

Funding opportunities at NIH, the
review process and thoughts related
to achieving success

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Dartmouth

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1. Preliminary Musings

2. Some Factual Stuff

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As of November, 2008...

“It’s a great time to be a
new investigator”

Now...

It's still a great time to be a
new investigator for almost all
of you

Opportunities to do science are fantastic

- Fellowship (F) success rates good (20-45%)
- Career Award (K) success rates excellent (~35-45%)
- K99/R00 was created (~20%)
- Higher paylines than for established investigators

In FY07 - FY09, the NINDS payline =
~20-30%tile compared with 9-12%tile for
established investigators)

- Director's New Innovator Award created
 - Up to \$1.5M over 5 years
 - 125 awards made in 2007-2009
 - 27% success rate in 2009

In 2007...

New investigator designation
(no major NIH grants yet)

In 2008...

ESI (10 years since degree)

We'll talk about jobs later

HAVE A LONG-RANGE PLAN

- Where are you going and how are you going to get there.
- Keep your eyes on the target and your progress.
- Be proactive.

What should you be thinking about when looking for a training environment?

- High quality science
- Significant science
- Exciting science

- Strong mentorship
- Great lab environment (people)
- Support of independence

- Institutional support for research

Find people who know what they're talking about and get help

DO NOT listen to rumors

DO NOT pay attention to those who are chronically negative

Some Factual Stuff

National Institutes of Health

- **27 Institutes or Centers (ICs)**
- **Each IC has its own mission**
- **Each IC has its own budget**
- **Each IC has its own activities**
- **Each IC has its own ways of doing things**
- **Each IC has its own personality**

When you're planning to submit a grant, check with program directors from different institutes to determine their specific policies and interest in your science.

Funding Opportunities for Trainees

The Main Menu

Funding Opportunities

Fellowships

- **F30 – NRSA for MD/PhDs (9 institutes)**
- **F31 – NRSA for MD/PHDs (NINDS)**
- **F31 – NRSA predoc. (8 institutes) (5 year max)**
- **F31 – NRSA predoc [diversity] (all institutes)**
- **F32 – NRSA postdoc. fellowship (3 year max)**

Institutional Training Grants

- **T32 – NRSA institutional training – pre & postdoc**
- **K12 – Mentored clinical scientist development award**

Funding Opportunities

Mentored Career Development Awards

- **K01** –generally for PHDs; IC-specific uses
- **K07** –Academic Career Award (few ICs)
- **K08, K23** – For clinicians doing basic or clinical research
- **K25** - Quantitative research

Career Transition Awards

- **K99/R00** - Pathway to Independence Award
- **K22** –Transition Award; 5 ICs-all different

K01 Mentored Scientist Award

- **NINDS:** Diversity, Reentry
- **NCI:** Diversity
- **NCRR:** DVMs only

- **NIAID:** Epidemiology, modeling techniques, outcomes research

- **NICHD:** Population res., medical rehab. res., child abuse and neglect research

- **NIDCD:** Retooling, transition of junior and mid-level scientists in 1) translational, 2) clinical res.

- **NIMH:** Broad use

Funding Opportunities

Independent Career Development Awards

- **K02 – Research Scientist Development**

NINDS: Clinicians only before R01

Others: MD or PHD, Career Development
after R01

- **K24 – Midcareer award in patient-oriented research**

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Some Relevant Characteristics of Different Mechanisms

For all NRSA fellowships, and all K awards except K99/R00, applicants must be a U.S. citizen or permanent resident.

Predoc (F31): 1-5 years, primarily stipend

Postdoc (F32): 1-3 years, primarily stipend

ALL POSTDOCS should be applying

K awards: 3 – 5 years, provide salary,
fringe, research costs and
protected time (most require
75% effort devoted to research)

Details for all mechanisms vary by IC

K01/K08/K23/K25... (all Mentored)

- 75% effort required for most
 - 50% effort required for neurosurgeons
 - Up to 5 years protected time
 - Up to \$85,000 salary (NINDS)
 - \$50,000 research costs (NINDS)
-
- Used differently by all institutes
 - All Ks are 12 pages (plus various forms)
 - Must be a US citizen or permanent resident

The K99/R00 Transition to Independence Award

- **What the K99/R00 was intended to do**
Speed the transition to R01 and thus reduce the age of applicants getting 1st one
- **What the K99/R00 does**
Facilitates the transition to a good academic position
- **Who gets the K99/R00**
The most creative, scientifically sound, articulate postdocs (and physician-scientists*)

K99/R00

Must have less than 5 yrs. postdoc. res. experience

- 2 years K99 (mentored)
 - 75% effort required
 - \$90,000 total cost, up to \$50,000 salary
 - Exceptions related to salary (MD, other)
- 3 years R00 (independent)
 - must have tenure track or equivalent position
 - must get appropriate startup package
 - 75% effort on research required
 - \$249,000 total cost

K99/R00

K99 phase (mentored)

- IC-specific salary differences
- IC-specific research expense differences
- IC-specific duration differences

R00 phase (independent)

- IC-specific duration differences
- Administrative review – undoubtedly IC differences

In the program announcement, there's a web table listing all of the IC-specific information.

http://grants.nih.gov/grants/guide/contacts/pa-07-297_contacts.htm

K99 Fundamentals

- Open to U.S. and Non-U.S. Citizens
- Both phases must be done in the U.S.
- For NINDS, must do at least 1 full year in K99 phase – varies by IC
- Can submit amended application, but must be within 5 year rule
- Must be in mentored position to apply

For the K99,
reviewers are looking for the Duck

Bottom line for K99 reviewers

- Am I impressed?
- Do I think this person's great?
- Does this person do great research?
- Will this person do significant research?
- Is this person creative?
- Will this person be a leader in the field?
- Are the flaws in this grant so minor, and the person and ideas so good, that I can overlook the flaws?
- Will this person get a tenure-track job within 2 years?

Research Grants for Independent Scientists



The Main R-series Grants

Large Research Grant (R01)

- 4-5 years, \$250,000 or more/yr

Exploratory Research Grant (R21)

- High Risk/High Reward
- Exploratory
- 2 years, \$275,000 total

Small Grant (R03)

- 2 year max, \$50,000/yr max
- Self-contained small project

Acad. Res. Enhancement Award (R15)

- primarily undergrad institutions

R-series Grants recommended for NI/ESI

Large Research Grant (R01)

- 4-5 years, \$250,000 or more/yr

~~Exploratory Research Grant (R21)~~

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Other Funding for Independent Scientists

- R41...R44 (STTR/SBIR) – Supports collaboration between researchers and small business
- P-type (program projects and centers)
- U-type (cooperative agreements)

NIH isn't the only game in town

- Other federal
- Private Foundations
- Do not disregard small grant opportunities

Application Preparation and Review

Applications are submitted electronically

They are submitted by your institution's business office. But you are the one who loses if it's incomplete or incorrect!

**YOU HAVE TWO DAYS TO CHECK
THE APPLICATION AFTER
SUBMISSION. YOU SHOULD CHECK!**

What happens when you submit an application?

Center for Scientific Review



Scientific Review Group/
IC Review Branch



Program, NINDS



Advisory Council-NINDS



Institute Director

**FUNDING
DECISION**



What is a study section
(scientific review group)?

Your application is reviewed at study section by:

- Experts
- Non-experts
- People who are reading lots of grants
- People who want to be excited by science
- People who will be irritated by a sloppy application

Submit a high quality application!

Have people review your application critically
WELL BEFORE submission

BEFORE study section

- 3 or more reviewers assigned to each application
- Reviewers read applications, post preliminary evaluations and scores

DURING study section

- Assigned reviewers describe strengths and weaknesses
- Some at table scan application during talks
- ALL reviewers discuss, give final score



What is required for a good training grant application?

- Significant research question
- Clear hypotheses
- Clear tests of hypotheses
- Feasibility

- Excellent career development (training) plan
- Excellent mentoring
- Appropriate institutional support
- High quality publications (where appropriate)
- Plans to evaluate progress

Hypothesis-Driven vs. Discovery Science

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The specific aims page is your
hook

Make it as perfect as possible

Write clearly, coherently, logically

DO NOT BE BORING!

DO NOT BE SLOPPY!

**DO NOT MAKE IT DIFFICULT
FOR THE REVIEWERS!**

You may not be funded on the
first submission

You may not even get an
IMPACT score!

**DO NOT TAKE REJECTION
PERSONALLY!**

PERSIST!

Fix the problems

- Don't get trapped by the new expedited review process for ESI / NI
- Know whether you should come back in quickly or take more time
- Get advice from your NIH Program Director if in doubt

Fix the problems

- You only get 2 shots
- Don't think you should come back in quickly or succumb to pressure to come back in quickly

When you miss the funding range, respond to reviewer comments appropriately



The review process has changed dramatically

- Length change; 25 → 12 + 1 pages
- Length change; 10 → 6 + 1 pages
- Change in scoring system
- More structured review
- Change in review criteria
- A2 eliminated
- UN eliminated. Now ND
- New Investigators reviewed as group

<http://www.nih.gov>

Click on “Peer Review” – lower right corner

- Changes in review were designed to place more focus on impact and less on details of approach or prelim. data
- But you'll still need sufficient attention to details

Score	Descriptor	Additional Guidance on Strengths/Weaknesses
1	Exceptional	Exceptionally strong with essentially no weaknesses
2	Outstanding	Extremely strong with negligible weaknesses
3	Excellent	Very strong with only some minor weaknesses
4	Very Good	Strong but with numerous minor weaknesses
5	Good	Strong but with at least one moderate weakness
6	Satisfactory	Some strengths but also some moderate weaknesses
7	Fair	Some strengths but with at least one major weakness
8	Marginal	A few strengths and a few major weaknesses
9	Poor	Very few strengths and numerous major weaknesses

Minor Weakness: An easily addressable weakness that does not substantially lessen impact

Moderate Weakness: A weakness that lessens impact

Major Weakness: A weakness that severely limits impact

NIH Core Review Criteria for Fs

- Candidate
- Sponsors, Collaborators, Consultants
- Research Training Plan
- Training Potential
- Institutional Environment and Commitment to Training

HINT:

Significance, Mentors, Quality are buried in here and of huge importance

NIH Core Review Criteria for Ks

- Candidate
- Career Development Plan/Mentoring
- Research Plan
- Mentors
- Environment and Institutional Commitment

NIH Core Review Criteria for RPGs

- Significance
 - Investigator(s)
 - Innovation
 - Approach
 - Environment
-
- All criteria receive a score
 - Application receives an overall **IMPACT** score that is **NOT** directly related to criterion scores

Significance is more important than ever

- The issue is not: ‘why this disease is important.’
- The issue is: **‘why this research is important’**
- For clinical research grants, you must explain how your study will make a difference to patients

BUT

**You also must demonstrate that you
can do what you say you are going to
do**

IMPACT =

Significance

plus

Can you do it

**This is ultimately what is being
scored**

Cannot emphasize this enough

- You must do important work
- You must do high quality work – reflected in journal quality, prelim. data and mentor reputation
- Pick your lab/institution based on the quality of the work AND the quality of the training AND whether you think you'll be happy there –

Do your homework and interview the place

Where to find the latest information:

1. Go to www.nih.gov and click on the “Grants” tab

OR

2. do a Google search for “NIH peer review” or “enhancing peer review”

Some Statistics

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NIH-wide F Success Rates

Fiscal Year	Number Reviewed	Number Awarded	Total cost awarded (x1000)	<u>Success Rate</u>²
2008	3,920	1,281	\$52,932	32.7%
2007	4,243	1,277	\$52,349	30.1%
2006	4,407	1,267	\$52,824	28.7%
2005	4,000	1,237	\$51,086	30.9%
2004	3,618	1,272	\$50,638	35.2%
2003	3,030	1,193	\$47,455	39.4%
2002	2,369	1,050	\$38,439	44.3%
2001	2,490	1,230	\$41,729	49.4%
2000	2,584	1,219	\$39,571	47.2%
1999	2,639	1,159	\$37,895	44.6%
1998	2,839	1,159	\$30,983	40.8%
1997	3,075	1,210	\$32,297	39.3%

apps awrds -----Success rates-----

	2008	2008	2008	2007	2006	2005		2003
NIA	118	34	29%	41%	17%	16%		54%
NIAAA	51	25	49%	65%	68%	74%		55%
NIDA	96	40	42%	50%	48%	41%		60%
NIDCD	72	27	38%	39%	40%	42%		66%
NIMH	307	88	29%	30%	25%	26%		35%
NINDS	390	100	26%	23%	21%	22%		27%

# apps	2008	2007	2006	2005	2004	2003
NIA	118	64	12	19	14	13
NIAAA	51	51	40	34	28	31
NIDA	96	133	120	101	67	68
NIDCD	72	96	91	74	76	53
NIMH	307	299	360	388	327	263
NINDS	390	398	423	366	305	179

**F31
Statistics**

F32 success rates

	2008	2007	2006	2005	2004
NIAAA	52%	48%	50%	59%	36%
NIA	12%	21%	22%	18%	41%
NIDA	43%	38%	51%	49%	44%
NIDCD	47%	41%	38%	33%	60%
NEI	28%	23%	28%	35%	51%
NIMH	26%	20%	19%	10%	27%
NINDS	23%	18%	19%	24%	25%
NIGMS	35%	38%	33%	38%	39%

In FY09, NINDS fellowship success rate = 23%

Increase in the number of Fellowship (F31, F32) applications, 2003 - 2007

	2007	2003	% increase
NIAAA	72	46	56%
NIA	140	71	97%
NIDA	181	102	77%
NIDCD	147	93	58%
NIMH	455	403	13%
NINDS	644	364	77%

K99/R00 NINDS

Applications	# Apps.	Awards	% Success
FY2007	73	14	19
FY2008	85	16	19
FY2009	109	18	17
Total	267	48	18
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Applicants			
MD	9	3	33
MD/PHD	14	3	21
PhD	192	42	22
Other	3	0	0
Total	218	48	22

K99/R00 results thus far for NINDS

31 of the first 36 awardees (through awards made 10/2008) have tenure-track positions

Others are interviewing heavily now

NIH-wide Career Awards, 2008

Activity	Number Reviewed	Number Awarded	Success Rate*	Total Cost Awarded
K01	443	172	39%	26,926,629
K02	72	27	38%	3,398,620
K07	84	29	35%	3,805,123
K08	509	222	44%	30,178,636
K12	36	19	53%	11,846,194
K22	115	26	23%	4,066,411
K23	574	216	38%	31,635,924
K24	97	49	51%	7,776,530
K25	50	24	48%	3,072,154
K99	795	180	23%	17,195,013

NIH-wide RPG Success Rates

	Mech.	2008	2007	2006
New	P01	34%	27%	22%
New	R01	19%	19%	16%
New	R03	22%	24%	19%
New	R15	26%	24%	24%
New	R21	17%	16%	15%
Cont	P01	41%	47%	43%
Cont	R01	35%	36%	34%
Cont	R15	46%	49%	42%

Keep in mind, success rates are underestimates because of how they're calculated

Applicant success rate is higher!

Miscellaneous Musings

(forgive me, some of this is preachy
but my experience tells me it needs to
be said)

A research career is a blast...

But you have to be good
(you'll hear this more than once!)

Evaluate yourself honestly
(not what you wish, but what is)

Are you publishing in the best journals?

Do you have good first author papers?

If not, why not?

If not, when are you planning to start?

Realize, high quality publications are the key to the kingdom – and some good ones must be first author

When you look around you, are you one of the best predocs or postdocs you know? If not, do you want to be? What do you want?

When you read your grant, do you think the leader in your field would be impressed?

- If not, keep writing.
- You must get rid of your ego and be honest with regard to your writing
- You must get help (from your mentor)

You are ultimately the person
responsible for your success

You must have some first author papers
in good journals

Interviews and lab/institution situations
are two way streets – you must get what
you need to succeed

If you are in a bad situation, get out

You must find your passion -

This is not an easy job – never was

And there's a lot of frustration and
rejection

But if you find your passion, there's no
better job

The little secret nobody says but everybody knows (ssshh!)

Biggest factors in success:

- Fire in the Belly
- Important Project
- Good Mentoring
- Strong Institutional Support

Remember to

HAVE FUN
&
HAVE A LIFE

(those who don't choose not to!)

Sorry, I'm not quite done

You are not ENTITLED to an independent research position – you need to position yourself to get one

Stay positive, optimistic and keep moving forward

Jobs are bad all over right now – just hang in there

OK, let's talk jobs

1. There are jobs now
2. There will be more in the future
3. You need to expand your thinking about what job you want
4. You don't want the job you "should" want, you want the job that's best for you

Don't be negative – it's completely
pointless

If you have questions:

Email or Call

Program Director - questions related to science

Training Director (e.g. me at NINDS) - for questions related to mechanisms, application preparation, etc.

Who you need to speak with will vary by institute