.nih.gov/grants/guide/pa-files/PA-06-512.html>.

NIDDK Mentored Clinical Scientist Award to Promote Diversity in Health-Related Research (K08)

This program is supported by NIDDK. This program is a 3-year career award made to clinician scientists from diverse backgrounds including individuals from underrepresented racial and ethnic groups and individuals from socially, culturally, economically, or educationally disadvantaged backgrounds. This award provides an opportunity for specialized study in NIDDK-relevant research areas for clinician scientists committed to a career in laboratory or clinical research. Complete details are available at <http://grants.nih.gov/grants/guide/rfa-files/RFA-DK-06-015.html>.

NCI Mentored Clinical Scientist Award to Promote Diversity (K08)

The goal of the NCI Comprehensive Minority Biomedical Branch (CMBB) K08 is to diversify the pool of laboratory or field-based cancer investigators. Candidates eligible for support under this award include individuals with health professional doctoral degrees who come from groups that have been shown to be underrepresented in science. Such candidates include individuals from underrepresented racial and ethnic groups, individuals with disabilities, and individuals from disadvantaged backgrounds. The awards will be for a project period of 3 to 5 years of supervised study and research experience that may integrate didactic studies with clinically based research. Complete details are available at <http://grants.nih.gov/grants/guide/pa-files/PAR-06-221.html>.

K23 funding mechanism

Mentored Patient-Oriented Research Career Development Award (K23)

The NIH K23 program is supported by multiple NIH institutes with an interest in hematology research including NCI, NHLBI and NIDDK. The purpose of the K23 is to support the career development of investigators who have made a commitment to focus their research endeavors on patient-oriented research. Clinically trained professionals or individuals with a clinical degree who are interested in further career development in biomedical research that is not patient-oriented should refer to the Mentored Clinical

Scientist Career Development Award (K08). Complete details are available at <http://grants1.nih.gov/grants/guide/pa-files/PA-05-143.html>.

Mentored Patient-Oriented Research Award to Promote Diversity (K23)

This program is supported by NCI. The goal of this program is to promote diversity for career development of individuals with a health professional doctoral degree from groups that have been shown to be underrepresented in health-related science. Complete details are available at <http://grants.nih.gov/grants/guide/pa-files/PA-06-222.html>.

K99/R00 funding mechanism

NIH Pathway to Independence (PI) Award (K99/R00)

The NIH K99/R00 program is supported by multiple NIH institutes including NCI, NHLBI, and NIDDK. The K99/R00 award provides an opportunity for promising postdoctoral scientists to receive both mentored and independent research support from the same award. The initial phase will provide 1 to 2 years of mentored support for highly promising, postdoctoral research scientists followed by up to 3 years of independent support contingent on securing an independent research position. Award recipients will be expected to compete successfully for independent R01 support from the NIH during the career transition

award period. Complete details are available at <http://grants1.nih.gov/grants/guide/pa-files/PA-07-297.html> and at the New Investigators Program web site (http://grants1.nih.gov/grants/new_investigators/index.htm).

Summary

Health scientists who plan to pursue an academic career should strongly consider submitting an application for a career development award during the critical transition phase from postdoctoral trainee to junior faculty. A career development award provides multiple benefits to the recipient and sets the stage for future success in obtaining peer-reviewed funding. The active participation of an experienced mentor is critical to the selection of the appropriate funding mechanism, and the development of a competitive application.

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