NIH/NIAID “K” Programs:
For the Next Generation of Independent Researchers

Matthew J. Fenton, Ph.D., Director
Division of Extramural Activities, NIAID
NIH mission is to conduct (intramural) and support (extramural) biomedical research

Annual Budget >$30 Billion
Fiscal Year 2017
National Institutes of Health

Main Campus – Bethesda, Maryland
27 NIH Institutes and Centers
NIAID Funding, FY 2000 - 2017

Fiscal Year

Dollars in Billions
NIAID’s Mission Areas

Scientific Opportunity

Research in

- IMMUNOLOGY
- MICROBIOLOGY
- INFECTIOUS DISEASES

HIV/AIDS

Biodefense

Emerging Microbes

Immune-mediated Diseases

Global Health

Vaccines

Diagnostics

Drug Development

Other Interventions (e.g., prevention strategies)

Public Health Needs
NIAID Research: Dual Mandate

Maintain and “grow” a robust basic and applied research portfolio in microbiology, infectious diseases, immunology and immune-mediated diseases

Respond rapidly to emerging and re-emerging disease threats

New/Improved Interventions
Research Training and Career Development

In addition to conducting research in our own labs (intramural) and supporting research at laboratories around the world (extramural), the NIH mission also includes training the next generation of scientists.
Training Continuum: Ph.D. and M.D. Tracks

**Ph.D. Track**

- T34
- R25
- F30, F31, DF31
- T32
- R25
- F32
- K01, K25
- K22
- K99/R00

**M.D. and M.D./Ph.D Track**

- F30
- T32
- T32
- F32
- K01, K08, K23
- K22
- K99/R00

Diversity Supplement Program (DSP)
K Awards

- NIH launched the **research career ("K") development** programs in 1957

- To “help develop the nation’s biomedical research workforce by providing **protected research time** to promising investigators....”

- **Goal: Research Independence.** After K award transition to research independence (e.g., **R01** award or equivalent)
K Awards

- Compared to unfunded applicants, K awardees received more subsequent NIH research grants and were more likely to apply for (and receive) R01 renewals (per 2011 NIH study of mentored K award programs)

- Number, nature, and specific types of K programs have varied as NIH seeks to address changing research workforce needs

# K Awards

<table>
<thead>
<tr>
<th>NIH K Mechanism</th>
<th>Program Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>K01</td>
<td>Mentored Research Scientist</td>
</tr>
<tr>
<td>K02</td>
<td>Independent Research Scientist</td>
</tr>
<tr>
<td>K05</td>
<td>Senior Research Scientist</td>
</tr>
<tr>
<td>K07</td>
<td>Academic Career Development Award</td>
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<tr>
<td>K08</td>
<td>Mentored Clinical Scientist Research</td>
</tr>
<tr>
<td>K12</td>
<td>Clinical Scientists Institutional</td>
</tr>
<tr>
<td>K18</td>
<td>Research Career Enhancement</td>
</tr>
<tr>
<td>K22</td>
<td>Career Transition</td>
</tr>
<tr>
<td>K23</td>
<td>Mentored Patient-Oriented Research</td>
</tr>
<tr>
<td>K24</td>
<td>Midcareer Investigator Award</td>
</tr>
<tr>
<td>K25</td>
<td>Mentored Quantitative Research</td>
</tr>
<tr>
<td>K26</td>
<td>Midcareer Investigator in Biomed</td>
</tr>
<tr>
<td>K43</td>
<td>Emerging Global Leader</td>
</tr>
<tr>
<td>K76</td>
<td>Emerging Leaders</td>
</tr>
<tr>
<td>K99/R00</td>
<td>Pathway to Independence</td>
</tr>
</tbody>
</table>
## NIAID K Awards

<table>
<thead>
<tr>
<th>K</th>
<th>Award Duration</th>
<th>Salary Support (Per Year)</th>
<th>Res. Support (Per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Research Ks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K01</td>
<td>3-5 yrs.</td>
<td>Up to $75,000 plus fringe benefits</td>
<td>Up to $25,000</td>
</tr>
<tr>
<td>K25</td>
<td>3-5 yrs.</td>
<td>Up to $75,000 plus fringe benefits</td>
<td>Up to $20,000</td>
</tr>
<tr>
<td><strong>Physician-Scientists Ks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K08</td>
<td>3-5 yrs.</td>
<td>Up to $100,000 plus fringe benefits</td>
<td>Up to $50,000</td>
</tr>
<tr>
<td>K23</td>
<td>3-5 yrs.</td>
<td>Up to $100,000 plus fringe benefits</td>
<td>Up to $50,000 (POR)</td>
</tr>
<tr>
<td><strong>Transition to Faculty Ks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K22</td>
<td>2 yrs.</td>
<td>No more than $50,000</td>
<td>$150K – yr1 + $100K – yr 2</td>
</tr>
<tr>
<td>K99/R00</td>
<td>4 yrs.</td>
<td>Up to $75,000 plus fringe benefits</td>
<td>Up to $25,000</td>
</tr>
<tr>
<td><strong>Mid-Career Faculty K</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K24</td>
<td>3-5 yrs.</td>
<td>Varies, for 25-50% effort</td>
<td>Up to $50,000 (POR)</td>
</tr>
</tbody>
</table>
StARR Program: Research in Residency

- Stimulating Access to Research in Residency (StARR)
- New NIH FOA to be published shortly
- Institutes participating to date: NIAID, NCI, NHLBI
- This is a two-phase award
  - Institutional phase that supports residents
  - Individual phase that supports fellows (portable)
StARR Program: Research in Residency

- Phase I (R38) institutional awards: 5 yr award, 1 award/institution/yr supporting multiple residents
- No more than 16 R38 awards/yr across all participating Institutes during this pilot
- Peer review needed to approve progression to the Phase II (K38) award
- Phase II (K38) individual awards: support for up to 2 yr of research support at 80% PGY salary plus $10K/yr research support
- FOA to be published July-August, 2017
K Grantees Will Soon be Able to Apply for R03 Grants

- Designed to enhance the capability of K award recipients to conduct research as they complete their transition to fully independent investigator status
- R03 serves as a “bridge” for the K awardee to eventually get a R01 grant
- There is a 2.7-times greater R01 success rate for applicants who previously received a R01 after their K grant compared to K grantees who did not receive a R03.
K Grantees Will Soon be Able to Apply for R03 Grants

- NIAID K01, K08, and K23 awardees eligible
- Last two years of K award apply for R03
- Why an R03?
  - Supports research projects carried out in a short period of time with limited resources
  - Provides preliminary data to support a subsequent R01 (or equivalent) application
- Budget - Up to $50,000 direct costs per year for up to 2 years of support
- Anticipate FOA release in FY2018
NIAID K Assessment

- To determine program impact and value

- Goal of Ks – research independence, such as obtaining a R01, or similar research project grant (RPG)
### NIAID K Assessment

#### FY2005-2012

<table>
<thead>
<tr>
<th>K</th>
<th># Applicants (Discrete Individuals)</th>
<th># Awardees (Discrete Individuals)</th>
<th># Non-Awardees (Discrete Individuals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K01</td>
<td>74</td>
<td>44</td>
<td>30</td>
</tr>
<tr>
<td>K25</td>
<td>30</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>K08</td>
<td>399</td>
<td>222</td>
<td>177</td>
</tr>
<tr>
<td>K23</td>
<td>227</td>
<td>145</td>
<td>82</td>
</tr>
<tr>
<td>K22</td>
<td>287</td>
<td>121</td>
<td>166</td>
</tr>
<tr>
<td>K99</td>
<td>280</td>
<td>38</td>
<td>242</td>
</tr>
<tr>
<td>Total</td>
<td>1297</td>
<td>585</td>
<td>712</td>
</tr>
</tbody>
</table>

- **585** NIAID K Awardees
- **712** NEVER K Awardees

R01/RPG Outcomes?
## NIAID K Assessment

1297 Discrete Individual Applicants

<table>
<thead>
<tr>
<th></th>
<th>585 K AWARDEES</th>
<th>712 NEVER K AWARDEES</th>
</tr>
</thead>
<tbody>
<tr>
<td># First R01</td>
<td>253</td>
<td>112</td>
</tr>
<tr>
<td># First Other RPG</td>
<td>16</td>
<td>07</td>
</tr>
<tr>
<td>Total</td>
<td>269</td>
<td>119</td>
</tr>
<tr>
<td>% of all applicants</td>
<td>21%</td>
<td>9%</td>
</tr>
</tbody>
</table>

K Awardees get R01/RPG **2.4x** more than Non-K (NEVER K) Awardees; Ks Work!
Why were there better R01/RPG outcomes?

Likely several factors:

• K Awardee – is familiar w/ NIH grant system of funding

• K Awardee - can show successfully been through NIH peer-review in R01 application

• K Awardee – has data/publications from K (independent award, not tied to mentor) to use as prelim data in R01 application (engenders confidence)
There is no amount of Grantsmanship that will turn a bad idea into a good one.

... but there are many ways to disguise a good idea.

Dr. William Raub
Past Deputy Director, NIH
NIH Grantsmanship: How To Apply

READ all Relevant Information:

- NIAID website [https://www.niaid.nih.gov/grants-contracts/apply-grant](https://www.niaid.nih.gov/grants-contracts/apply-grant)
- Funding Opportunity Announcements (FOAs)
  - Notices in the *NIH Guide*
  - SF424 Application Instructions
  - Career Development Supplemental Instructions
NIH Grantsmanship: How To Apply

NIH website https://grants.nih.gov/grants/how-to-apply-application-guide.html

How to Apply - Application Guide

Use the application instructions found on this page along with the guidance in the funding opportunity announcement to submit grant applications to NIH, the Centers for Disease Control and Prevention, the Food and Drug Administration, and the Agency for Healthcare Research and Quality.

Important:
Access forms through the funding opportunity announcement.

Prepare to Apply

- Systems and Roles
- Register
- Understand Funding Opportunities
- Types of Applications
- Submission Options
NIH Grantsmanship: How To Apply

NIAID website [https://www.niaid.nih.gov/grants-contracts/apply-grant](https://www.niaid.nih.gov/grants-contracts/apply-grant)

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Apply for a Grant

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Sample Applications and More

Some useful samples and examples that are part of the grant application from NIAID and NIH, including sample applications and summary statements, data sharing, and model organism sharing plans.

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Determine Eligibility for NIAID Grants

Before you contemplate applying for funding, see if and how you may fit in at NIH by assessing whether your area of science falls within the NIH mission. You can also learn about qualifying for an...
Special Note: Not all NIH Institutes and Centers participate in Parent Announcements. Applicants should carefully note which ICs participate in this announcement requirements at the Table of IC-Specific Information, Requirements and Staff Contacts website. ICs that do not participate in this announcement will not strongly encouraged.

Funding Opportunity Title
NIH Pathway to Independence Award (Parent K99/R00)

Activity Code
K99/R00 Career Transition Award/Research Transition Award

Announcement Type
Reissue of PA-16-077

Related Notices
- June 21, 2016 - Modification of No-Cost Extension and Carryover of Funds Policies for the NIH Pathway to Independence Award. See Notice NOT-
- June 2, 2016 - Notice to Extend the Expiration Date for PA-16-193. See Notice NOT-OD-16-102.

Funding Opportunity Announcement (FOA) Number
PA-16-193

Companion Funding Opportunity
None

It is critical that applicants follow the Career Development (K) instructions in the SF424 (R&R) Application Guide including Supplemental Grant Application Instructions
Prepare to Write a Grant Application

Critically Assess Yourself
- Do you have the necessary expertise, resources, personnel and preliminary data to be competitive?

Assess the Potential for Your Idea
- What has already been done, reported and funded in your area?
- What are the “gaps”?
- How can you take it a step farther?

Assess the Competition
- Who are the important contributors to the field? Remember they might be your reviewers!
- What have they accomplished?
- Search the literature and the NIH RePORTER database of funded grants in the field
Search NIH funded projects

- Over 200 disease categories
- Keywords
- RFA/PA
- Investigators
- Organizations
- Funding mechanisms
- Locations
- Study Sections

[Image of NIH RePORTER website]

Grant Mechanism
Recent Awards
Study Section

https://projectreporter.nih.gov/reporter.cfm
K applications assigned to NIAID go to one of four in-house study sections, based on proposed science:

- Acquired Immunodeficiency Syndrome Research Review Committee (AIDS)
- Allergy, Immunology, and Transplantation Research Committee (AITC)
- Microbiology and Infectious Diseases Research Committee (MID) and
- Microbiology and Infectious Diseases B Subcommittee (MID B)
Contact NIH staff listed on FOA before drafting the entire proposal

Email your:

- NIH-formatted biosketch (check your eligibility)
- Draft specific aims page (check if IC is interested in your research)
Key Features of Successful Applications

Hypothesis
- A meaningful hypothesis AND a means of testing it
- A sound rationale for the hypothesis

Preliminary Data
- Documents feasibility of the proposed project
- Shows training for research proposed and ability to interpret results
- Include alternative interpretations and address limitations of methods

Well Organized Research Plan
- Aims focused *(relate to each other and the hypothesis)*
- Rationale for methods proposed, *with alternatives*
- Research flow and priorities clearly indicated
- Sufficient experimental detail to show you understand methods
- Emphasize MECHANISM *(avoid “descriptive data gathering”)*
Put Yourself in the Reviewer’s Shoes (Review Criteria)

- **Candidate**
  - Does the candidate have the potential to develop as an independent & productive researcher?
  - Are the candidate's prior training and research experience appropriate for this award?
  - Is the candidate’s academic, clinical (if relevant), and research record of high quality?

- **Career Development Plan/Career Goals and Objectives**
  - What is the likelihood that the plan will contribute substantially to the scientific development of the candidate and lead to scientific independence?
  - Are the candidate's prior training and research experience appropriate for this award?

- **Research Plan**
  - Are the proposed research questions, design, and methodology of significant scientific and technical merit?
  - Is there a strong scientific premise for the project?
  - Has the candidate presented strategies to ensure a robust and unbiased approach, as appropriate for the work proposed?

- **Mentor(s), co-Mentor(s), Collaborator(s), Consultant(s)**
  - Are the qualifications of the mentor(s) in the area of the proposed research appropriate?
  - Does the mentor(s) adequately address the candidate’s potential and his/her strengths and areas needing improvement?

- **Institutional Environment & Commitment to Training**
  - Is the institutional commitment to the career development of the candidate appropriately strong?
  - Is the environment for scientific and professional development of the candidate of high quality?
So, You’re Application Wasn’t Scored…

**Most Common Reasons for Unscored or Not Recommended for Further Considerations**

- Rationale for hypothesis or methods not sound or not supported by preliminary data
- Unfocused or superficial research plan
- Aims do NOT address hypothesis
- Flaws in experimental approaches
- Models not relevant to human situation
- Unrealistically large amount of work proposed
- Work not new or original *(lack of appreciation of published relevant work)*
- Lack of experience in essential methods
- Insufficient experimental detail
- Serious risks to human subjects or use of animals
Don’t Get Discouraged