NIH Primer:
Demystifying the Funding Process

Strategies for a Successful Grant Submission

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Vice President of Research
Legacy Research Institute

April 11, 2018

LEGACY HEALTH
LEGACY RESEARCH INSTITUTE

Transforming Medical Care through Research

What's an NIH?

National Institutes of Health

NCI	NEI	NHLBI
NHGRI	NIA	NIAAA
NIAID	NIAMS	NIBIB
NICHD	NIDCD	NIDCR
NIDDK	NIDA	NIEHS
NIGMS	NIMH	NIMHD
NINDS	NINR	NLM
CC	CIT	CSR
FIC	NCATS	NCCIH
OD		

Find the right Institute/funding source?

- **www.nih.gov**
- **www.“institute”.nih.gov**

How do I find current FOAs?

NIH Institute web sites

NIH Guide – you can subscribe!

http://grants2.nih.gov/grants/guide/index.html

The NIH Guide is worth its weight in gold!

(Subscribe to it!)

Three Government **Officials**…

You ***Should Know!***

Program – *Program Officer*

Review – *Scientific Review Officer*

Grants Management – *Grants Specialist*

Program

Program Officer (PO)

- Sets scientific/programmatic priorities
- Interacts with the extramural grantee community to assess research needs and opportunities
- Provides scientific expertise to Institute & other NIH components and federal agencies
- Develops research concepts and initiatives
- Facilitates investigator-initiated research by advising investigators on funding opportunities

Program

Program Officer (PO) *(cont'd)*

- Reviews applications and proposals for responsiveness to published initiatives
- ***Observes/listens to peer-review meetings***
- Provides information on program priorities, grant process, application submission, research issues
- Recommends funding
- Administers grants, cooperative agreements & contracts
- Monitors progress

➢ ***Advocate for the researcher (for good science)***

Review

Scientific Review Officer (SRO)

- Selects SRG (Scientific Review Group) members and conducts the review
- Assigns applications to SRG members (reviewers)
- Provides scientific, administrative, & logistical oversight of the peer review process
- Conducts the SRG review
- Prepares the Summary Statement
- Provides information on technical aspects of grant application submission and review

Grants Management

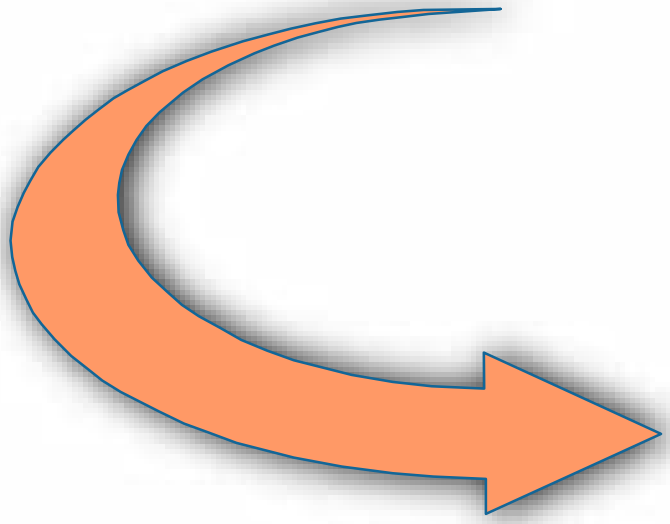
Grants Specialist

- Initiates and implements the funding process
- Negotiates the terms of grant award
- Generates the Notice of Grant Award
- Responds to applicant and staff policy questions about allowable costs, actions, and approvals
- Watches over budgetary issues
- Ensures compliance of grantee with Institute policies and regulations

Dual Review System for Grant Applications

First Level of Review

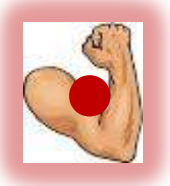
Scientific Review Group (SRG)



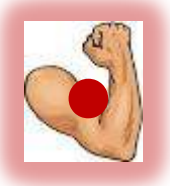
Second Level of Review

Institute's National Advisory Council

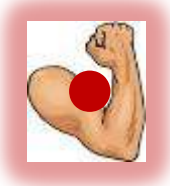
Components of a Successful Grant Application – *Bottom Line!*



Strong Idea



Strong Science



Strong Application

Before You Start Writing

Do your homework!

- Find the right NIH Institute
- Review the Institute FOAs
- Find the right funding mechanism
- Know the review committee(s)
- Talk to the Program Officer at the Institute

Except for deciding on a funding mechanism, there's no requirement that you do any of these!

Funding Mechanisms

Funding Mechanisms

Graduate Student

NRSA F30, F31, R36, T32

Postdoctoral

NRSA F32, T32

Transition

K01, K08, K23, K12, K22, K99/R00

Early Career

R03, R01, R21, R15

Mid-Career

R01, K02, P01, K24

Senior Investigator

K05

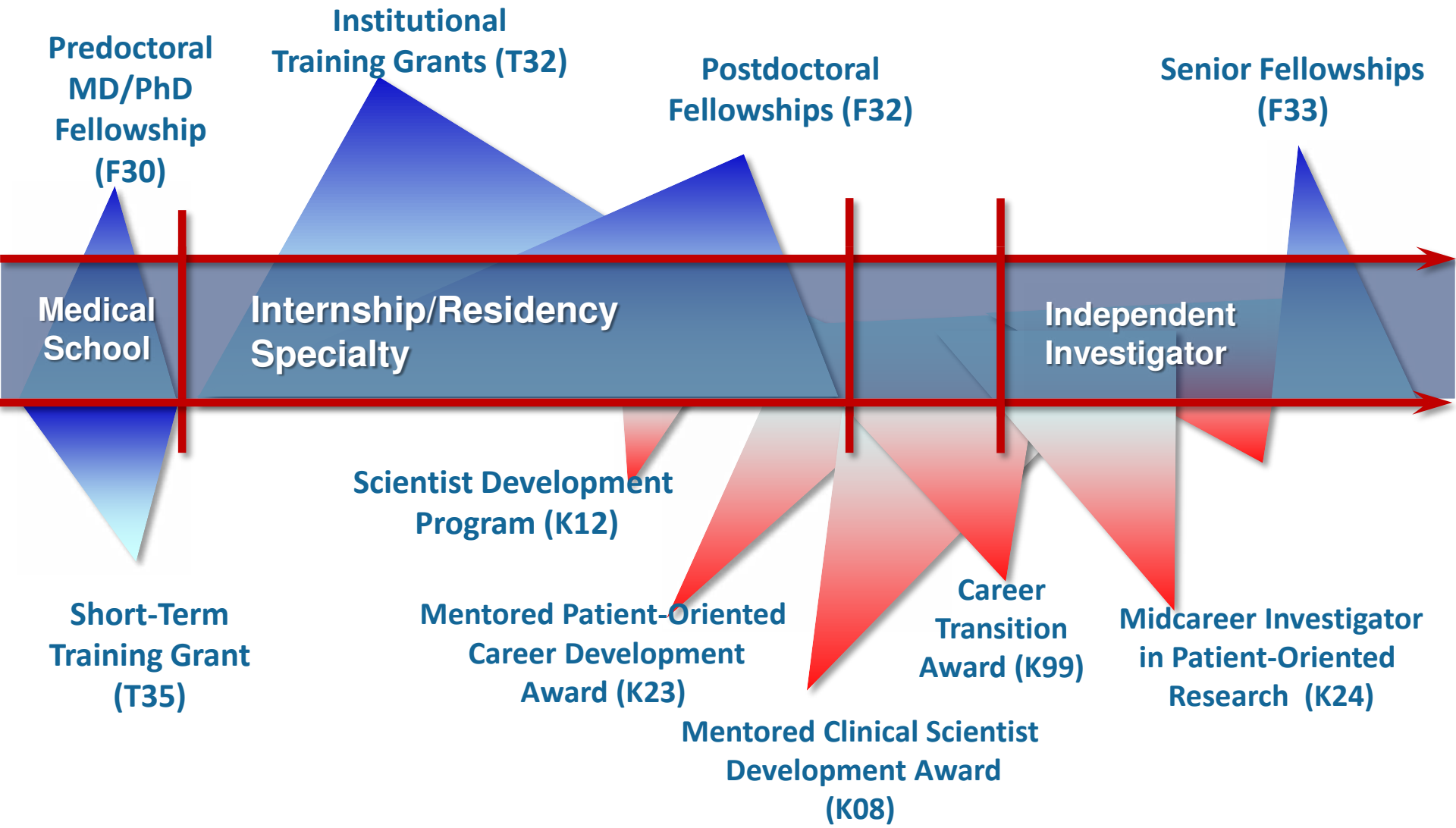
NIH Funding Mechanisms

http://grants.nih.gov/grants/oer.htm

NIH Funding Mechanisms

Talk to your Program Officer

Awards for Individuals with a Health-Professional Doctorate (MD, DDS, DVM, etc.)



Selected NIH Resources for New Investigators

WHO IS FUNDED BY NIH?

To find abstracts of funded NIH grants at your university, in your state and for future postdoctoral opportunities.

RePORTER http://projectreporter.nih.gov/reporter.cfm

TRAINING

For information on research training, including individual fellowships (Fs) and institutional fellowships (Ts):
http://www.drugabuse.gov/researchtraining/traininghome.html

For information on research training on NIH campus through the intramural research program (IRP): https://www.training.nih.gov/
Consider funding through the Research Supplements to Promote Diversity in Health-Related Research program: PA Number: PA-05-015, http://grants.nih.gov/grants/guide/pa-files/pa-05-015.html

Selected NIH Resources for New Investigators

GRANT INFORMATION

Subscribe to NIH guide http://grants.nih.gov/grants/guide/

Advice on how to write a grant application
http://www.ninds.nih.gov/funding/write_grant_doc.htm

Example of a grant application (will be updated this year)
http://funding.niaid.nih.gov/ncn/grants/app/default.htm#intro

AAAS NIH R01 Tool Kit
http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2007_07_27/caredit_a0700106

NIH Regional Seminars on Program Funding and Grants Administration: http://grants.nih.gov/grants/seminars.htm

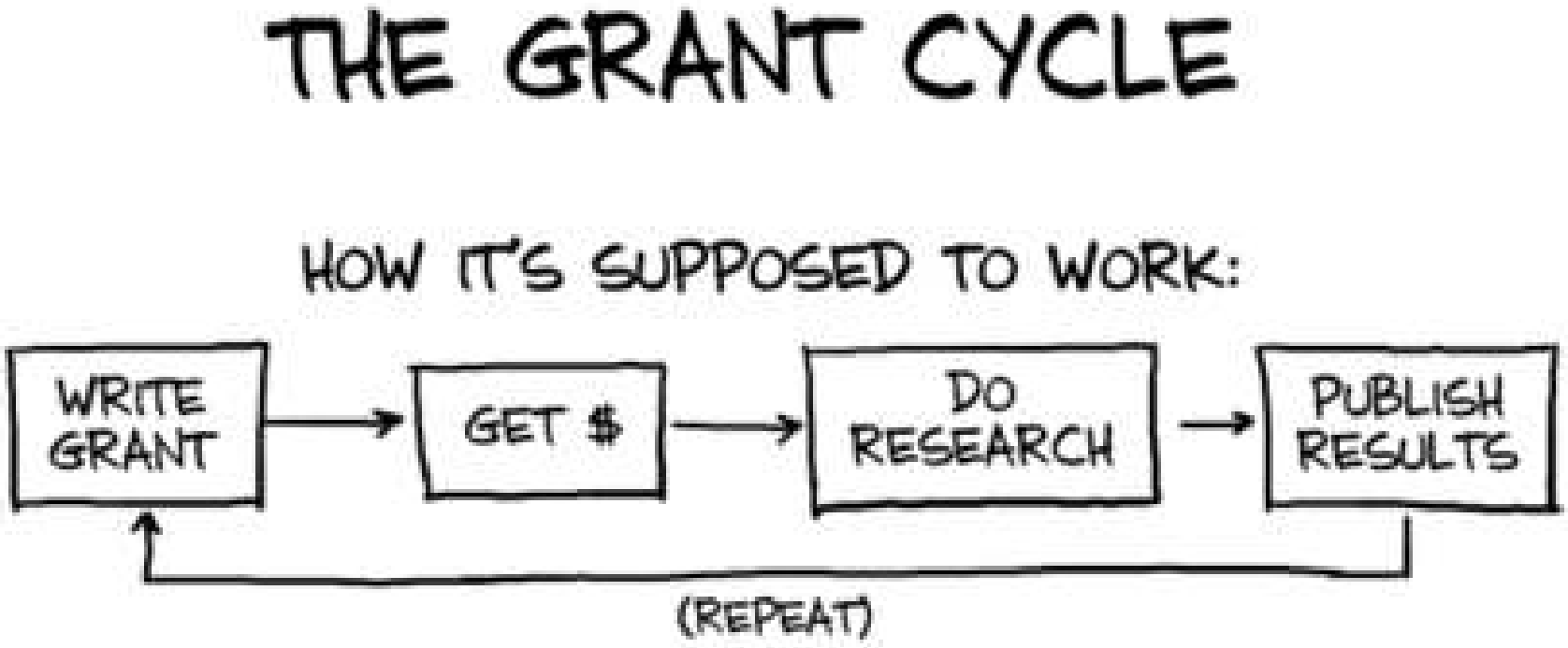
Selected NIH Resources for New Investigators

NIH video of a grant review

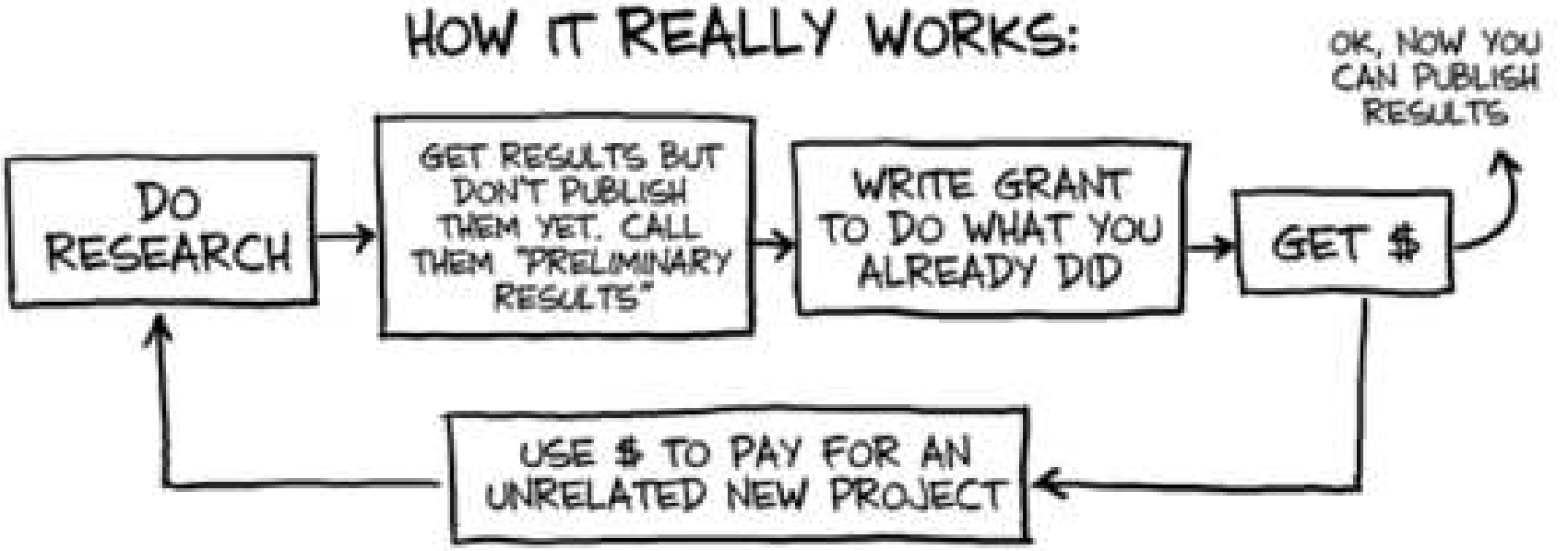
http://cms.csr.nih.gov/ResourcesforApplicants/InsidetheNIHGrantReviewProcessVideo.htm


The Grant Process?!

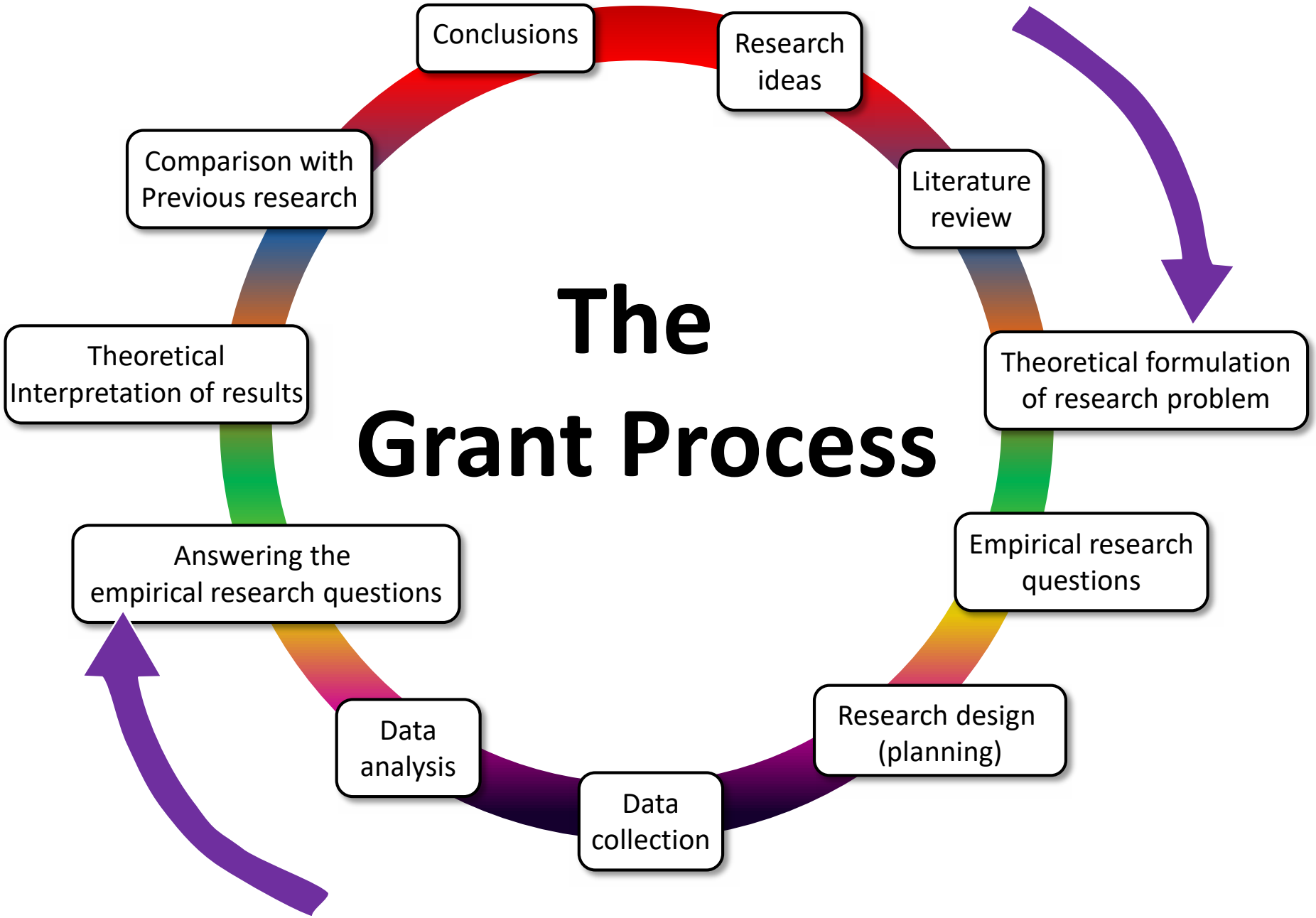
The Grant Process



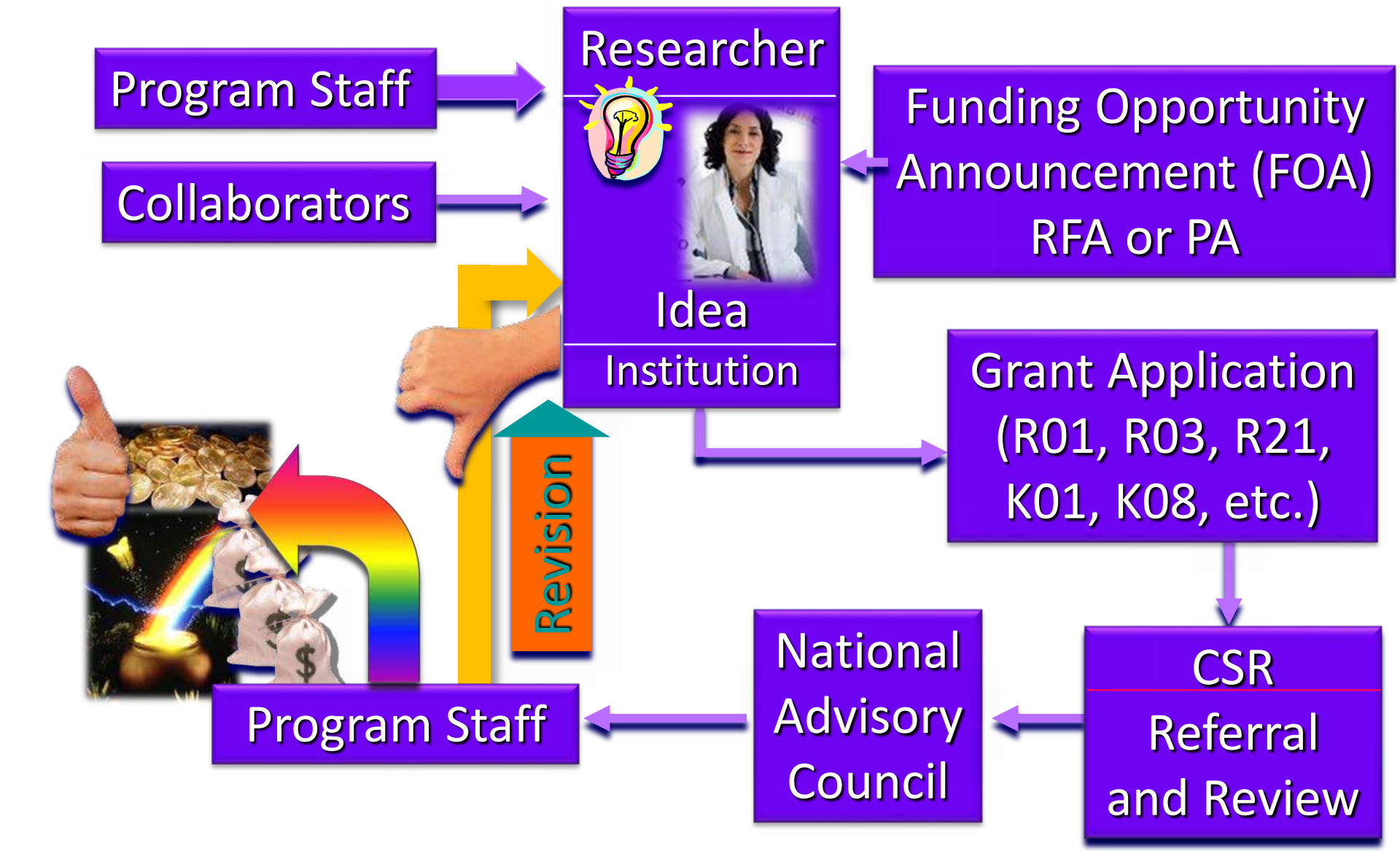
The Grant Process



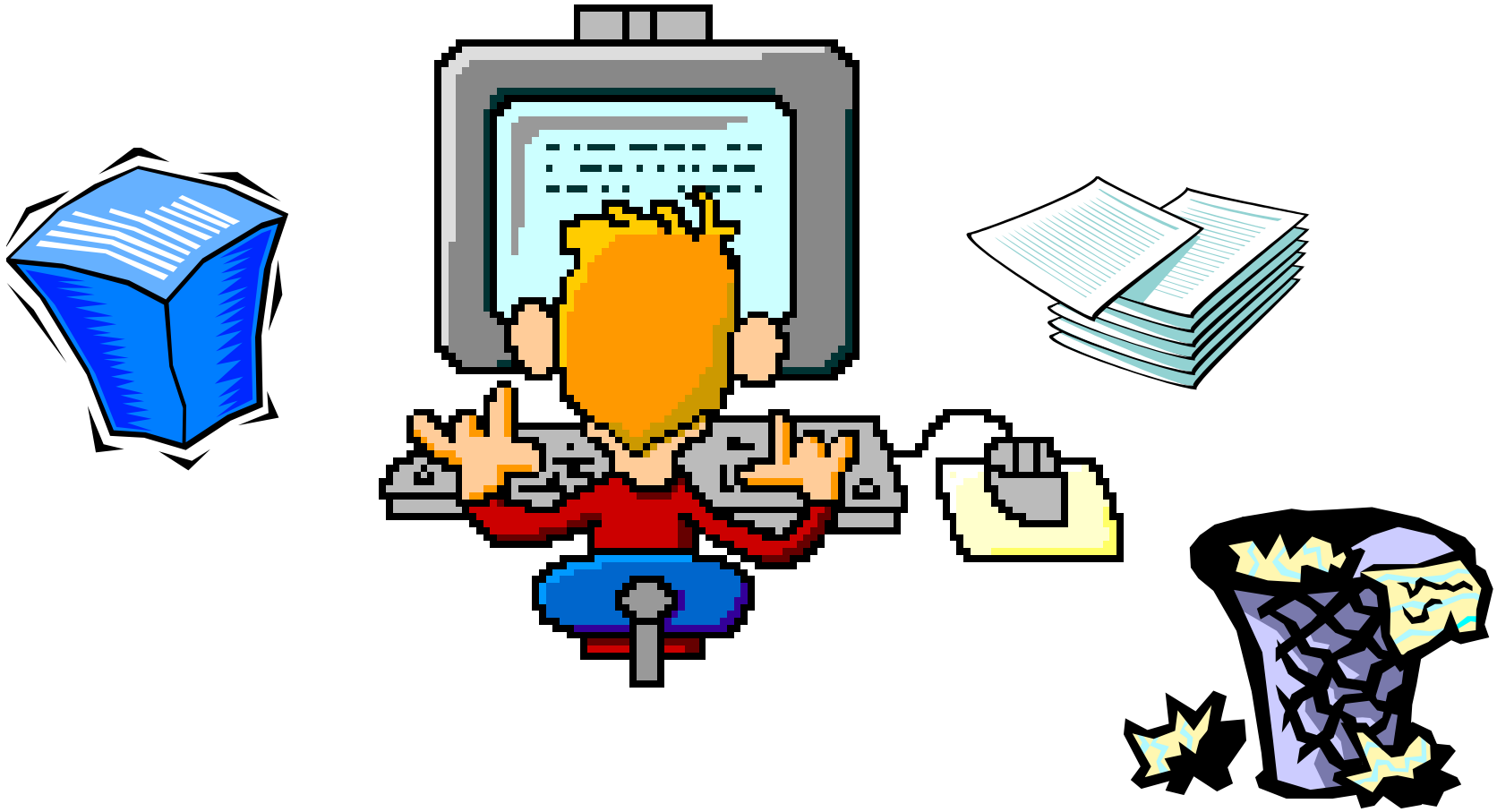
***footnote**: Thanks to Anthony from U. Guelph for this comic idea!


The
Grant Process
Research ideas
Literature review
Theoretical formulation of research problem
Empirical research questions
Research design (planning)
Data collection
Data analysis
Answering the empirical research questions
Theoretical Interpretation of results
Comparison with Previous research
Conclusions

"Anatomy" of the Grant Process



Fill out the application …



E-mail through: GRANTS.GOV

After you hit "Submit" button:

…hope and pray for the best

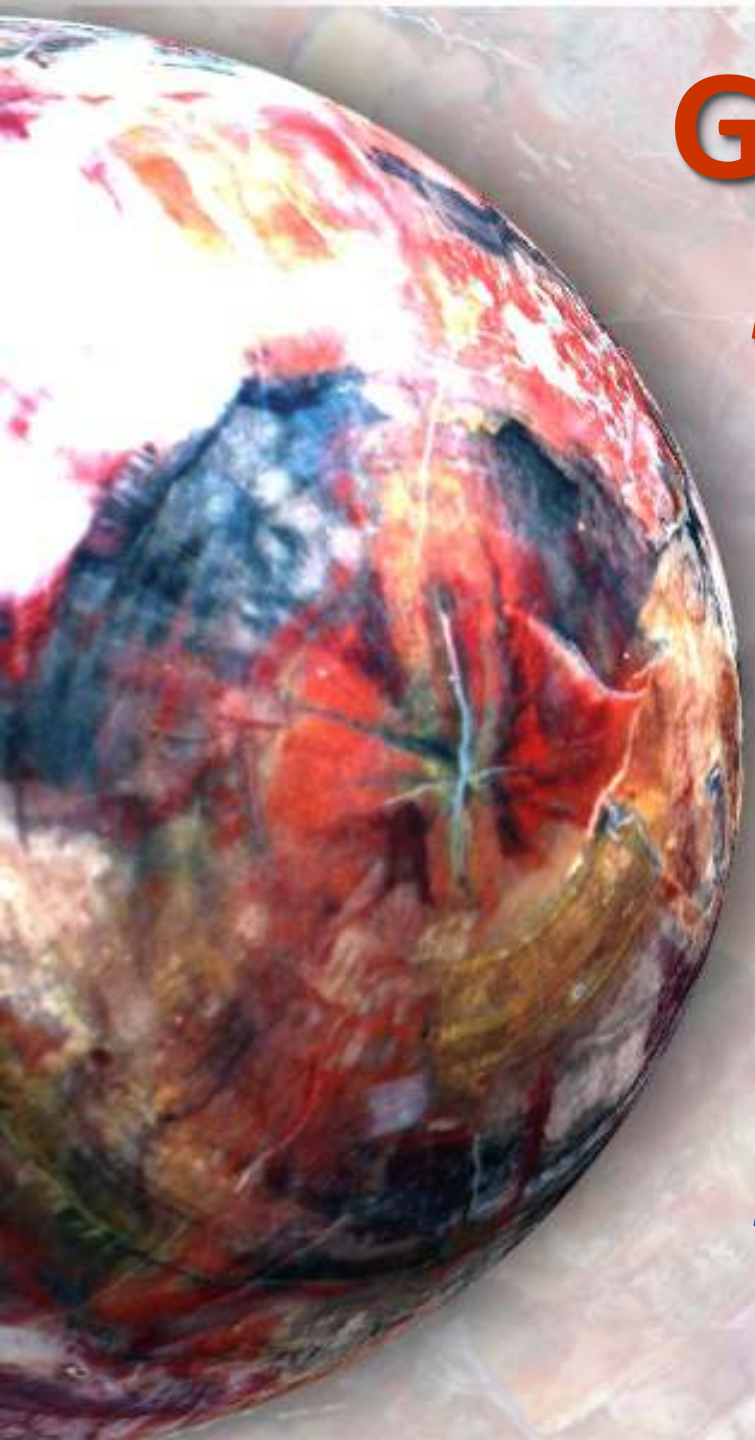
The End

the end

You're done!


BUT WAIT!
THERE'S MORE
memegenerator.net

The Grant Process…



Grant Process:
Myth and Reality

. . . not a process by which bad ideas get transformed into good ones –

but instead, it is more often the case of a good idea disguised as a bad one!

Before Starting (*The "Reality"*)

It generally takes 3 – 6 months to write a grant application;

***…therefore, planning** is **essential**!!!*

- Check with your institution's grants office to see what deadlines/requirements they have
  --- you'll need to work with them to apply

- Allow time for your own ***internal*** review and to make the revisions/edits from that review

General Planning Guide for New Applications

Know the Review Committee(s)

Why?

- **Know the audience to whom you are writing**
- **Find the committee that has the best expertise to review your application**

Finding the Review Committee(s)

Center for Scientific Review:

http://www.csr.nih.gov/Committees/rosterindex.asp#A

Concept Development

- Focused sequence of studies that builds - on one another - and sets out to answer a particular question

- Planned studies that are:

  -- hypothesis driven

  -- follow a logical sequence

  -- have a contingency plan if studies don't work

  -- provide useful information regardless of outcome

Concept Development

Questions to continually ask yourself:

-- What will be learned?

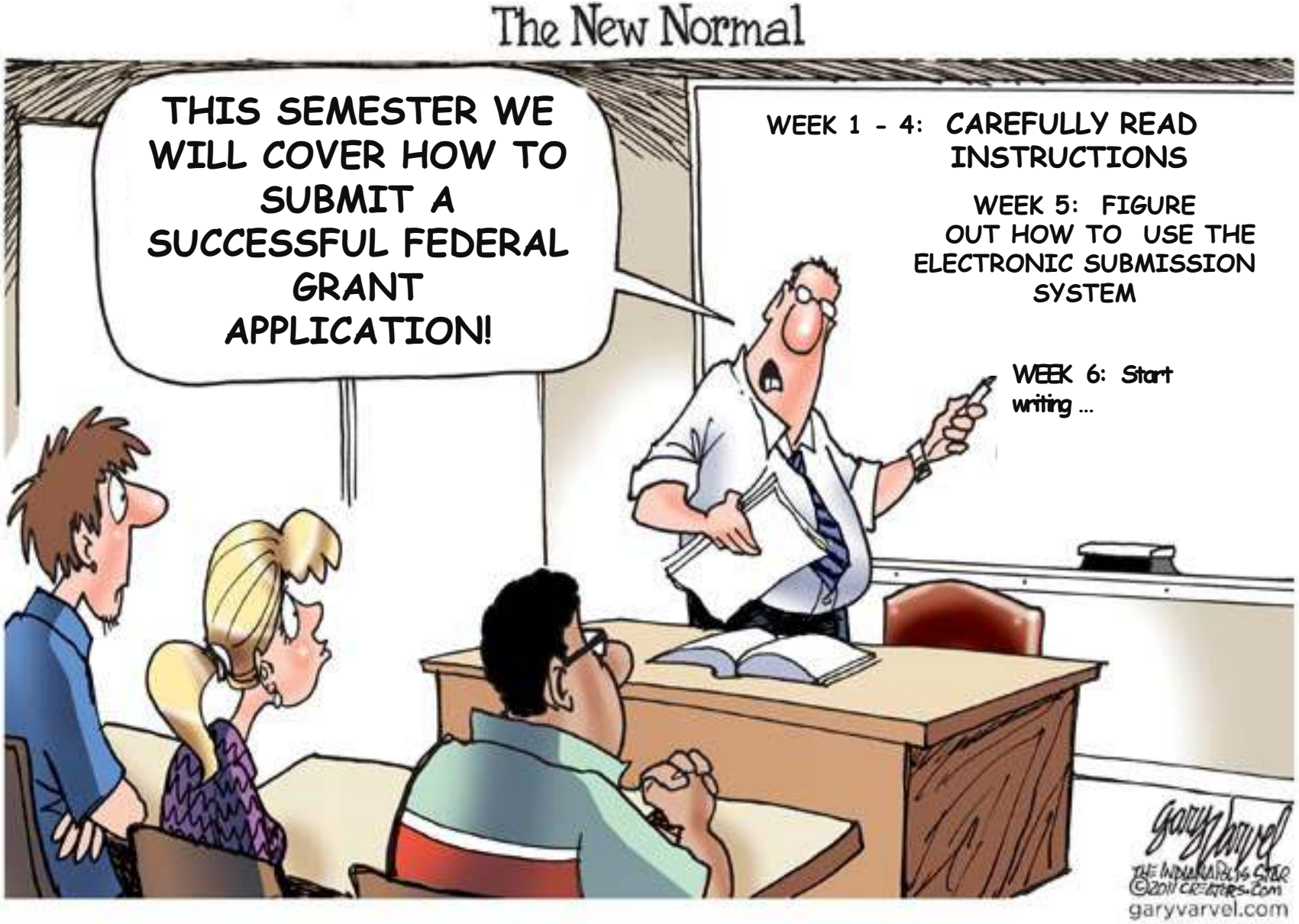
-- Why is this research important?

Before Starting

Get with the Program!

- Talk to Program at appropriate Institute(s)
- Know your audience - review committee
- *Propose research that you are passionate about and totally committed to doing –*

THIS WILL COME THROUGH!!!


The New Normal
THIS SEMESTER WE WILL COVER HOW TO SUBMIT A SUCCESSFUL FEDERAL GRANT APPLICATION!
WEEK 1 - 4: CAREFULLY READ INSTRUCTIONS
WEEK 5: FIGURE OUT HOW TO USE THE ELECTRONIC SUBMISSION SYSTEM
WEEK 6: Start writing ...
garyvarvel.com

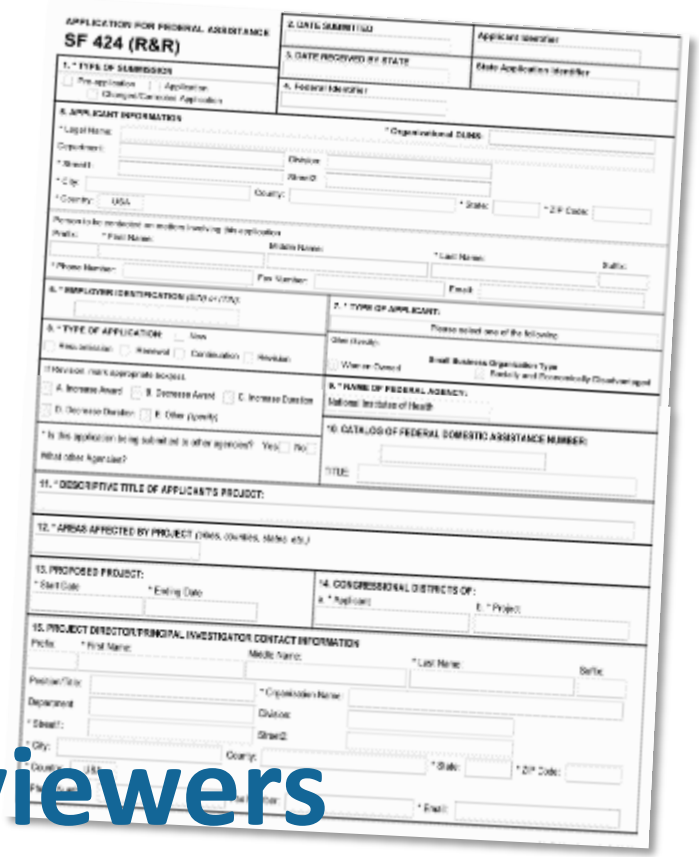
The SCIENCE

- Define a fundamental question
- Transform idea(s) into an exciting story/ "a scientific journey"
- Build confidence and enthusiasm *(and sense of importance/relevance of your particular research to the field)*

Writing -- *General Comments*

- Investigate a significant issue in science
- Use clear and concise language
- Propose a doable project

The Application


APPLICATION FOR FEDERAL ASSISTANCE
SF 424 (R&R)

12 pages
… to convince reviewers

* For RO1s, most Ks and some other grant mechanisms

keep up-to-date with changes
by subscribing to the NIH Guide!

The Research Plan

- Specific Aims
- Background and Significance
- Preliminary Studies
- Research Design and Methods
- Human Subjects
- Vertebrate Animals
- Literature Cited
- Consortium/Contractual Arrangements
- Consultants

Writing -- General Comments (cont)

- Create interest and build enthusiasm about project
- Be very concerned about "packaging"
- Never assume your audience will "know what you mean"

Title (the "Hook")

Clear and descriptive

Abstract (Project Description)

Present the big picture

Abstract (Project Description)

… the 2nd "Hook" … use it as another important opportunity

If the reviewers aren't excited after reading the abstract…

Specific Aims

- Provide the big picture
- Hypothesis driven
- Have clear focus
- Be realistic

Specific Aims

Summary of your goals

What will be the IMPACT!

Your best shot!

If the reviewers aren't enthusiastic by the end of the Specific Aims, they're seldom won back

Specific Aims

- The aims of the proposed research indicate what is to be accomplished so clarity is of utmost importance
- The review committee will evaluate your application in terms of the adequacy of the design, sampling plan, and data analyses for addressing each specific aim
- The Background and Significance and Data analysis sections should be organized in terms of each specific objective

Specific Aims

- State specific aim; each specific aim is its own section
- State hypothesis associated with that specific aim
- State question(s) associated with that hypothesis
- Provide rationale for each question
- Describe experiments
- Expected results, interpretation, shortcomings and pitfalls

Background & Significance

- Provide enough background information so the reviewer appreciates what you are proposing
- Extraneous information is distracting
- Organize information by specific aim and use bold headings
- Use terminal sentences pointing to your goal at the end of each specific aim section

Significance

Why is what you want to do important?

How will what you want to do change the field?

Significance

Succinct, scholarly, and persuasive dialogue that ends with ***why the research should be done***

If the reviewer can ask the question – "So what? Or "Who cares?" then . . .

Significance

- Be imaginative
- Avoid unrealistic ideas
- Keep it simple
- Be brief

Preliminary Studies

- Present preliminary data that supports the feasibility of each specific aim
- Do not present preliminary data that completely accomplishes the specific aim
- Present preliminary data that shows you can use a new technique
- Present preliminary data to support your development and validation of a previously undescribed technique

Preliminary Studies

- For first time applicants – describe all of the relevant prior work and experience of each key investigator
- As part of demonstrating feasibility, provide information on training experience and skills represented in the team
- Argue your collective capacity to accomplish the field work and do the science

Research Design & Methods

- For first time applicants – describe all of the relevant prior work and experience of each key investigator
- As part of demonstrating feasibility, provide information on training experience and skills represented in the team
- Argue your collective capacity to accomplish the field work and do the science

Research Design & Methods

- Present most often used methods first each in separate titled paragraphs
- Present in a depth that is inversely proportional to your published experience with the methods
- Cite publications for the methods you have used
- Refer to the preliminary data when describing unpublished methods

Human Subjects/Vertebrate Animals

- Follow the instructions carefully
- Providing details is good
- Be realistic about number of subjects/animals
- Be aware of rules governing limitations of use

Innovation

- *What's new here?*
- *Are there novel concepts, approaches, methodologies?*

Approach

- Provide rationales throughout as to why certain methods were selected and why key alternatives were not
- Provide timeline – a realistic and well-planned estimate of start/end times for each experiment
- Address potential problems and solutions


Anticipate and Avoid Pitfalls

Approach

- What are possible alternative approaches?
- Why are you using the approach you are?
- Why are you not using one of the alternatives?
- What are the strengths and weaknesses of the approach you are using?
- Are there any pitfalls you foresee?
- How will you deal with them?
- What are the major strengths and weaknesses of your research plan?

Approach

(Avoid These Criticisms!)

- Not enough detail
- Methods out of date
- Experiments don’t test the hypotheses
- What hypothesis/hypotheses?

Some Further Tips/Suggestions

- Wonderfully elaborate and detailed methods, techniques, and procedures are ***worthless*** if you do not convince reviewers that the study is worth doing in the first place!
- "High tech" is no substitute for solid, logical planning

Just to Reiterate…

- *Nothing beats a good idea*
- *Be realistic*
- *The presentation - clear and simple, easy to read*
- *Present yourself as the greatest expert in the field*
- *Submit a realistic budget*

Just to Reiterate…

- *Articulate a worthwhile, single, overall objective (a rather focused objective in the case of experimental research)*
- *Articulate Specific Aims that are clearly related to one another and logically fit under the umbrella of the overall objective*
- *Present gaps in our knowledge*
- *Plant the seed for achieving each specific aim by presenting the questions to be asked which will fill the gaps*

Just to Reiterate…

- *Ask questions that are answerable*
- *Provide tantalizing preliminary data as evidence that the questions are worth asking and answerable*
- *Propose technical approaches that are within the realm of your published technical expertise OR provide preliminary data*
- *The volume of work proposed should be proportional to the time of support requested and your other obligations*

Just to Reiterate…

- *Assume (almost) total ignorance on the part of the reviewers*
- *Provide all of the simplest conceptual background*
- *No abbreviations or acronyms without definitions*
- *Use diagrams and to illustrate concepts and models*
- *Use formatting for emphasis*
- *Be redundant (of important points)*

Just to Reiterate…

- *Think of the reviewer (and as a reviewer)*
- *Avoid verbosity and jargon*
- *Do not force the reviewer to hunt through the application for information*

Just to Reiterate…

- *Know the literature in depth and breadth*
- *Do not make statements without attribution or preliminary data*
- *Do not be reluctant to admit shortcomings (provide "Plan B")*
- *Seek collaborators or mentors when your expertise cannot be documented*

Just to Reiterate…

- *Request only what you need and you can defend*
- *Do not request less than you need*
- *Justify every item in the budget thoroughly*
- *Present evidence that your institution supports your research*

Common Reasons for Unfundable Scores

- Poor organization
- Not an integrated body of work
- Exercise in data collection
- “Fishing expedition”
- Work too descriptive and not analytic or experimental
- No compelling case made for the theoretical or practical utility of anticipated findings

Common Reasons for Unfundable Scores

- Lack of sufficient detail
- Insufficient convincing preliminary data
- Applicant not capable of performing the work
- Inadequate institutional support
- Objective not very important to health and disease
- Overly ambitious

"Rule of 4 P's"

Be ProACTIVE!!!

"Rule of 4 P's"

Be ProACTIVE!!!

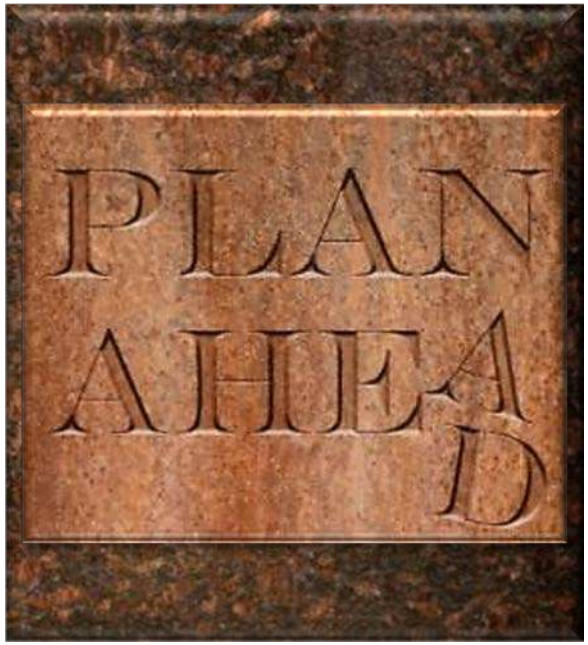
Be PERSISTENT!!!

"Rule of 4 P's"

Be ProACTIVE!!!

Be PERSISTENT!!!

PLAN Ahead!!!



"Rule of 4 P's"

Be ProACTIVE!!!

Be PERSISTENT!!!

PLAN Ahead!!!

Talk with your PROGRAM OFFICER!!!


SG AB 839

You miss 100% of the shots you never take

Wayne Gretzky

You will not get a grant

You *Don't* Apply!

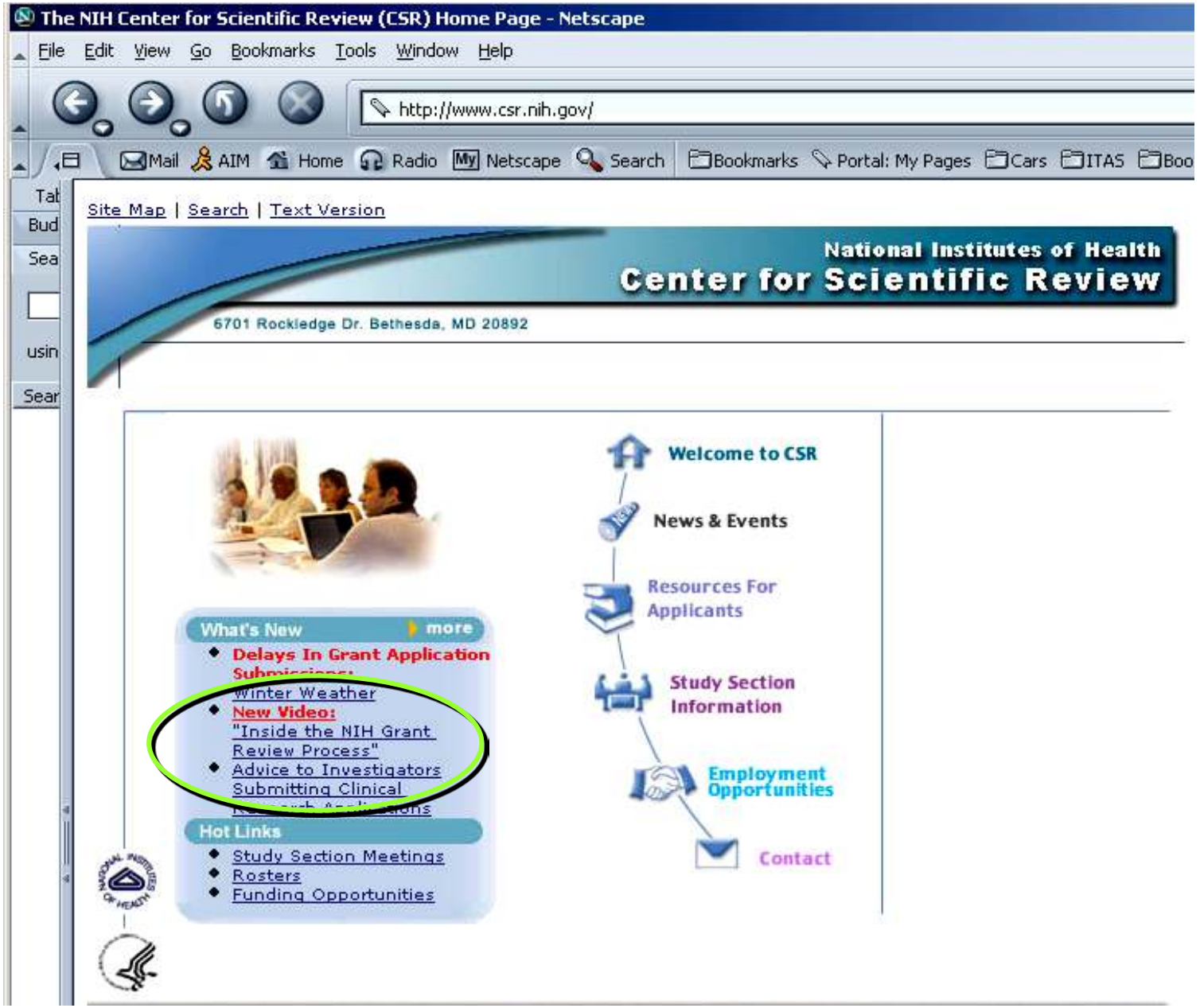

Ok, so what happens next?

The Peer Review Process

"Is it just me or are these review panels getting a lot tougher?"

We have read your application and
are giving it serious consideration!

We **have** read your application and
are giving it **serious** consideration!


The NIH Center for Scientific Review (CSR) Home Page - Netscape
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Site Map | Search | Text Version
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Resources For Applicants
Study Section Information
Employment Opportunities
Contact
What's New more
Delays In Grant Application
Winter Weather
New Video:
"Inside the NIH Grant Review Process"
Advice to Investigators Submitting Clinical
Hot Links
Study Section Meetings
Rosters
Funding Opportunities

CSR - Inside the NIH Grant Review Process - Netscape

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http://www.csr.nih.gov/Video/Video.asp

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Center for Scientific Review

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News & Events
Resources For Applicants
Study Section Information
Employment Opportunities
Contact

Inside the NIH Grant Review Process

Inside the NIH Grant Review Process

PRINTER FRIENDLY

A Video on Peer Review at NIH

The Center for Scientific Review has produced a video of a mock study section meeting to provide an inside look at how NIH grant applications are reviewed for scientific and technical merit. The video shows how outside experts assess applications and how review meetings are conducted to ensure fairness. The video also includes information on what applicants can do to improve the chances their applications will receive a positive review.

To make the video both authentic and authoritative, real reviewers volunteered to review real but altered and disguised applications. NIH staff members also volunteered to participate in this video, which was developed in collaboration with the NIH Office of Extramural Research.

Download the Video

Click on the link below to run the 39-minute video, using Windows Media software.

"Inside the NIH Grant Review Process"

256K for faster Web connections
56K for slower Web connections
Text of the video in PDF format

You can download the latest free version of the Windows Media Player from Microsoft's

View the Documents Used in the Video

Read the fictionalized documents used in the video to get a better understanding of the review process:

applications, summary statements, and the program announcements

Get More Information

Ima Krank
(301) 443-0000
kranki@nih.gov

SUMMARY STATEMENT

(Privileged Communication) *Release Date: 05/26/2011*

Application Number: **1 R01 HL12345-01**

Grant, I. Needa, Ph.D.
Department of Medicine
Hallowed Hall
University of Beaware
Old Ark, DE 02468

Review Group: NPBAD
Neuropathology of Biochemical and Analytical Disorders

PCC: **CD/ LT**
Dual PCC: **XD**
Dual IC(s): **MH**

Project Title: Computational Stress Analysis on Atherosclerotic Plaques

***SRG Action*:** **Priority Score: 42 Percentile: 51**
Human Subjects: ***44*-Human subjects involved – SRG concerns**
Animal Subjects: ***10*-No live vertebrate animals involved for competing appl**
Gender: ***1A*-Both genders, scientifically acceptable**
Minority: ***1A*-Minorities and non-minorities, scientifically acceptable**
Children: ***1A*-Both Children and Adults, scientifically acceptable**
Clinical Research – not NIH-defined Phase III Trial

Project Year	Direct Costs Requested	Estimated Total Costs
1	$ 225,000	$ 212,500
2	$ 234,000	$ 208,500
3	$ 228,000	$ 213,345

RESUME AND SUMMARY OF DISCUSSION: The purpose of this application is to…

Significance: 2
Investigator(s): 3
Innovation: 3
Approach: 3
Environment: 2

Overall Impact: Dr. Faubion is an excellent physician-scientist who is an up and coming leader in the area of Treg biology related to GI diseases. He has published a number of very good manuscripts in the first funding period investigating the role of transcription factors and modulation of chromatin modifying complexes in Treg biology. In this application, he proposes to study the exciting area of epigenetic modulation of Treg suppressive function through the EZH2 signaling pathway. The area of investigation is considered highly significant. Globally, while studied by other leading investigators, pursuing regulation of epigenetic modifications of FoxP3 and Treg biology as a therapeutic approach for IBD is considered innovative. Enthusiasm for this application was somewhat dampened by the failure by the applicant to integrate and discuss the findings of three high profile recent papers that are directly related to this application (and suggest alternative mechanisms). In addition, the studies assessing the role of IL-6 related biology on the regulation of EZH2-mediated signaling would be strengthened by more preliminary data.

1. Significance:

Strengths

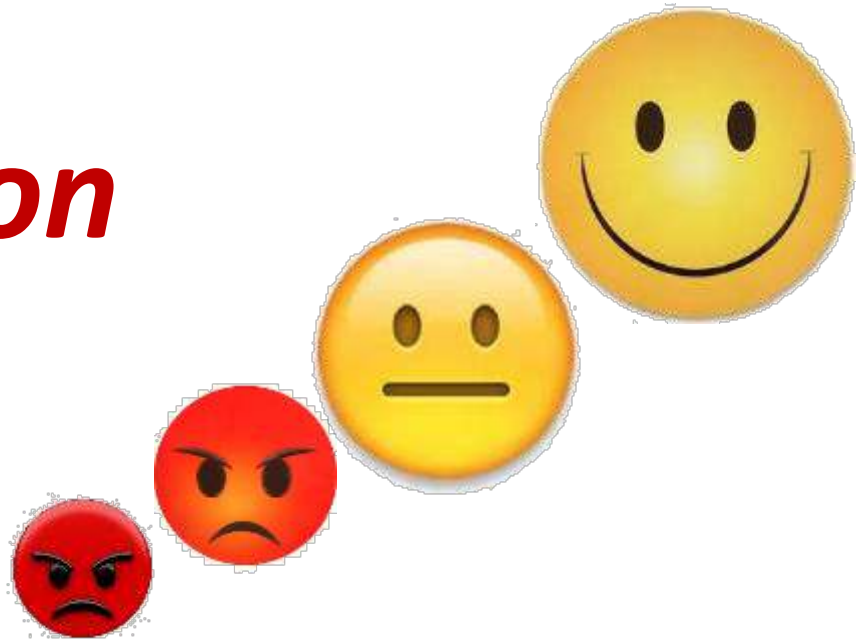
- Deciphering the role of epigenetic regulation of FoxP3 and Tregs has clear relevance to immune-mediated disease. Dr. Faubion's group made the initial discovery, confirmed by others in high impact journals, of a role for the histone methyl transferase EZH2 in the regulation of FoxP3.

- Inflammatory processes that potentially paralyze the HMT activity of EZH2 has relevance to Treg-targeted therapies. 2. Investigator(s): Strengths Dr. Faubion is an excellent physician scientist. He is an Associate Professor of Pediatrics, Medicine and Immunology at the Mayo Clinic.

NOW WHAT TO DO?!!

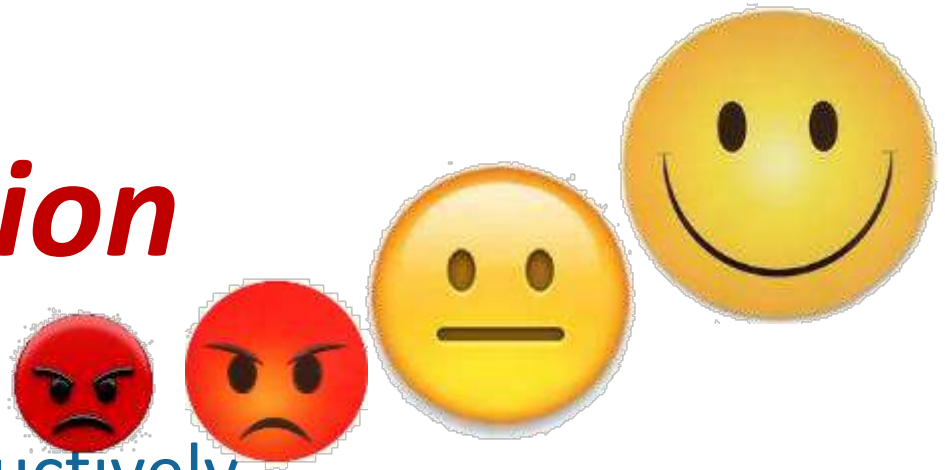
- Read summary statement
- Reread summary statement
- ***Talk with your Program Officer***
- Revise the application
- Resubmit the application

The Reapplication



- Be polite/diplomatic
- Respond to all criticisms
- Provide explicit statement of responses
- Add additional pilot data

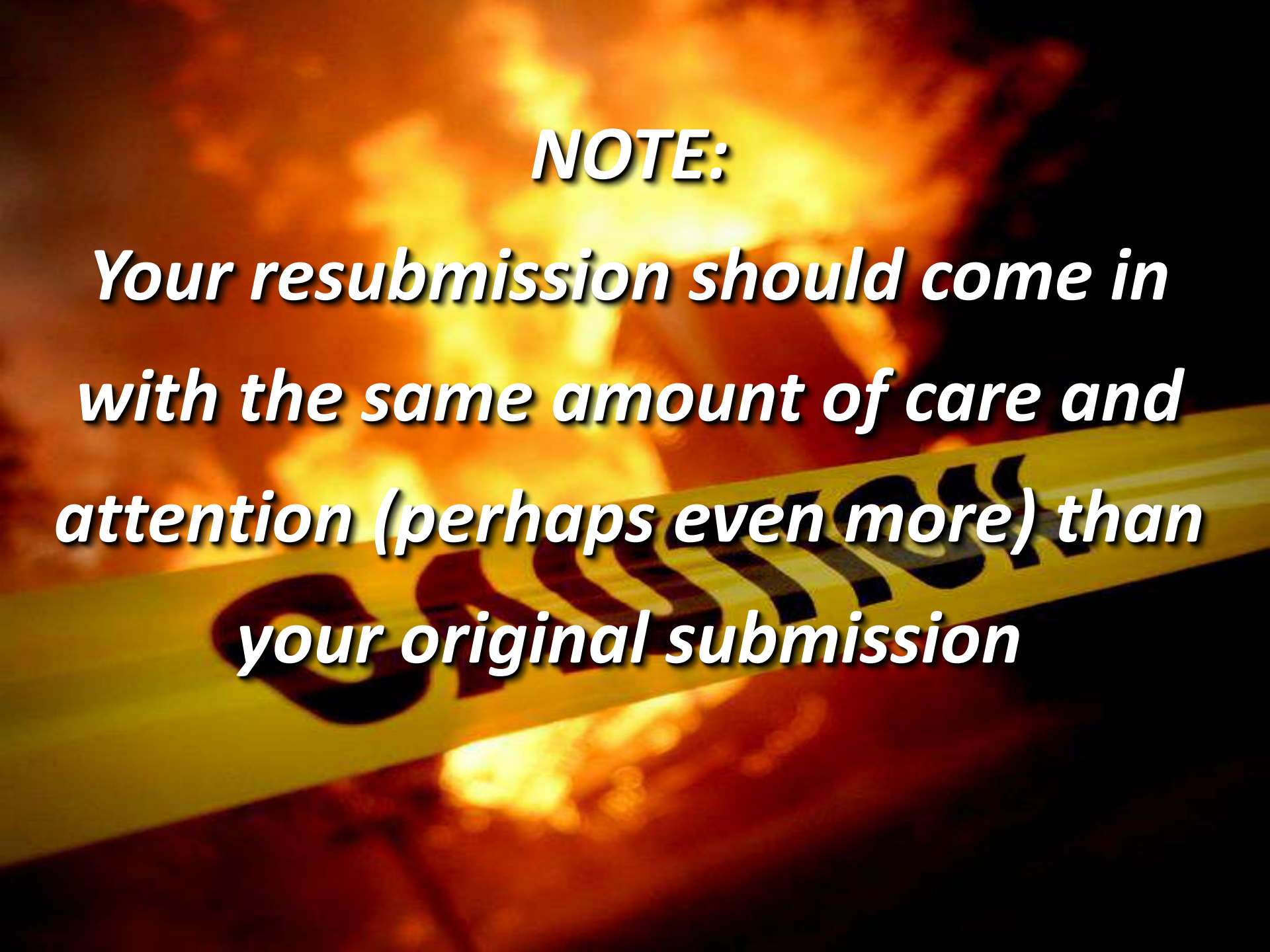
The Reapplication



- Take the criticism constructively
- No finger pointing or accusations
- Admit the reviewers were right
- Articulate your response to each point
- Reorganize and simplify presentation
- Provide more detail
- Provide preliminary data in response
- Get a consultant
- Add a research aim or eliminate one
- DIPLOMATICALLY point out reviewer error

The Reapplication

- Highlight major changes in application
- Address ALL comments/concerns in the Introduction
- Use same terminology as the reviewers
- Avoid confrontation/becoming defensive


NOTE:
Your resubmission should come in with the same amount of care and attention (perhaps even more) than your original submission

...and FINALLY

NOW WHAT TO DO…

If you get a grant funded?!

Work ~~like *HE!%*~~…

really hard!!!

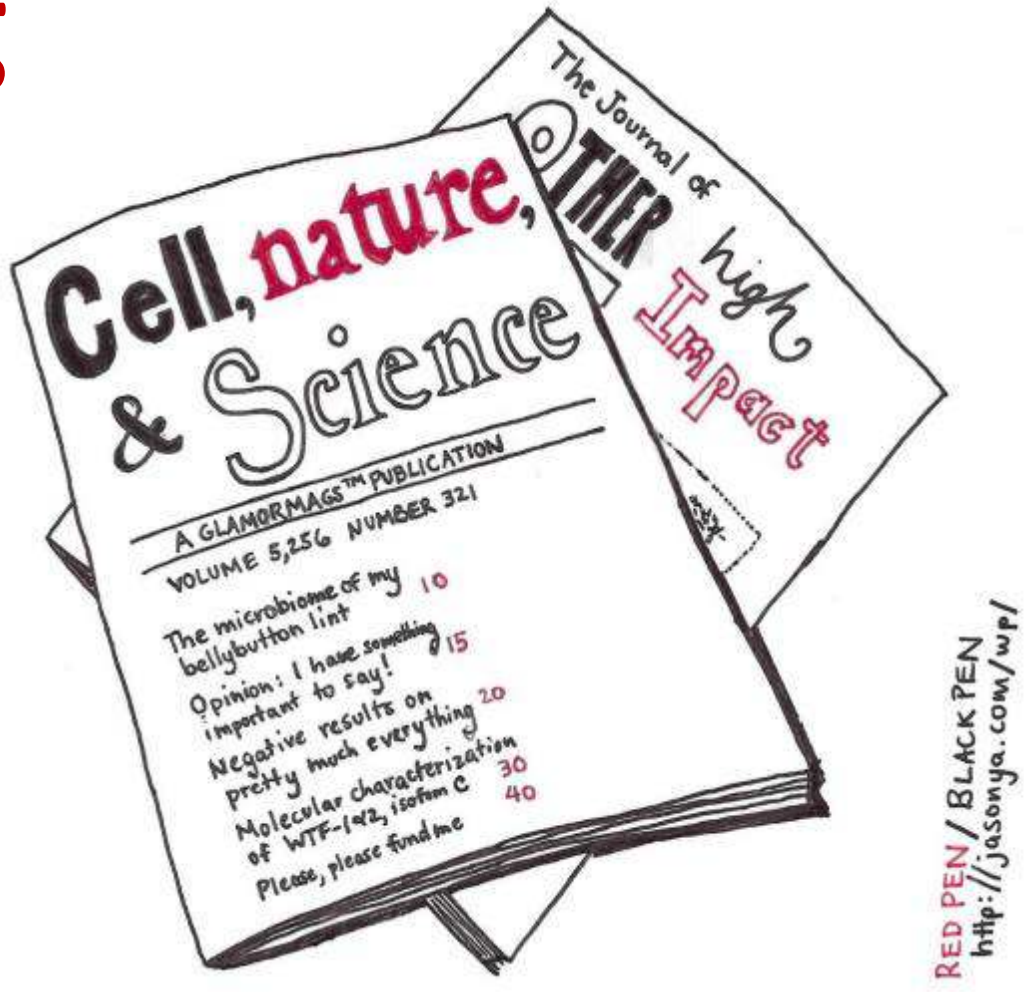
Thanks for your attention!!!

Watch this site!

Enhancing Peer Review at NIH

http://enhancing-peer-review.nih.gov/index.html

Publishing



My latest career strategy: Start my own strategically titled journals. "Why yes, I publish extensively in Cell, Nature, and Science and other high impact journals."