GRANT WRITERS' SEMINARS AND WORKSHOPS

in association with the

Boston University

presents

"WRITE WINNING GRANTS"

Handout June 29, 2010

M. S. AtKisson, PhD

A note about these handouts:

The version of the handouts you have here does not contain all of the slides. Screen shots from Web pages and "joke" slides are not included. On occasion, slides with single, key points are also not included, because the act of writing information helps you to retain it.

GRANT APPLICATIONS TO *VERY DIFFERENT* FUNDING AGENCIES ARE *VERY SIMILAR!*©

Component	NIH	State Art Commission	USDA	NEH Dissertation	NSF
• Descriptive title	X	X	X	X	X
• Abstract/Summary	X	X	X	X	X
• Budget	X	X	X	N/A	X
• Applicant credentials	X	X	X	X	X
• Background/Significance	X	X	X	X(Dir*)	X
• Previous experience or preliminary data	X		X	X(Dir)	X
• Narrative description	X	X	X	X(Dir)	X
• Completion schedule	X	X	X	X(Dir)	

*Dir = Completed by program director

ANY WELL-TRAINED PERSON CAN BECOME FUNDED©

YOUR KEYS TO SUCCESS

. Your Idea!

. Your Commitment!

. Your Proposal-Writing Skills!

AN ESSENTIAL NEED OF A COMMITTED GRANT WRITER©

KEY POINT!

Arguably, the single most important reason for failure in grant applications is a lack of commitment to find/make the time necessary to prepare and write a truly competitive proposal.

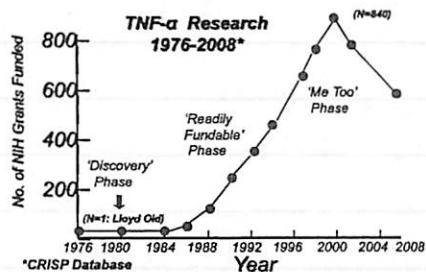## YOUR IDEA IS KEY©

*HOW TO DEVELOP
AN IRRESISTIBLE,
FUNDABLE IDEA*

YOUR IDEA IS KEY©

*THREE PHASES OF
FUNDABILITY FOR AN IDEA*

- **Discovery**
- **Readily Fundable**
- **"Me Too"**

GRANT WRITERS' SEMINARS AND WORKSHOPS

TNF-α Research
1976-2008*

(N=840)

'Me Too' Phase

'Readily Fundable' Phase

'Discovery' Phase

(N=1: Lloyd Old)

No. of NIH Grants Funded

*CRISP Database

Year

THE IMPORTANCE OF BEING *FIRST*©

YOU NEED TO MAKE YOURSELF FIRST IN WHATEVER CATEGORY YOU CHOOSE!

_____

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_____

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SIX STEPS TO DEVELOP A COMPELLING, NOVEL IDEA©

1. Identify the niche area
2. Collect and critically analyze background information related to the problem
3. Develop a preliminary idea (don't force it)

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SIX STEPS TO DEVELOP A COMPELLING, NOVEL IDEA©

4. Assess the idea's potential for success and modify it, if necessary
5. Seek constructive criticism from knowledgeable colleagues
6. Refine the idea to maximize its potential for impact on your field

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CRITICAL ASSESSMENT OF YOUR IDEA©

- ASSESS YOURSELF

- ASSESS THE COMPETITION

- ASSESS FUNDING POTENTIAL

ASSESS YOURSELF©

Critically assess whether you have the necessary expertise, resources, personnel, and preliminary data to be competitive.

ASSESS THE COMPETITION©

- Thoroughly search the literature
- *Use reference databases (e.g., Pubmed, Science Citation Index, Highwire, etc.)*

ASSESS THE COMPETITION[©]

http://highwire.stanford.edu

- Biological, medical, behavioral & social sciences
- > 429,306 FREE full-text articles
- Access to your institution's electronic subscriptions
- Quick search by author and/or keyword
- Only three numbers (year,volume,page) to find link to abstract and (in most cases) full text
- RSS publication/TOC alert service

ASSESS THE COMPETITION[©]

- Thoroughly search the literature
- Use reference databases (e.g., *Pubmed, Science Citation Index, Highwire, etc.*)
- *List key words and individuals who have been important contributors to the area chosen during the past ten years*

ASSESS THE COMPETITION[©]

Search databases of existing grants:

- RePORTER (Research Online Reporting Tool Expenditures and Results) (http://projectreporter.nih.gov/reporter.cfm)
- NSF Award Search (http://www.nsf.gov/awardsearch/index.jsp)
- CRIS (Current Research Information System) (http://cristel.csrees.usda.gov)
- Community of Science (http://fundedresearch.cos.com)

ASSESS THE COMPETITION[©]

Search databases of existing grants:

- **RePORTER**
  (http://projectreporter.nih.gov/reporter.cfm)

1. Idea: adherence regulates expression of some monocyte genes.

2. Search Strategy: key words and workers in field.

   Haskill, J.S.

ASSESS THE COMPETITION[©]

Search databases of existing grants:

- **RePORTER** (http://projectreporter.nih.gov/reporter.cfm)

1. Idea: adherence regulates expression of some monocyte genes.
2. Search Strategy: key words and workers in field.
   Haskill, J.S.
   Adherence Regulated Monocyte Genes
   Abstract: which genes; extracellular matrix
   Indexing Terms: Integrins; DNA footprinting; genetic regulation; tissue /cell culture

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ASSESS POTENTIAL FOR FUNDING[©]

FIND THE AGENCY THAT FITS YOUR IDEA

FIND THE AGENCY THAT FITS YOUR IDEA©

- Ideally, funding your proposal should help the agency achieve its goals

- Know what an agency <u>wants</u> to fund
  NIH Homepage - http://www.nih.gov

FIND THE AGENCY THAT FITS YOUR IDEA©

- Know what a foundation <u>wants</u> to fund
  Foundation's Web Site and/or Annual Report (if it publishes one)

FOUNDATION GRANT SUPPORT©

THERE ARE LITERALLY <u>THOUSANDS</u> OF FOUNDATIONS

"Search the universe of 77,000+ grantsmakers and over 400,000 grants"*

*The Foundation Directory Online
http://www.fdncenter.org

FOUNDATION SUPPORT©

ALL ARE DIFFERENT!

*"You've seen one foundation --
you've seen one foundation."*

FIND THE AGENCY THAT FITS YOUR IDEA©

- Ideally, funding your proposal should help the agency achieve <u>its</u> goals
- Know what an agency <u>wants</u> to fund
- Contact the Program Officer and listen carefully

KNOW HOW APPLICATIONS ARE MADE TO FOUNDATIONS©

<u>UNDERSTANDING THIER PRIORITIES:</u>

- *READ THE WEB SITE*
- Contact your own corporate and foundation relations office
- Talk with a foundation program officer (if possible)

KNOW HOW APPLICATIONS ARE MADE TO NIH©

UNDERSTANDING NIH PRIORITIES:

- *Talk to an NIH Program Officer*

FIND THE AGENCY THAT FITS YOUR IDEA©

- Ideally, funding your proposal should help the agency achieve its goals
- Know what an agency wants to fund
- Contact the Program Officer and listen carefully

  How to find the relevant Program Officer at NIH

NIH PROGRAM OFFICERS ARE OF GREAT VALUE TO YOU©

Planning Phase:
- Help choose funding vehicle and will know priorities (Program Announcements)

Writing Phase:
- Can help establish appropriate scope/focus

Submission:
- Assistance with a cover letter

Review Phase:
- Important feedback on proposal's review and on future submission

Funding Phase:
- Advocate within Program

KNOW HOW APPLICATIONS ARE MADE TO NIH©

UNDERSTANDING NIH PRIORITIES:

- **Talk to an NIH Program Officer**
- *Subscribe to NIH Electronic News Services*
  - **Guide to Grants & Contracts**
    https://list.nih.gov/
  - **NIH Extramural Nexus**
    http://grants1.nih.gov/grants/nexus.htm
- **Read the Mission Statement**
- *Identify opportunities to get help*

HELP IS OUT THERE IF YOU LOOK FOR IT – NIH!

- **25 Helpful Hints for New Investigators from NIGMS Staff**
  http://www.nigms.nih.gov/Research/Application/Tips.htm
- **Writing a Grant- Hints for the first time applicant**
  www.niddk.nih.gov/fund/grants_process/
  grantwriting.htm
- **NCI's Short Guide to the Preparation of NIH Grant Applications (old form)**
  http:deainfo.nci.nih.gov/extra/extdocs/gntapp.htm
- **NIAID 'How To' Website for Developing a Grant Application**
  www.niaid.nih.gov/ncn/grants/default.htm

ASSESS POTENTIAL FOR FUNDING©

FIND THE GRANTING MECHANISM THAT FITS YOUR IDEA

THERE ARE THREE LEVELS AT WHICH PURPOSE MUST BE MET©

➤ THE GRANTING MECHANISM

● EACH SECTION OF THE PROPOSAL

● COMPONENTS WITHIN EACH SECTION

KNOW WHICH KIND OF NIH GRANT IS RIGHT FOR YOU

"Activity Codes, Organization Codes, and Definitions Used in Extramural Programs"
http://grants.nih.gov/grants/funding/ac.pdf

R01 - Res. Project Grant   P01 - Program project

R03 - Small Research Grant   R13 - Conferences

R15 - AcadRsrchEnhnAwd   R21 - Explor/Development

R43 - SmBusInnovRes I   R44 - SmBusInnovRes II

F Series - Ind. Fellowship   K Series-Res Career Prog

K99/R00 - Pathway to Independence Award

INVESTIGATOR-INITIATED RESEARCH PROJECT GRANT (R01)

• Used to support a discrete, specified, circumscribed research project

• NIH's most commonly used grant program

• No specific dollar limit unless specified in FOA

• Advance permission required for $500,000 or more (direct costs) in any year

• Generally awarded for 3 to 5 years

• Utilized by all ICs

NIH SMALL RESEARCH GRANTS (R03)

- Purposes differ with Institute/Center – see *http://grants.nih.gov/grants/funding/r03.htm* – usually preliminary data for competitive R01

- The following Institutes and Centers allow self-initiated R03s: NIDA NIA NIAAA NIAID NIBIB NICHD NIEHS NIMH NINDS NINR NHGRI
  See Program Announcement PA-06-167 (*http://grants.nih.gov/grants/guide/pa-files/PA-10-064.html*)

NIH SMALL RESEARCH GRANTS (R03)

- See PAs & RFAs of other Institutes/Centers, except NEI and NCMHD, which do not sponsor R03 at all

- Does **not** disqualify as New Investigator on R01

KNOW WHICH KIND OF NIH GRANT IS RIGHT FOR YOU

"Activity Codes, Organization Codes, and Definitions Used in Extramural Programs"
http://grants.nih.gov/grants/funding/ac.pdf

R01 – Res. Project Grant   P01 – Program project

R03 – Small Research Grant R13 – Conferences

R15 – AcadResrchEnhnAwd R21 – Explor/Development

R43 – SmBusInnovRes I   R44 – SmBusInnovRes II

F Series – Ind. Fellowship   K Series – Res Career Prog

K99/R00 – Pathway to Independence Award

NIH EXPLORATORY / DEVELOP-MENTAL GRANTS (R21)

- **High risk/impact; proof of concept/feasibility**
  – *http://grants1.nih.gov/grants/funding/r21.htm*

- **These Institutes and Centers allow self-initiated R21s: NEI NHLBI NHGRI NIDCD NLM NIA NIAAA NIAID NIAMS NIBIB NICHD NIDCD NIDA NIDCR NIDDK NIEHS NIMH NINDS NINR – See Program Announcement PA-06-169** *(http://grants.nih.gov/grants/guide/pa-files/PA-10-069.html)*

NIH EXPLORATORY / DEVELOP-MENTAL GRANTS (R21)

- **See PAs & RFAs of other Institutes / Centers**

- **Does <u>not</u> disqualify applicant as New Investigator for subsequent R01 application**

TIPS ON WRITING R03s & R21s©

- **Not necessarily meant to be a starter grant for New Investigators – must use for the purpose intended.**
- **Should <u>not</u> be written to be a small, complete research grant (in most cases)**
- **<u>Should</u> be written as a stepping stone to a subsequent R01**
- **Conceive Specific Aims of the subsequent R01 as the means of informing development of the R03/R21**

GRANT WRITERS' SEMINARS AND WORKSHOPS

MENTORED, INDIVIDUAL CAREER DEVELOPMENT AWARDS FROM NIH

RESEARCH TRAINING AVAILABLE FROM THE NATIONAL INSTITUTES OF HEALTH

K Series
Research Career Programs

F Series
Fellowship Programs

PATHWAY TO INDEPENDENCE AWARD   (K99/R00)©

- **Purpose: independence / earlier R01 support**
- **See Program Announcement PA-06-163** *(http://grants.nih.gov/grants/guide/pa-files/ PA-10-063.html)*
- **1-2 years of mentored post-doctoral support**

PATHWAY TO INDEPENDENCE AWARD (K99/R00)©

- Up to 3 years of independent support – contingent on securing an independent research position
- Expected to compete successfully for R01 support during 3 years of independent support
- Eligibility: no more than 5 years of post-doctoral research training

PATHWAY TO INDEPENDENCE AWARD (K99/R00)©

- These are intended to support the transition between post-doctoral fellow and faculty position
- The R00 portion is expected to be granted to an institution other than the postdoctoral institution.

DIFFERENCES BETWEEN 'K' AWARD AND F32 NRSA

- *Purpose:* K – independence in a new area; F32 – continued development in same area
- *Duration:* K – 3-5 yrs; F32 – maximum of 3yrs
- *Experience:* K – some postdoctoral; F32 – little or no postdoctoral experience
- *Time Commitment:* K – at least 75% effort; F32 – full time

PLANNING MUST INCLUDE FUNDING OPPORTUNITIES©

PROACTIVELY SEARCH FOR THEM

- It is <u>critical</u> to identify funding opportunities at the earliest possible time
- Plan to invest search time weekly
- Use a planned search strategy, for example:
  - Network of contacts
  - Institutional databases/bulletins
  - listServs and RSS feeds

USE LISTSERVS and RSS FEEDS©

- **National Institutes of Health**
  http://grants1.nih.gov/grants/guide/listserv.htm
  http://www.nih.gov/news/rss.htm

USE E-MAIL ALERT SERVICES©

- **Community of Science**
  http://www.cos.com/services/funding.shtml
- **InfoEds SPINPlus**
  http://www.infoed.org
- **Grants.gov**
  http://www.grants.gov/search/email.do

FORMAT & SUBMISSION OF FEDERAL PROPOSALS©

- A single website – Grants.gov – is now used to apply for <u>all</u> federal assistance
- All Funding Opportunity Announcements (FOAs) are announced through Grants.gov
- Electronic submission in almost all cases is through Grants.gov using SF 424 application forms

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SF424 (R&R)

Application Guide for NIH and Other PHS Agencies

A guide developed and maintained by NIH for preparing and submitting applications via Grants.gov to NIH and other PHS agencies using the SF424 (R&R)

Adobe Forms Version B (to be used with FOAs specifying use of Adobe-Forms-B application packages)

Updated December 22, 2009

http://grants.nih.gov/grants/funding/424/SF424_RR_Guide_General_Adobe_VerA.pdf

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MOST COMMON REASONS FOR APPLICATION FAILURE©

- Lack of a good, original idea
- Lack of sufficient commitment

1 Unimportant or unresponsive problem
2 Lack of an acceptable rationale
3 Insufficient demonstration of knowledge base
4 Lacks essential experience/expertise/resources
5 Diffuse, superficial or unfocused approach
6 Interdependence of aims upon outcomes
7 Unrealistic amount of work proposed
8 Uncertain outcomes and future directions

MOST COMMON REASONS FOR APPLICATION FAILURE©

- Lack of sufficient commitment/time
- Lack of a good, original idea
- - - - - - - - - - - - - - - - -
9. Unrealistic budget
10. Not relevant to mission of funding agency
11. Interdependence of aims/goals
12. Reader-unfriendly application
13. Misinterpreted deadline for application
14. Misunderstood review criteria
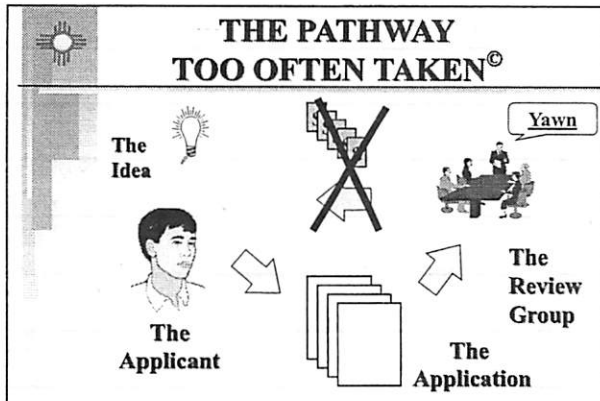15. Insufficient preliminary data
16. Etc., etc., and etc.

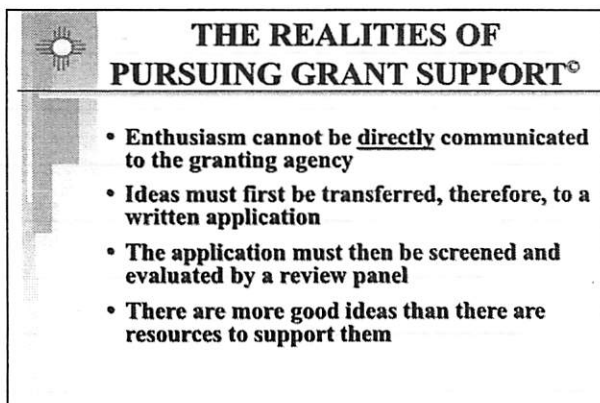## YOUR FINAL KEY IS GRANTSMANSHIP SKILLS©

- Maximally convey your enthusiasm
- Write with maximal clarity & compelling logic
- Anticipate problems and provide alternative approaches
- Tell your reviewers what to expect for their investment
- Make your application 'reviewer friendly'
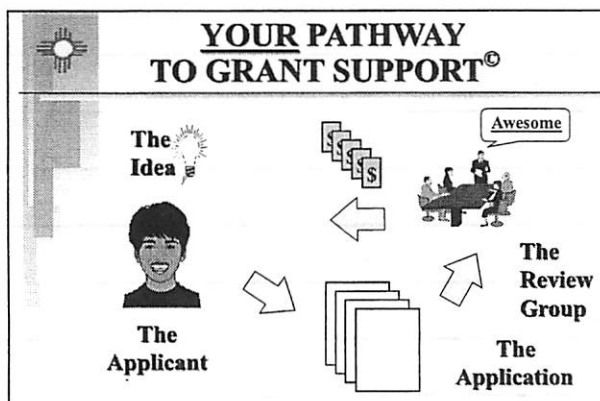- Avoid avoidable mistakes

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GRANT WRITERS' SEMINARS AND WORKSHOPS

THE PRINCIPLES AND FUNDAMENTALS OF GOOD PROPOSAL WRITING

THE PATHWAY TOO OFTEN TAKEN©

The Idea

Yawn

The Applicant

The Application

The Review Group

THE REALITIES OF PURSUING GRANT SUPPORT©

- Enthusiasm cannot be _directly_ communicated to the granting agency
- Ideas must first be transferred, therefore, to a written application
- The application must then be screened and evaluated by a review panel
- There are more good ideas than there are resources to support them

YOUR PATHWAY TO GRANT SUPPORT©

The Idea

Awesome

The Applicant

The Application

The Review Group

CHARACTERISTICS OF A SUCCESSFUL SALESPERSON©

- Makes a good first impression
- Is well-prepared
- Is credible
- Delivers a clear message
- Provides supporting documentation
- Has appropriate endorsements
- Has something special to offer
- Is persistent

CHARACTERISTICS OF A SUCCESSFUL NEW PRODUCT*

- *Obvious relative advantage*
- Compatible with existing usage
- Opportunity for consumer testing
- Opportunity to observe its newness
- Simple rather than complex

Effective Marketing: Creating & Keeping Customers
Zikmund & D'Amico, 1994

GRANT WRITERS' SEMINARS AND WORKSHOPS

THE REVIEW PROCESS

PRE-SUBMISSION REVIEW OF YOUR APPLICATION©

"We need very strong ears to hear ourselves judged frankly..."

Michel de Montaigne
(French Philosopher and Writer. 1533-1592)

IN-HOUSE REVIEW OF YOUR APPLICATION©

This is an absolute necessity!

- **Get review from knowledgeable colleagues**
- **Choose the <u>right</u> colleagues to review your completed application**
- **Do *not* restrict yourself only to colleagues in your field**

IN-HOUSE REVIEW OF YOUR APPLICATION©

To Escape Criticism:
Do Nothing
Say Nothing
Be Nothing

Elbert Hubbard
1856-1915

paraphrasing
Aristotle

IN-HOUSE REVIEW OF YOUR APPLICATION©

This is an absolute necessity!

- Give your colleagues time enough to help

- Do *not* ask for help while you're still making changes

KEY POINT©

A full understanding of the targeted agency's review process, including (if possible) who is doing the evaluation, is critical to your success!

IDENTIFY YOUR REVIEWERS, IF POSSIBLE©

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

NATIONAL INSTITUTES OF HEALTH
Center for Scientific Review

Study Section
Rosters & Charges

WHO ARE YOUR REVIEWERS?©

They are:

- **Accomplished**
- **Dedicated**
- **Knowledgeable**
- **Conscientious**
- **Fair**

WHO ARE YOUR REVIEWERS--REALLY?©

They are actually:

- **Overly committed and overworked**
- **Underpaid for their efforts**
- **Tired**
- **Inherently skeptical**
- **Overly critical**
- **Looking for the easiest way to get the job done *well***

HOW DO REVIEWERS REVIEW PROPOSALS?

WHAT DO REVIEWERS LOOK FOR FIRST ?

- **What's the title? Is it interesting?**
- **Who is the applicant?**
- **What's the applicant institution?**
- **What's the basic idea? Is it within my area of expertise?**
- **Is the application "reviewer-friendly?"**

IS YOUR APPLICATION "REVIEWER-FRIENDLY?"

KEY POINT!

"While the guidelines specified above establish the **minimum** type size requirements, PIs are advised that readability is of paramount importance and should take precedence in selection of an appropriate font for use in the proposal."

NSF Instructions to Applicants, 2007

THE REVIEW PROCESS ©

TWO SETS OF REVIEW CRITERIA:

- INTRINSIC
  - The reviewers first impression of your application
- EXTRINSIC
  - The evaluation criteria established by the funding agency

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ROLE OF PROGRAM OFFICER IN REVIEW/REVISION OF PROPOSALS©

- Your Program Officer will usually be aware of what transpired during the review of your proposal
- You are encouraged to contact your Program Officer – after you first thoroughly analyze the content of your review
- E-mail request for an appointment to discuss the critique by telephone

ROLE OF SCIENTIFIC REVIEW OFFICER / PANEL MANAGER©

Responsible for the process of review:
- Recruits qualified reviewers
- Contact for change in review assignment
- Checks content and for completeness
- Documents & manages conflicts of interest
- Assigns applications to reviewers
- Oversees administrative & regulatory aspects of review
- Prepares Summary Statements

KEY POINT©

The key to success in proposal writing is to engender enthusiasm in the reviewer--who then becomes an *advocate* for funding the applicant's proposal.

REVIEW OF A NEW INVESTIGATOR'S PROPOSAL

- Reviewers will often cut New Investigators some slack and score a proposal that would be triaged if submitted by an experienced investigator
- Resubmitted proposal often will be streamlined if a full and substantive response to <u>all</u> of the prior criticism is not made
- There is no third submission

RÉSUMÉ (SUMMARY OF DISCUSSION)

Approval with slightly less than average enthusiasm is recommended for this application. Although this is an *important area of study that clearly merits investigation,* and while *the applicant and her colleagues are well-qualified to undertake these studies,* *the absence of a sound experimental plan* as to how the data generated will be interpreted, or how potentially *conflicting data* would be reconciled, dampen enthusiasm for the application. Concerns also exist about the *ability of the applicant to either obtain or make the necessary reagents* for use in her studies. The *singular focus upon one aim* will limit the value of the results.

UNDERSTAND 'REVIEWER SPEAK' – DON'T WING IT

- If you don't understand what a reviewer has written, get help from an experienced colleague or the SRO / Panel Manager to interpret what you have been told

- Reviewers often use their own jargon to characterize flaws they perceive

UNDERSTAND 'REVIEWER SPEAK' – DON'T WING IT

- ⇨ "Overly ambitious"
- ⇨ "Unfocused fishing expedition"
- ⇨ "Descriptive"
- ⇨ "Insufficient preliminary data"

HELP IS OUT THERE IF YOU LOOK FOR IT!©

NIH and the individual Institutes and Centers (ICs) have resources on the web.

Use them!

See URL page in the back of your handout.

GENERAL HELP IS OUT THERE IF YOU LOOK FOR IT!©

"A Guide for Proposal Writing"
http://www.nsf.gov/pubs/1998/nsf9891/nsf9891.htm

"Broader Impacts: Representative Activities"
http://www.nsf.gov/pubs/2004/nsf042/bicexamples.pdf

"The 2002 User-Friendly Handbook for Project Evaluation"
http://www.nsf.gov/pubs/2002/nsf02057/start.htm

GRANT WRITERS' SEMINARS AND WORKSHOPS

TIPS ON HOW TO WRITE FOR YOUR REVIEWERS

WRITE AS THOUGH FOR A NEWSPAPER©

- Brevity – saintly – up to a point (up to 10% less than maximum number of pages allowed)
- Headlines – hook the reviewer's interest
- Paragraphs – two strategies:
  - Introductory paragraphs
  - Paragraphing to make a single point

WRITE AS THOUGH FOR A NEWSPAPER©

- Sentence structure – write simple declarative sentences
- Assertive presentation style – avoid weak words
- Always present problems as the 'glass half full'

WRITE AS THOUGH FOR A NEWSPAPER©

ESSENTIAL FEATURES OF A GOOD NEWSPAPER (GRANT APPLICATION)

- Know the readership (your reviewers)
- "Not the most words, just the right words"
- Make the document attractive, concise easy to read and comprehensible
- Make it easy for the readers (reviewers) to find the information they need

WRITE AS THOUGH FOR AN E-MAIL[©]

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To: Respected Colleague <RC@au.edu>
From: Grant Applicant applg@ou.edu
Date: June 4, 2010
Subject:
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KEY POINTS[©]

- For clarity, use simple declarative sentences

KEY POINTS[©]

- For clarity, use simple declarative sentences

When addressing issues of a complex nature, it may not be necessary to compile every portion of the issue into a single sentence; in fact, brevity and linear presentation may benefit both the writer and the reviewer to assure clarity of communication.

KEY POINTS [©]

- **For clarity, use simple declarative sentences**

Complex issues can be presented clearly by using a brief, linear style. Most reviewers are intelligent people who are also over-committed. A straightforward presentation helps the reviewer to understand your project easily and to review your application on merit.

WRITING FOR CLARITY

- Before you write, understand your goals and be able to state them clearly.

"If any man wish to write in a clear style, let him be first clear in his thoughts..."

Johann Wolfgang von Goethe
(1749 - 1832)

WRITING FOR CLARITY

- Before you write, understand your goals and be able to state them clearly.
- Write so that someone outside your field can understand your project.

"Say all you have to say in the fewest possible words, or your reader will be sure to skip them; and in the plainest possible words, or he will certainly misunderstand them."

John Ruskin (1819 - 1900)

KEY POINTS[©]

- For clarity, use simple declarative sentences
- *Avoid complicated words, unusual acronyms or abbreviations*

ABBREVIATIONS & ACRONYMS

Abbreviation: "A shortened or contracted form of a word or phrase, used to represent the whole"*

Acronym: "A word formed from the initial letters of a name"*

* Random House Dictionary

ABBREVIATIONS & ACRONYMS

- Keep the use of abbreviations and acronyms to a minimum
- Overuse of these abbreviated word forms can be confusing and disruptive
- Restrict use to only internationally-accepted abbreviations and/or acronyms
- Be careful to avoid use of 'applicant-unique' abbreviations/acronyms

KEY POINTS©

- For clarity, use simple declarative sentences
- Avoid complicated words, unusual acronyms or abbreviations
- *Avoid 'weak' words that convey doubt*

KEY POINT©

"Convey your confidence and enthusiasm for the project."

NIGMS
Tips for New Grant Applicants

KEY POINT©

Avoid "<u>weak</u>" words that may introduce doubt in the mind of the reviewer about your ability to do the work.

<u>EXAMPLE:</u>

We will <u>try</u> to create ....

vs.

We <u>expect</u> to create ....

KEY POINT©

Avoid "<u>weak</u>" words that may introduce doubt in the mind of the reviewer about your ability to do the work.

<u>EXAMPLE</u>:

<u>If</u> we can demonstrate that....

vs.

We *expect* to demonstrate that....

KEY POINT©

Avoid "<u>weak</u>" words that may introduce doubt in the mind of the reviewer about your ability to do the work.

<u>EXAMPLE</u>:

We <u>believe</u> that .... *or* We <u>hope</u> that

vs.

We <u>expect</u> that .....

KEY POINT©

Avoid "<u>vague</u>" words that may introduce doubt in the mind of the reviewer that you have confidence and a solid plan.

<u>EXAMPLE</u>:

We <u>seek</u> to ....

vs.

Our <u>objective</u> is to .....

KEY POINT©

Avoid "<u>vague</u>" words that may introduce doubt in the mind of the reviewer that you have confidence and a solid plan.

EXAMPLE:

We will work with various schools of public health, such as Johns Hopkins....

vs.

We will work with Johns Hopkins and other schools of public health.....

KEY POINTS©

- For clarity, use simple declarative sentences
- Avoid complicated words, unusual acronyms or abbreviations
- Avoid 'weak' words that convey doubt
- *Keep emphasized text to a minimum*

USE OF EMPHASIZED TEXT IN PROPOSALS

- **Bolded**, *italicized*, <u>underlined</u> or CAPITALIZED text (or some combination thereof) may be used to draw attention to text
- As a general rule, a "*little goes a long way*"
- Keep emphasized text to a minimum (< 1%)
- Use **Bolded Text** primarily for Section Headings
- Use *italicized text* within the body of the text
- <u>Underlining is more intrusive in terms of "readability"</u>
- Keep use of *MULTIPLE* EMPHASIS to a minimum

KEY POINTS[©]

- For clarity, use simple declarative sentences
- Avoid complicated words, unusual acronyms or abbreviations
- Avoid 'weak' words that convey doubt
- Keep emphasized text to a minimum
- *Avoid long/short paragraphs, leave spaces between paragraphs*

WRITE AS THOUGH FOR A NEWSPAPER[©]

REMEMBER THAT PARAGRAPHS ARE:

- *Arbitrary* units designed to group information related to an idea or concept
- Somewhat subjective as to what constitutes the "functional unit"
- Basically under the control of the writer
- Therefore, try to avoid excessively long or excessively short paragraphs or sections
- Three to four per page is <u>ideal</u>

KEY POINTS[©]

- For clarity, use simple declarative sentences
- Avoid complicated words, unusual acronyms or abbreviations
- Avoid 'weak' words that convey doubt
- Keep emphasized text to a minimum
- Avoid long/short paragraphs, leave *spaces* between paragraphs
- Avoid errors in syntax

EXAMPLES OF INACCURACIES IN SYNTAX©

- This *project* will *facilitate* the mission of NIAID by....
- Recent *research* has *shown* that......
- This grant *application proposes* to study the.....
- *Determining* interventions will *move* the field forward by....
- This proposal *seeks* to *identify*......
- The work outlined here *aims* to *show* that.......

EXAMPLES OF INACCURACIES IN SYNTAX©

- "Milwaukee, its bordering seven counties, and Lake Michigan contain a potential urban workforce lacking in job opportunities ..."
- "We will examine the existence of genomic instability in tumors with appropriate technologies..."

KEY POINTS©

- For clarity, use simple declarative sentences
- Avoid complicated words, unusual acronyms or abbreviations
- Avoid 'weak' words that convey doubt
- Keep emphasized text to a minimum
- Avoid long/short paragraphs, leave *spaces* between paragraphs
- Avoid errors in syntax
- Do *everything* you can to make it easy for the reviewer to read your proposal

GRANT WRITERS' SEMINARS AND WORKSHOPS

PREPARATION OF THE APPLICATION

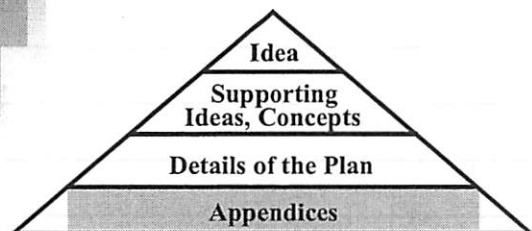## THERE ARE THREE LEVELS AT WHICH PURPOSE MUST BE MET©

- THE GRANTING MECHANISM

- EACH SECTION OF THE PROPOSAL

- COMPONENTS WITHIN EACH SECTION

CONCEPTUAL STRUCTURE OF THE IDEAL GRANT APPLICATION©

Idea

Supporting Ideas, Concepts

Details of the Plan

Appendices

PREVIOUS FORMAT FOR NIH RESEARCH PLAN©

1. Specific Aims (recommended length, 1 page)
2. Background and Significance (3 pages)
   - *Significance*
   - *Review of Relevant Literature*
3. Preliminary Studies (6-8 pages)
4. Research Design and Methods (remainder, up to 25)
   - *Each Specific Aim*
     - Introduction
     - Experimental Design
     - Expected Outcomes
     - Potential Problems & Alternative Strategies
   - *Timetable*
   - *Future Directions*

MAJOR CHANGES REGARDING 'SELLING' YOUR IDEA TO NIH©

- Research Plan shortened; review of literature and preliminary data sections removed
- Sections of the proposal now linked to each of the five core review criteria
- Greater emphasis on quality of content and less on detailed description of approach
- Switch to a 9-point evaluation scale
- Standardization and shortening of reviews
- Emphasis on funding New Investigators – sooner
- Greater emphasis on the fastest path to funding, especially if triaged: reapply or switch to something else?

NEW FORMAT FOR NIH RESEARCH PLAN©

1. Specific Aims (1 page)
2. Research Strategy (12 pages R01; 6 pages R03/R21)
   - *Significance*
   - *Innovation*
   - *Approach*
     - Each Specific Aim
       - Justification & Feasibility
       - Experimental/Research Design
       - Expected Outcomes
       - Potential Problems & Alternative Strategies
     - Timetable
     - Future Directions

MAJOR CHANGES REGARDING 'SELLING' YOUR IDEA TO NIH©

- Research Plan shortened; review of literature and preliminary data sections removed
- *Sections of the proposal now linked to each of the five core review criteria*
- Greater emphasis on quality of content and less on detailed description of approach
- Switch to a 9-point evaluation scale
- Standardization and shortening of reviews
- Emphasis on funding New Investigators – sooner
- Greater emphasis on the fastest path to funding, especially if triaged: reapply or switch to something else?

RELATION OF CORE CRITERIA TO PROPOSAL'S SECTIONS©

REVIEW CRITERION	SECTION OF PROPOSAL
SIGNIFICANCE	Research Strategy *Significance subsection*
INVESTIGATOR(S)	Biographical Sketch *Personal subsection*
INNOVATION	Research Strategy *Innovation subsection*
APPROACH	Research Strategy *Approach subsection*
ENVIRONMENT	Facilities & Other Resources *Environment subsection*

GRANT WRITERS' SEMINARS AND WORKSHOPS

PREPARATION OF THE APPLICATION

-Overview of Aims/Goals-
Specific Aims Section

OVERVIEW SECTION[©]

- **NIH**: Specific Aims section
- **NSF**: Overview & Objectives section
- **USDA**: First part of Introduction + Rationale & Significance section
- **Other agencies**: First thing to identify

SPECIFIC AIMS SECTION[©]

- One of two of most important sections in the grant application, *because it is the template or master plan for the rest of the proposal*
- This is what is sent to the Program Officer for feedback on programmatic relevance
- This section works very well as a pre-proposal

SPECIFIC AIMS SECTION©

- It is the most difficult section to write
- It must <u>quickly</u> engender enthusiasm for your idea
- The flow of logic must be <u>compelling</u>

LINEAR PROGRESSION FOR A STRONG SPECIFIC AIMS SECTION©

Linkage, achieved by outlining, is the key to a bulletproof Specific Aims section!

<u>Introductory Paragraph</u>
Opening sentence
Current knowledge
Unknown or need

<u>What, Why, Who Paragraph</u>
Long-term goal
Overall objective of application
Central hypothesis & how formulated
Rationale

<u>Specifics Paragraph</u>
Specific aims

<u>Payoff Paragraph</u>
Innovative
Expected outcomes
Positive impact

THERE ARE THREE LEVELS AT WHICH PURPOSE MUST BE MET©

- THE GRANTING MECHANISM

- EACH SECTION OF THE PROPOSAL

- COMPONENTS WITHIN EACH SECTION

OVERVIEW & OBJECTIVES©

INTRODUCTORY PARAGRAPH

- Open with a real 'grabber' – one that clearly relates to agency's mission
- Summarize current knowledge in the field
- Delineate the scientific gap in the knowledge base or unmet need that will drive the proposal

OVERVIEW SECTION©

OPENING SENTENCE

Do not tell them obvious things.

Cardiovascular disease is a leading cause of death.

Is this a compelling opening?

OPENING SENTENCE

Try to take it to a higher level, and give them an idea of where you're going and why this is exciting.

Glucose metabolism plays a key role in heart function, both at the myocardial level and through hormonal consequences of "metabolic syndrome."

(Yes, I just made this up.)

OPENING SENTENCE

"Throat-Clearing"

Breast cancer is the leading cause of death in post-menopausal women in the US due to metastatic processes.

OPENING SENTENCE

"Throat-Clearing"

Breast cancer is the leading cause of death in post-menopausal women in the US due to metastatic processes. While the etiology of such cancers is quite broad, there is a strong role for genetics in early-onset breast cancer.

OPENING SENTENCE

~~Breast cancer is the leading cause of death in post-menopausal women in the US due to metastatic processes.~~ While the etiology of breast cancers in post-menopausal women is quite broad, there is a strong role for genetics in early-onset breast cancer.

The sentences can be easily combined.

OVERVIEW SECTION©

CURRENT KNOWLEDGE IN THE FIELD

- Give 3-5 sentences, general, that set the stage for what is known
- Use only lynchpin references
- Work from the bigger picture to the smaller
- Set this up so that you can give....

OVERVIEW SECTION©

GAP IN KNOWLEDGE

- This should follow from your "knowns"
- Do not be afraid to label this sentence. "What is not known is...." OR

  "There is a key gap in the knowledgebase with respect to..."
- Set this up so that you can frame....

OVERVIEW SECTION©

GAP AS A PROBLEM

- This should follow from your knowns and your gap.
- Do not be afraid to label this sentence. "Lack of such knowledge is a problem because...." or "Without such knowledge we cannot..."
- Set this up so that you can give....

LINEAR PROGRESSION FOR A STRONG SPECIFIC AIMS SECTION©

Linkage, achieved by outlining, is the key to a bulletproof Specific Aims section!

Introductory Paragraph
Opening sentence
Current knowledge
Unknown or need

What, Why, Who Paragraph
Long-term goal
Overall objective of application
Central hypothesis & how formulated
Rationale

Specifics Paragraph
Specific aims

Payoff Paragraph
Innovative
Expected outcomes
Positive impact

OVERVIEW SECTION©

LONG-TERM GOAL

- This is <u>not</u> the goal of the current application
- This <u>is</u> the goal of your overall program, i.e., the continuum of research of which this application is a part
- Be realistic: do not overstate or over-anticipate your capabilities

OVERVIEW SECTION©

OVERALL OBJECTIVE

- Must be appreciated as a step toward attainment of the long-term goal
- Defines the purpose of the proposed research, which is always to fill the gap/ meet the need
- Must be phrased in such a way that the central hypothesis logically grows from it

OVERVIEW SECTION©

CENTRAL HYPOTHESIS

- Make certain that you write a <u>real</u> hypothesis:

A tentative assumption made in order to draw out and <u>test</u> its logical or empirical consequences   Webster's Dictionary

- It should be a 'directional' hypothesis, i.e., one that gives focus to the proposed research

---

TIPS ON WRITING YOUR HYPOTHESIS©

- The central hypothesis is your 'best bet' from among all alternatives
- Implicit in any hypothesis is that it could be invalidated when objectively tested
- You <u>must</u> have an alternative strategy, should the hypothesis prove to be invalid
- Testing of the primary hypothesis/alternatives must attain the proposal's objective

---

TIPS ON WRITING YOUR HYPOTHESIS©

KEY POINT!

"INSIDER TIP: State a clearly-defined hypothesis. Make sure that the proposed specific aims will directly test your hypothesis."

NCI

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

LINKAGE OF THREE KEY COMPONENTS©

1. *Long-Term Goal: Broadest (the 'forest')*
   - Projects your continuum of research

2. *Overall Objective: Narrower (section of 'forest')*
   - Step along the continuum
   - Must be achieved, <u>regardless</u> of how hypothesis tests

3. *Central Hypothesis: Narrowest (the 'tree')*
   - Best bet, but could be invalid
     (Alternative presented later, therefore)

LINKAGE OF THREE KEY COMPONENTS©

1. *Long-Term Goal: Broadest*
   - Reduce birth defects among children of farm workers.

2. *Overall Objective: Narrower*
   - Determine the cause of environmentally linked cleft palate syndrome

3. *Central Hypothesis: Narrowest*
   - Herbicide 'X' is the cause
     (Pesticide 'Y' presented later, as alternative)

LINKAGE OF THREE KEY COMPONENTS©

Our *long-term goal* is to reduce birth defects among children of farm workers. The *overall objective of this application*, which is a step toward attainment of our long-term goal, is to determine the cause of environmentally linked cleft palate syndrome. It is our *central hypothesis* that prenatal exposure to herbicide 'X' is the cause. We have formulated this hypothesis on the basis of our own preliminary data (see *Preliminary Studies* section), as well as ....

(Note: Pesticide 'Y' offered as alternative later)

CENTRAL HYPOTHESIS

The difference between a <u>hypothesis</u> and a <u>predetermined conclusion</u>:

Correct: The central hypothesis is that components of automobile exhaust accelerate degradation of statuary in Washington, D.C.

Incorrect: The central hypothesis is to show that components of automobile exhaust accelerate degradation of statuary in Washington, D.C.

OVERVIEW SECTION©

RATIONALE

- **Ensure that you formulate a true rationale**

  The underlying reason: BASIS

  Webster's Dictionary

- **What will become possible that is not possible now?**

- **The rationale must directly relate to the problem you have delineated**

LINEAR PROGRESSION FOR A STRONG SPECIFIC AIMS SECTION©

Linkage, achieved by outlining, is the key to a bulletproof Specific Aims section!

<u>*Introductory Paragraph*</u>
Opening sentence
Current knowledge
Unknown or need

<u>*What, Why, Who Paragraph*</u>
Long-term goal
Overall objective of application
Central hypothesis & how formulated
Rationale

<u>*Specifics Paragraph*</u>
Specific aims

<u>*Payoff Paragraph*</u>
Innovative
Expected outcomes
Positive impact

OVERVIEW SECTION©

Characteristics of Specific Aims:

- Two-to-five, at the most
- Brief, focused and limited in scope
- Each must be an eye-catching "headline"
- Conceptual, *NOT* descriptive
- Must collectively test all parts of the hypothesis
- Each must flow logically into the next
- None should be absolutely dependent on the outcome of an earlier aim

---

OVERVIEW SECTION©

CONCEPTUAL VS. PROCEDURAL AIMS

Aim 1: Clone viral protein IX93 and transfect it into primary endothelial cells to assay for transformation.

OVERVIEW SECTION©

CONCEPTUAL VS. PROCEDURAL AIMS

Aim 1: Determine whether protein IX93 causes transformation in endothelial cells.

OVERVIEW SECTION©

CONCEPTUAL VS. PROCEDURAL AIMS

Aim 1: Determine the role of protein IX93 in viral-mediated transformation of endothelial cells.

OVERVIEW SECTION©

CONCEPTUAL VS. PROCEDURAL AIMS

Aim 1: Determine the key mechanism of viral-mediated transformation of endothelial cells. Our *working hypothesis* is that protein IX93 disrupts the XYZ signaling cascade by sequestering Y, inducing immortalization of primary endothelial cells.

OVERVIEW SECTION©

Purpose of the specific aims: to test the parts of the central hypothesis

The Central Hypothesis must be linked to the Specific Aims, therefore...

Tip: write the central hypothesis so that it has readily identifiable parts, each of which gives rise to a specific aim

LINKAGE OF THREE KEY COMPONENTS©

Example: You are a clinical researcher who has a strong interest in promoting breast cancer screening for women. Significant disparities exist among different ethnic groups. Both the literature and results of your pilot data suggest that physician and patient communication is a central factor. You have <u>Your central hypothesis:</u>

OVERVIEW SECTION©

Gap/Neeed: The racial disparities in breast cancer screening are well documented, but it is unclear whether the major driver is access to care, or patient–provider communication

Overall Objective: Understand the role of patient–provider communication in order to develop evidence-based interventions

Central Hypothesis: Given equal access to care, the quality and content of patient–provider communication is the key predictive factor for whether women undertake breast cancer screening.

OVERVIEW SECTION©

Central Hypothesis: Given equal access to care, the quality and content of patient–provider communication is the key predictive factor for whether women undertake breast cancer screening.

Specific Aims:

1. Determine relationship between the general patterns of patient–provider dialog and the ethnicity of the patient.

2. Determine the role of patient-centered communication about breast cancer screening

OVERVIEW SECTION©

Specific Aims:

Central Hypothesis: Given equal access to care, the quality and content of patient–provider communication is the key predictive factor for whether women undertake breast cancer screening.

Specific Aims:

1. Determine relationship between the general patterns of patient–provider dialog and the ethnicity of the patient. Our working hypothesis, based on preliminary data obtained using our recently developed dialogue coding system, is that total utterances by physicians will be in higher proportions to those of patients when the patients are from minority groups.

OVERVIEW SECTION©

Specific Aims:

Central Hypothesis: Given equal access to care, the quality and content of patient–provider communication is the key predictive factor for whether women undertake breast cancer screening.

Specific Aims:

2. Determine the role of patient-centeredness in communication about breast cancer screening. Our working hypothesis, again based on our preliminary data using a method for coding speech, is that more patient-centered discussion, as opposed to generic recommendations, will result in more women undertaking breast cancer screening

---

SPECIFIC AIMS SECTION©

Characteristics of Specific Aims:

- Two-to-five, at the most
- Brief, focused and limited in scope
- Each must be an eye-catching "headline"
- Conceptual, *NOT* descriptive
- Must collectively test all parts of the hypothesis
- Each must flow logically into the next
- None should be absolutely dependent on the outcome of an earlier aim

KEY POINT©

Tie the narrative for each of the specific aims together **but** avoid having feasibility of one aim dependent upon a particular outcome of an earlier aim.

HYPOTHESIS: the quality and content of patient–provider communication is the key predictive factor for whether women undertake breast cancer screening

AIM 1. Determine how the content of physician communication changes with the ethnicity of their patient.

AIM 2. Determine the extent to which changes in communication style based on perceived English language skills is a barrier to undergoing screening.

KEY POINT©

HYPOTHESIS: the quality and content of patient–provider communication is the key predictive factor for whether women undertake breast cancer screening

AIM 1. Determine how the content of physician communication changes with the ethnicity of their patient. *It turns out to be the same.*

AIM 2. Determine the extent to which changes in communication style based on perceived English language skills is a barrier to undergoing screening. So why does this even matter???

LINEAR PROGRESSION FOR A STRONG SPECIFIC AIMS SECTION©

Linkage, achieved by outlining, is the key to a bulletproof Specific Aims section!

Introductory Paragraph
Opening sentence
Current knowledge
Unknown or need

What, Why, Who Paragraph
Long-term goal
Overall objective of application
Central hypothesis & how formulated
Rationale

Specifics Paragraph
Specific aims

Payoff Paragraph
Innovative
Expected outcomes
Positive impact

OVERVIEW SECTION©

PAYOFF PARAGRAPH

- Key section in developing advocacy
- Statement regarding *innovation* must grow out of your specific aims
- *Expected outcomes* must be specific and credible: this is the return on reviewers' investment
- Conclude with a deliberately general statement regarding *positive impact*, i.e., how your outcomes will advance the field and mission of the granting agency

---

TIPS ON WRITING A NEED-DRIVEN APPLICATION©

- <u>Not</u> appropriate for most research grant proposals to NIH; hypothesis-driven research is usually expected
- Appropriate for applications that would be contrived/not in keeping with norms of the field
- If you are unsure about whether to offer a needs- *vs.* hypothesis-driven proposal, seek the advice of your Program Officer
- A 'hybrid' (need/hypothesis-driven) application can be a very powerful presentation format

---

TIPS ON WRITING A NEED-DRIVEN APPLICATION©

- Opening: same as for hypothesis-driven
- Current Knowledge: use to set up need
- Gap: substitute Statement of Need, followed by objective evidence of existence of the need (need assessment; other investigators)
- Gap As An Important Problem: substitute Need As An Important Problem
- Long-Term Goal: same as hypothesis-driven
- Overall Objective: to meet the need

TIPS ON WRITING A NEED-DRIVEN APPLICATION©

- Rationale: what will become possible after need is met that is not possible now
- Specific Aims: tasks that will be undertaken to meet the need; approaches substitute for working hypothesis in subordinate paragraphs
- Innovation: same as hypothesis-driven
- Expected Outcomes: same – collectively must attain overall objective, which meets the need
- Positive Impact: same as hypothesis-driven

LINEAR PROGRESSION FOR A STRONG SPECIFIC AIMS SECTION©

Linkage, achieved by outlining, is the key to a bulletproof Specific Aims section!

Introductory Paragraph
Opening sentence
Current knowledge
Unknown or need

What, Why, Who Paragraph
Long-term goal *
Overall objective of application
Central hypothesis & how formulated
Rationale *

Specifics Paragraph
Specific aims

Payoff Paragraph
Innovative
Expected outcomes *

K-AWARD REVIEW CRITERIA

- Scientific and technical merit
- Potential of the candidate
- Quality of the training plan
- Quality of the mentoring relationship
- Research environment
- Extent of institutional commitment

WHAT DOES IT TAKE TO SUCCEED?

- The best K Award applications often have been 'ramped up' over time through early partnering of the Candidate and Mentor
- Maximize rate of publication during ramp-up period
- Set goals and bench marks
- Use development of manuscripts and grant applications to optimize your research focus

LINEAR PROGRESSION FOR A K-AWARD SPECIFIC AIMS SECTION©

Linkage, achieved by outlining, is the key to a bulletproof Specific Aims section!

Introductory Paragraph
Opening sentence
Current knowledge
Unknown or need

What, Why, Who Paragraph
Long-term goal *
Overall objective of application
Central hypothesis & how formulated
Rationale *

Specifics Paragraph
Specific aims

Payoff Paragraph
Innovative
Expected outcomes *

RESEARCH PLAN OF THE K AWARD DIFFERS FROM THAT OF R SERIES

The following, critically important part of the instructions is often overlooked in the way that the Research Plan is written:

"It is important to relate the research to the candidate's scientific career goals. Describe how the research, coupled with other developmental activities, will provide the experience, knowledge, and skills necessary to launch and conduct an independent research career, ..."

K AWARD SPECIFIC AIMS SECTION: LONG-TERM GOAL

- Should reflect the purpose of the K Award
- Should reflect the new field the Candidate aspires to enter

For example:

'The Candidate's *long-term goal* is to develop an independent research career as a molecular epidemiologist focused on the pathogenesis of breast cancer.'

- Overall objective that follows should be a scientific step along the research continuum

---

K AWARD SPECIFIC AIMS SECTION: RATIONALE

Should reflect why you want to do the research: what will become possible after the program is completed that is not possible now
- Scientifically
- With respect to research career development

For example:

'The *rationale* for the proposed research program is that it is expected to yield important new insights into the role of the environment in the pathogenesis of breast cancer while, at the same time, it provides the means of establishing the PI's independence as a molecular epidemiologist.'

K AWARD SPECIFIC AIMS SECTION: PERSONAL STATEMENT

- Training and experience to date
- A well-established mentor in the area the Candidate aspires to enter
- Strong research environment in which to acquire the additional training

LINEAR PROGRESSION FOR A K-AWARD SPECIFIC AIMS SECTION©

Introductory Paragraph
Opening sentence
Knowns
Unknown or need
Unknown/need as a problem

What, Why, Who Paragraph
Long-term goal *
Overall objective of this application
Central hypothesis & how formulated
Rationale *

Specifics Paragraph
Specific aims

Payoff Paragraph
Innovative
Expected outcomes *
General positive impact

K AWARD SPECIFIC AIMS SECTION: EXPECTED OUTCOMES

"The Candidate must provide a plan for achieving independent research support by the end of the award period."

In addition to scientific expectations, your expectation to write and submit an R01 should be included. For example:

'These outcomes are expected to position the Candidate to submit a competitive R01 application during the fourth year of the proposed Award.'

K AWARD: PERSONAL STATEMENT

For example:

'The Candidate is well prepared to capitalize on a K Award due to training and research experience acquired to date (see Biographical Sketch and letters of reference). This, coupled with having identified a well-established molecular epidemiologist as a mentor, in a research environment that contains other funded investigators who are doing complementary research (see Description of Institutional Environment), helps to assure that the scientific and training goals of this application will be met.'

LINEAR PROGRESSION FOR A STRONG SPECIFIC AIMS SECTION©

Linkage, achieved by outlining, is the key to a bulletproof Specific Aims section!

Introductory Paragraph
Opening sentence
Current knowledge
Unknown or need

What, Why, Who Paragraph
Long-term goal *
Overall objective of application
Central hypothesis & how formulated
Rationale *

Specifics Paragraph
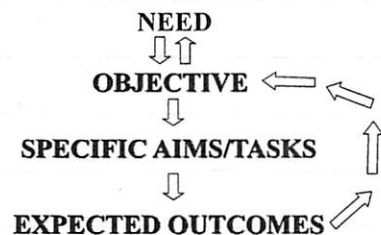Specific aims

Payoff Paragraph
Innovative
Expected outcomes *

LINEAR PROGRESSION FOR A STRONG OVERVIEW SECTION©

GAP
⇓⇑
OBJECTIVE ⇐
⇓
CENTRAL HYPOTHESIS
⇓
SPECIFIC AIMS
⇓
EXPECTED OUTCOMES

LINEAR PROGRESSION FOR A STRONG OVERVIEW SECTION©

NEED
⇓⇑
OBJECTIVE ⇐
⇓
SPECIFIC AIMS/TASKS
⇓
EXPECTED OUTCOMES
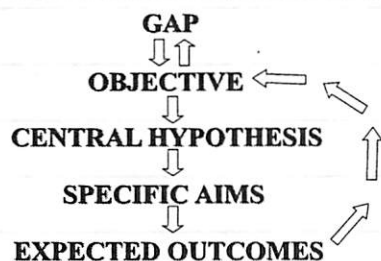
CREATING QUALITY TIME TAKES COMMITMENT©

I have made this letter longer than usual, only because I have not had the time to make it shorter.

Blaise Pascal (1623 - 1662)

"SHORTENED" NIH APPLICATIONS

- Specific Aims – 1 page
- Research Strategy – 12 pages (6 for R03 and R21)
  - Significance – ½ page
  - Innovation – ½ page
  - Approach
    - (Progress Report)
    - Aim 1
    - Aim 2
    - Aim 3
    - Timeline / benchmarks

GRANT WRITERS' SEMINARS AND WORKSHOPS

PREPARATION OF THE APPLICATION
-Significance and Innovation-

(Recommended Length: 1 page)

JUSTIFICATION

"Three things are to be looked to in a building:
that it stands on the right spot;
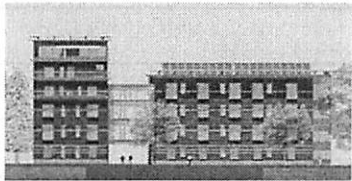that it be securely founded;
that it be successfully executed."

Johann Wolfgang von Goethe
from *Elective Affinities*, 1808

JUSTIFICATION

How do you convince reviewers
your "building" is both necessary and good?

Justify. Justify. Justify.

MAJOR CHANGES REGARDING 'SELLING' YOUR IDEA TO NIH©

- Research Plan shortened; review of literature and preliminary data sections removed
- *Sections of the proposal now linked to each of the five core review criteria*
- Switch to a 9-point evaluation scale
- Greater emphasis on quality of content and less on detailed description of approach
- Standardization and shortening of reviews
- Emphasis on funding New Investigators – sooner
- Greater emphasis on the fastest path to funding, especially if triaged: reapply or switch to something else?

KEY POINT[©]

The Significance and Innovation subsections must be distinctly different!

Significance: the [positive] effect something is likely to have on other things

Innovation: a new and substantially different way of doing/considering something

---

CORE REVIEW CRITERIA ARE LINKED TO THESE SECTIONS[©]

Biographical Sketch
Facilities & Other Resources section
Research Plan
1. **Specific Aims**
2. **Research Strategy**
   - *Significance*
   - Innovation
   - Approach
     - Each Specific Aim
       - Justification & Feasibility
       - Research Design
       - Expected Outcomes
       - Potential Problems & Alternative Strategies
     - Timetable
     - Future Directions

SIGNIFICANCE SUBSECTION[©]

DEFINITION OF SIGNIFICANCE:

Generic: the [positive] effect that something is likely to have on other things

Applied to NIH: the positive effect that your research contribution is likely to have on something that is relevant to NIH

SIGNIFICANCE SUBSECTION©

SIGNIFICANCE:

- *The positive impact that your results will have on something that is relevant to NIH*
- Most important of the 5 core criteria
- Arguably the most important paragraph in the application
- The subsection should have three parts

SIGNIFICANCE SUBSECTION©

- *"Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses."*
- *"Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields."*
- *"Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved."*

http://enhancing-peer-review.nih.gov/docs/application_changes.pdf

---

SIGNIFICANCE SUBSECTION©

- Set the up the paragraph in three parts
- *"Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses."*
- The first part of the paragraph will contain information you might have otherwise had in the background—citations and details giving the current state of the knowledgebase
- The first part should expand upon the information given in the opening paragraph of the Specific Aims

SIGNIFICANCE SUBSECTION©

- *"Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields."*

- After defining the state of the art, state how you will expand it. What gap in the knowledgebase will your work fill?

- Then, state the significance in a direct sentence.

SIGNIFICANCE SUBSECTION©

- *"Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved."*

- Expand on the statement of significance and on the broad statement of positive impact in the Aims.

- Use any citations appropriate to support the need for the field to move in that direction.

JUSTIFICATION OF NEED©

SIGNIFICANCE:

- Part 1: substantiate with citations that there is a gap/need & why it's an important problem. Conclude with your expected contribution.
- Part 2: italicized statement of significance – *This contribution is significant because ...* [complete with why contribution is important]
- Part 3: tangible benefits – positive impact – that could be expected from application of the new knowledge

JUSTIFICATION

KEY POINT!

"New applicants make two common mistakes. One is....*insufficient justification for the significance of the problem.*"

www.niddk.nih.gov/fund/grants_process/grantwriting.htm

CORE REVIEW CRITERIA ARE LINKED TO THESE SECTIONS©

Biographical Sketch
Facilities & Other Resources section
Research Plan
1. **Specific Aims**
2. **Research Strategy**
   * **Significance**
   * ***Innovation***
   * **Approach**
     - **Each Specific Aim**
       > **Justification & Feasibility**
       > **Research Design**
       > **Expected Outcomes**
       > **Potential Problems & Alternative Strategies**
     - **Timetable**
     - **Future Directions**

INNOVATION SUBSECTION©

DEFINITION OF INNOVATION:

Generic: a new and substantial departure from the status quo, which opens new horizons that otherwise would have been unattainable

Applied to NIH: a new and substantial departure from the status quo [approach, concept, way of thinking], which enables new, NIH-relevant research directions that otherwise would have been unattainable

INNOVATION SUBSECTION©

INNOVATON:

- *This must project your new and substantially different way of doing/considering something*
- Most subjective of the five core criteria
- NIH instructions still seem to suggest that this is an 'optional' criterion
- True, but that can't be the message here, and you don't want to contrive something
- The strongest approach, therefore, is to offer a project that is genuinely innovative
- Use a three-part approach

INNOVATION SUBSECTION©

- *"Explain how the application challenges and seeks to shift current research or clinical practice paradigms."*

- *"Describe any novel theoretical concepts, approaches or methodologies, instrumentation or intervention(s) to be developed or used, and any advantage over existing methodologies, instrumentation or intervention(s)."*

- *"Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation or interventions."*
http://enhancing-peer-review.nih.gov/docs/application_changes.pdf

INNOVATION SUBSECTION©

- This is the most subjective of the review criteria, but together with Significance, it carries a great deal of weight for the Overall Impact.

- This section must be crafted very carefully.

INNOVATION SUBSECTION©

- *"Explain how the application challenges and seeks to shift current research or clinical practice paradigms."*
- Structure the paragraph in the same way as the Significance paragraph, but the information will be different.
- Whereas the "state of the art" for Significance is the state of the knowledgebase, the "state of the art" for Innovation should be an explanation and (tactful) critique of the current paradigm(s).

INNOVATION SUBSECTION©

- *"Describe any novel theoretical concepts, approaches or methodologies, instrumentation or intervention(s) to be developed or used, and any advantage over existing methodologies, instrumentation or intervention(s)."*
- State how what you will do advances, improves upon, or corrects current approaches or paradigms.
- Give them a sentence they can cut and paste in the review!

INNOVATION SUBSECTION©

- *"Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation or interventions."*
- Expand on what you meant in your "This is innovative, in our opinion, because..." statement.
- If possible, cite the need for the innovation.

INNOVATION SUBSECTION©

INNOVATION:

- Part 1: cite literature that diplomatically frames the past (approach, dogma, concept, etc.) and sets up your statement of innovation
- Part 2: italicized statement of innovation – *The proposed research in innovative, in our opinion, because ... [complete by stating how what you propose stands apart from the past]*
- Part 3: conclude with how such innovation will have positive impact – but don't repeat 'benefits' that support significance

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GRANT WRITERS' SEMINARS AND WORKSHOPS

PREPARATION OF THE APPLICATION

-Narrative Description-
Approach subsection of Research Strategy
(Recommended Length: 10-11 pages)

MAJOR CHANGES REGARDING 'SELLING' YOUR IDEA TO NIH©

- Research Plan shortened; review of literature and preliminary data sections removed
- Sections of the proposal now linked to each of the five core review criteria
- *Greater emphasis on quality of content and less on detailed description of approach*
- Switch to a 9-point evaluation scale
- Standardization and shortening of reviews
- Emphasis on funding New Investigators – sooner
- Greater emphasis on the fastest path to funding, especially if triaged: reapply or switch to something else?

FIVE CORE REVIEW CRITERIA FOR NIH – 'OLD' ORDER

SIGNIFICANCE
APPROACH
INNOVATION
INVESTIGATOR(S)
ENVIRONMENT

THE FIVE CORE REVIEW CRITERIA – 'NEW' ORDER*

SIGNIFICANCE
INVESTIGATOR(S)
INNOVATION
APPROACH
ENVIRONMENT

* Not equally weighted – influences impact score

APROACH SUBSECTION©

● This section has to cover the background, preliminary data, project plan, potential problems, resource sharing plans and time line. In 11 pages!

● Trying to structure this like a mini, old-form R01 does not work. (We tried it.)

● Completely re-think your information flow!

## NEW FORMAT FOR NIH RESEARCH PLAN©

1. **Specific Aims (1 page)**
2. **Research Strategy (12 pages R01; 6 pages R03/R21)**
   - *Significance*
   - *Innovation*
   - *Approach*
     - Each Specific Aim
       - ➢ Introduction
       - ➢ Justification & Feasibility
       - ➢ Experimental/Research Design *(Write first)*
       - ➢ Expected Outcomes
       - ➢ Timetable
       - ➢ Potential Problems & Alternative Strategies
     - Future Directions

THERE ARE THREE LEVELS AT WHICH PURPOSE MUST BE MET©

- THE GRANT MECHANISM

- EACH SECTION OF THE PROPOSAL

- COMPONENTS WITHIN EACH SECTION

PURPOSE OF REFERENCED LITERATURE©

- **Justification of the need for what is proposed**
- **Citation of methodology**

REVIEW/CITE LITERATURE IN THESE LOCATIONS©

1. *Specific Aims*
2. Research Strategy
   - *Significance*
   - *Innovation*
   - *Approach*
     - Each Specific Aim
       - ➤Introduction
       - ➤*Justification* & Feasibility
       - ➤ *Research Design*
       - ➤ Expected Outcomes
       - ➤ Potential Problems & Alternative Strategies
     - Timetable
     - Future Directions

NEW FORMAT FOR NIH RESEARCH PLAN©

1. Specific Aims (1 page)
2. Research Strategy (R01-12 pages; R03/R21-6 pages)
   - *Significance*
   - *Innovation*
   - *Progress Report (if renewal)*
   - *Approach*
     - Each Specific Aim
       - ➤Introduction
       - ➤Justification & Feasibility
       - ➤ Research Design
       - ➤ Expected Outcomes
       - ➤ Potential Problems & Alternative Strategies
     - Timetable
     - Future Directions

ORDER OF WRITING THE APPROACH SUBSECTION©

Each Specific Aim:

third   ➤Introduction

second   ➤Justification & Feasibility

      Review of Relevant Literature

      Preliminary Studies

Write

➤ Research Design

first { ➤ Expected Outcomes

➤ Potential Problems & Alternative Strategies

TIPS ON USING THE LITERATURE©

- Not meant to be comprehensive; should be highly selected and highly relevant
- Provide a *critical* review of what the gaps/problems are, not just a summary of who did what when
- Logically build toward what you expect to contribute
- If you have published using a method, cite the publication, don't describe the procedure
- Use italicized sentences to tell reviewers why what is reviewed justifies the need for what is proposed

PRELIMINARY DATA IN THIS LOCATION©

1. Specific Aims
2. Research Strategy
   - Significance
   - Innovation
   - Approach
     - Each Specific Aim
       - >Introduction
       - >Justification & *Feasibility*
       - > Research Design
       - > Expected Outcomes
       - > Potential Problems & Alternative Strategies
     - Timetable
     - Future Directions

ORDER OF WRITING THE APPROACH SUBSECTION©

Each Specific Aim:

third >Introduction

second >Justification & Feasibility

Review of Relevant Literature

Preliminary Studies

first { > Research Design
> Expected Outcomes
> Potential Problems & Alternative Strategies

(left margin vertical text: Write)

PURPOSE OF PRELIMINARY DATA©

Establish that what is proposed is
feasible in <u>your</u> hands

USE TO DEMONSTRATE FEASIBILITY IN YOUR HANDS©

PRELIMINARY DATA: TECHNICAL

- Organize this subsection to support the feasibility in your hands of the related aim
- Data presented should be as simple as possible, but not 'dumbed down'
- Design each figure or table to convey a single point or idea
- Avoid inclusion of extraneous or irrelevant data
- Vary the style of presentation to make the data maximally appealing

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USE TO DEMONSTRATE FEASIBILITY IN YOUR HANDS©

PRELIMINARY DATA: EDITORIAL

- Lead the reviewers through the data; don't make them do the work
- Place supporting figures/tables as close to where they are referred to in the text as possible
- Include italicized sentences that tell reviewers how data presented support feasibility
- Be certain that print in photo-reduced figures/tables is legible
- Put methodology into figure legends/footnotes to tables, *not* in the text

ORDER OF WRITING THE APPROACH SUBSECTION©

Each Specific Aim:

third ➤ **Introduction**

second ➤ **Justification & Feasibility**

Write

Review of Relevant Literature

Preliminary Studies

first ➤ *Research Design*

➤ **Expected Outcomes**

➤ **Potential Problems & Alternative Strategies**

APPROACH SUBSECTION©

EXPERIMENTAL/RESEARCH DESIGN

- Use separate paragraphs/sections to develop each set of studies
- Avoid inclusion of <u>mindless</u> detail (i.e., your proposal should not be a methods manual)
- Succinctly provide only <u>meaningful</u> detail – i.e., what can't be found in a methods manual
- Reference, don't detail, anything described in your team's peer-reviewed publications
- Consolidate anything common to two-or-more aims in a 'Methods & Procedures' section

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APPROACH SUBSECTION©

Subdivide on the basis of your aims; same format under each aim

<u>Title</u> (*verbatim restatement of the Specific Aim*):

- Justification & Feasibility
- Experimental/Research Design:
  - Explanatory Title for Study #1
  - Explanatory Title for Study #2
- Expected Outcomes
- Potential Problems and Alternative Approaches

ORDER OF WRITING
THE APPROACH SUBSECTION©

Each Specific Aim:

third   ➢Introduction

second   ➢Justification & Feasibility

Write   Review of Relevant Literature

Preliminary Studies

first {   ➢ Research Design
➢ *Expected Outcomes*
➢ Potential Problems & Alternative Strategies

APPROACH SUBSECTION©

EXPECTED OUTCOMES

● A key, and often overlooked, subsection

● Succinctly and realistically summarize what your most important results are expected to be

● Integrate outcomes and show that they collec-tively attain the aim's objective

● *Think of this as the return that your reviewers can expect if they 'invest' in this aim*

ORDER OF WRITING
THE APPROACH SUBSECTION©

Each Specific Aim:

third   ➢Introduction

second   ➢Justification & Feasibility

Write   Review of Relevant Literature

Preliminary Studies

first {   ➢ Research Design
➢ Expected Outcomes
➢ *Potential Problems & Alternative Strategies*

APPROACH SUBSECTION[©]

POTENTIAL PROBLEMS & ALTERNATIVE APPROACHES

- There is no such thing as problem-free research
- <u>Positively</u> acknowledge potential problems
- Include only things that could, but probably won't, go wrong; BIG problems don't belong here

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APPROACH SUBSECTION[©]

POTENTIAL PROBLEMS & ALTERNATIVE APPROACHES

- Most important problem is potential invalidity of the aim's working hypothesis
- Offer alternative approaches to problems — *but*
- Don't overemphasize them
- Use conditional language: "would" not "will"

ORDER OF WRITING THE APPROACH SUBSECTION[©]

Each Specific Aim:

third ➤ *Introduction*

second ➤ Justification & Feasibility

      Review of Relevant Literature

      Preliminary Studies

first ➤ Research Design

    ➤ Expected Outcomes

    ➤ Potential Problems & Alternative Strategies

Write

APPROACH SUBSECTION[©]

- <u>Introduce</u> what will be done under the aim with a final, brief paragraph that includes:

  - ➤ objective
  - ➤ working hypothesis
  - ➤ overall strategy or approach
  - ➤ rationale

GRANT WRITERS' SEMINARS AND WORKSHOPS

PREPARATION OF THE APPLICATION
-Feasibility-
(Biosketches/Facilities/Equipment/ Preliminary Data)

TWO CHANGES IN THE BIOGRAPHICAL SKETCH[©]

- Education/Training table
- *Personal Statement*
- Positions and Honors
- *Selected Peer-Reviewed Publications* – up to 15
  - Most Relevant to Proposed Project (e.g., 5)
  - Additional Recent Publications of Importance to the Field (e.g., up to 10 more)
- Research Support
  - Ongoing
  - Completed in Last Three Years

EMPHASES IN THE BIOGRAPHICAL SKETCH©

- Thoroughly document credentials of all Key Personnel and Other Significant Contributors

- Emphasize aspects of training and experience that are most relevant to the application, i.e., why each member of the research team is qualified/prepared to do what is proposed

- Early Stage Investigator: emphasize the extent and quality of training; experience to date

- Don't 'pad' the Biographical Sketch

TIPS ON PREPARING THE PERSONAL STATEMENT©

- Include status as an Early Stage Investigator, if relevant
- This should reflect why the person described has been included on the research team:
  - Relevance of expertise
  - Relevance of experience
  - Role in developing preliminary data
  - Provides access to resources/technology
  - Prior record of working with research team
  - Proximity to other members of the team
- Should not repeat routine biographical info

TIPS ON PREPARING THE PERSONAL STATEMENT©

- Cover management/administrative experience for anyone with role of PD/PI

- Include training experience, but only if relevant (e.g., mentor on a K Award proposal)

TIPS ON PREPARING THE PERSONAL STATEMENT©

- What can you say about your training beyond the bare names and dates?
- What about your training prepared you to be a "good bet" as PI for this application?
- Where does this research fit in your career trajectory?
- What is your role, and why are you best qualified to fill that role?

OTHER MEMBERS OF THE RESEARCH TEAM©

- Identify credible co-investigators, collaborators and consultants as part of planning
- No clones of your own expertise
- Exclude former mentors from intellectual roles
- No senior investigators as 'window dressing'
- Needn't limit search to your own institution
- If no effort is included on the application, a letter of commitment must accompany the proposal

GENERAL TIPS ON THE BIOGRAPHICAL SKETCH©

- You will not be able to have a generic biosketch on file.
- The Personal Statement and choice of publications must be tuned to the proposal
- This is true even for collaborators!

OVERCOMING DEFICIENCIES IN BASE OF EXPERTISE©

- Identify additional credible Key Persons / Other Significant Contributors to fill a gap
- Needn't limit yourself to your own institution; Community of Science's 'Expertise' or InfoEd's 'Genius' databases can help find expertise
- If no effort is included on the application, __must__ provide a letter of commitment
- Write the letters of commitment yourself

HOW TO MAKE USE OF YOUR COLLEAGUES©

An Unhelpful Collaborator's Letter

Dear Dr. AtKisson:

I will be happy to serve as a consultant on your research proposal to NIH. Please let me know how I can be of help.

Sincerely yours,

John Adams, Ph.D.

HOW TO MAKE USE OF YOUR COLLEAGUES©

A Helpful Collaborator's Letter

Dear Peg,

This correspondence confirms our agreement to collaborate on your proposed R01 application. I believe that you are addressing an important issue in the field of synaptic transmission, and our recently developed software algorithm would be an ideal addition to your proposed analysis. We would be pleased to help you set this up at your institution whenever you are ready. I am looking forward to our continued collaboration.

Best regards,

John

TIPS ON PREPARING FACILITIES & OTHER RESOURCES SECTION©

- Include six other subsections (Laboratory, Animal, Office, Clinical, Computer, Other Resources)
- Enter 'Not Applicable' adjacent to those that do not apply to your project
- Minor equipment (cost <$5K) should be listed under applicable subsections; often overlooked

TIPS ON PREPARING FACILITIES & OTHER RESOURCES SECTION©

- Include 'Shared/Core Resources' as subdivision of Other Resources
- Also Provide an 'Intellectual Resources' sub-division under Other Resources. Include table of names, granting agencies and grant titles of those doing complementary research

GENERAL TIPS ON FACILITIES & EQUIPMENT SECTIONS©

- Importance often underestimated; these sections are often written poorly, therefore
- Describe resources with <u>objective</u> detail; avoid subjectivity and clichés (e.g., 'adequate' space or 'state-of-the-art' equipment)
- Include shared and core resources
- Include relative proximity and extent of access to shared/core facilities

TIPS ON PREPARING FACILITIES & OTHER RESOURCES SECTION©

This subsection is linked to review of the ENVIRONMENT core review criterion

- Subsection of Facilities & Other Resources
- Should reflect how the research environment will contribute to success of the project
- Particularly call attention to distinguishing features of the research environment
  - Key collaborative arrangements
  - Extraordinary institutional commitment
  - Rich intellectual environment
- <u>Not</u> intended for routine space & equipment

TIPS ON PREPARING FACILITIES & OTHER RESOURCES©

This subsection is linked to review of the ENVIRONMENT core review criterion

- If there is more than one project site, write this subsection for each
- Early Stage Investigators should discuss extent of institutional investment in him/her (e.g., space, equipment, start-up funds [not $$ amount], support of students or technician, etc.), including dedicated time for research)

TIPS ON PREPARING THE EQUIPMENT SECTION©

- Include only equipment with a cost ≥ $5K
- Describe equipment at other sites, as well as the primary site
- Include shared and core equipment

TIPS ON PREPARING THE EQUIPMENT SECTION©

- Include only shared and core equipment that is relevant to the proposed project, no matter how 'sexy,' contemporary or otherwise attractive it may be

- Include relative proximity and extent of access to shared/core equipment

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GRANT WRITERS' SEMINARS AND WORKSHOPS

PREPARATION OF THE APPLICATION

-Budget-

THE THREE MOST IMPORTANT STEPS IN BUDGET PREPARATION!©

1. Read the instructions;

3. Read the Instructions; and then really

5. READ THE INSTRUCTIONS

THE REVIEW PROCESS©

4 ....AND THEN <u>REALLY</u> READ
THE APPLICATION INSTRUCTIONS

- Read the <u>correct</u> instructions
- Read <u>all</u> of the instructions
- Read the <u>current</u> instructions
- Read especially RFAs, PAs, and NRAs <u>especially</u> well

BUDGET APPROACHES FOR NIH GRANT PROPOSALS©

- Most research-series applications are modular: $25,000 direct-cost modules up to $250K/yr
- Consortial/contractual direct costs are included in total direct costs
- Consortial/contractual F&A (indirect) costs are included in total direct costs, but do not count against the $250K/yr maximum

BUDGET APPROACHES FOR NIH GRANT PROPOSALS©

- Applications between $250K and $500K/yr must use R&R 'breakout' budget forms
- Budgets exceeding $500K/yr cannot be submitted with prior approval of NIH Program Staff

MODULAR BUDGET JUSTIFICATIONS©

- Personnel Justification

- Consortium Justification

- Additional Narrative Justification

MODULAR BUDGET JUSTIFICATIONS (Cont'd)©

- Personnel Justification:
  - Three subdivisions: Key Personnel, Other Significant Contributors, and Other Personnel (techs, postdocs, etc)
  - Provide objective detail regarding title of position (e.g., Principal Investigator), person months (if applicable), and role in the project.
  - For those without a biosketch, summarize qualifications
  - Do not include Consortial/Contractual personnel here (see below)

BUDGET: PERSONNEL©

Anita Suarez - Technician, 6 person months

Anita Suarez - Technician. 6 person months. Ms. Suarez has a Master's degree in biotechnology and two years of molecular biology experience. She is conversant with all techniques required for Aim 2 and will be responsible for routine cell culture and cloning.

MODULAR BUDGET JUSTIFICATIONS (Cont'd)©

- Consortium Justification:
  - Include Personnel Justification here, not above
  - Include total-costs (direct + F&A) estimate for each year
  - Stipulate whether institution is domestic or foreign

MODULAR BUDGET JUSTIFICATIONS (Cont'd)©

- Additional Narrative Justification:
  - Justify any difference, up or down, in number of modules requested per year
  - Justification must be scientific, e.g., can't be that the total allowable for an R21, $275K, cannot be equally divided in modules over the two years allowed. Either request $125K/yr = $250K, in which case no justification is required, or have a scientific basis for requesting $125K/$150K = $275K
  - Justify any difference, up or down, in the F&A (indirect) costs requested per year

REALITIES OF BUDGET REVIEW©

- Budget should <u>never</u> drive the research unless there is a cap
- The idea that reviewers will invariably cut something is a myth
- Lack of adequate justification is the usual reason for cuts

REALITIES OF BUDGET REVIEW©

- *Most cuts are the fault of the applicant, not the reviewer*
- Once credibility is lost on any item, the budgetary ax will cut even deeper
- Every request must be credible, therefore...

NON-MODULAR BUDGET JUSTIFICATIONS©

- Personnel Justification
- Consortium Justification
- Supplies
- Equipment
- Travel

BUDGET: PERSONNEL©

- Personnel costs are frequently a significant component of your budget
- Include both salary and all appropriate fringe benefits
- Ensure that you justify each person with respect to both effort and expertise

BUDGET: PERSONNEL©

- If you will create a new position, provide a detailed description of duties
- Credibility can be lost, either by over- or underestimating needs (number & effort)

BUDGET: SUPPLIES©

- Be certain that your supply budget matches well with what you propose to do
- Therefore use your Narrative (Plan of Work) Section to develop your supplies budget

BUDGET: SUPPLIES©

- If possible, cost account each request; do not use round numbers
- Lump supplies into logical categories
- Extensively justify all requests for supplies on non-modular budgets

BUDGET: EQUIPMENT©

- Often one of the *more difficult* categories in proposals to justify
- Any equipment request <u>must</u> be congruent with your resources statement

BUDGET: EQUIPMENT©

- Replacement items are almost always questioned unless thoroughly justified
- Remember that small items of equipment are included under supplies

BUDGET: TRAVEL©

- Be realistic; travel is more expensive than reviewers are willing to acknowledge
- Travel must <u>tangibly</u> contribute to the project; justify who will travel and why

BUDGET: TRAVEL[©]

- Itemize which meeting(s) will be attended, or which sites will be visited, and cost-account accordingly

- Always budget economy travel (No First Class)

- Travel is (should be) a relatively easy budget item to justify

ACCEPTING REDUCED BUDGET AND/OR TIME

- If cuts equal $\geq 10\%$ the scope of work should be changed

- If not changed, applicant will be responsible for original scope of work

- Usually include revised budget and Impact Statement that projects new scope of work

- Involve your Sponsored Programs office in all correspondence

REALITIES OF BUDGET REVIEW[©]

KEY POINT!

The underlying secrets to any successful budget preparation are to base them on real costs that have accurately been determined and then to JUSTIFY all budgeted expenses *exhaustively* in the proposal

GRANT WRITERS' SEMINARS AND WORKSHOPS

PREPARATION OF THE APPLICATION

- Title, Project Summary and Project Narrative -

TIPS ON CREATING A TITLE©

- The title makes your application's first impression, which <u>must</u> be positive
- It is *extraordinarily important*, therefore...
- It should be equivalent to a 'headline'
- Maximal positive impact will come from emphasizing the payoff of your research
- The title should be changed to reflect the payoff of each renewal, i.e., it should not be constant over the continuum of research

---

TIPS ON CREATING A TITLE©

- Copy and paste the objective and the central hypothesis (Specific Aims section) and your contribution and its significance (Significance subsection) into a separate file
- List relevant acceptable abbreviations
- List words relevant to the payoff; similar words on same line; asterisk denotes 'must include'
- Arrange words/abbreviations into compelling, informative space-limited title (81 characters and spaces, including punctuation, or less)

CREATING THE TITLE – COPY AND PASTE©

Objective:

Treat DNA-mediated acute renal tubular necrosis with full recovery

Central Hypothesis:

Intervention must target mechanism X

Contribution:

Efficacious intervention

Significance:

Reduction of severity of necrosis with subsequent full recovery

TIPS ON PREPARING TITLE©

- *List relevant acceptable abbreviations*

CREATING THE TITLE - ABBREVIATIONS©

Generally Acceptable:
- DNA = deoxyribonucleic acid
- & = ampersand symbol = and

May Be Acceptable:
- IPF = idiopathic pulmonary fibrosis
- PID = pelvic inflammatory disease

Unacceptable:
- DEX = dexamethasone; dextran; dextrose
- RF = renal failure
- AAF = 2-acetylaminofluorene

TIPS ON PREPARING TITLE©

- List accepted abbreviations
- *List words relevant to the payoff*

CREATING THE TITLE – WORD LIST©

*Tubular Necrosis, Acute Tubular Necrosis, Acute Renal Tubular Necrosis
 Develop
 Treatment, Intervention
 Efficacious
*Mechanism, Mechanistic
 Target, Targeted
*DNA-Mediated
*Reduce Severity, Ameliorate, Amelioration
 Recovery, Complete Recovery, Full Recovery
 &

TIPS ON PREPARING TITLE©

- List accepted abbreviations
- List words relevant to the payoff
- *Arrange words/abbreviations into a compelling, informative title that fits the space*

CREATING THE TITLE – LIST OF POSSIBLE TITLES©

Mechanistic Intervention to Ameliorate DNA-Mediated Renal Acute Tubular Necrosis (80 char/spac)

Mechanism-Based Amelioration of, and Recovery From, DNA-Mediated Tubular Necrosis (81)

Efficacious Mechanism-Based Intervention to Reverse DNA-Mediated Tubular Necrosis (81)

Development of Mechanism-Based Treatment of DNA-Mediated Acute Renal Tubular Necrosis (79)

Recovery from DNA-Mediated Tubular Necrosis by Targeted, Mechanistic Intervention (81)

UNHELPFUL *vs.* HELPFUL TITLE©

PREVENTION OF ACUTE RENAL FAILURE

vs.

MECHANISM-BASED AMELIORATION OF, AND RECOVERY FROM, DNA-MEDIATED TUBULAR NECROSIS

(81 characters and spaces)

TIPS ON PREPARING TITLE©

- List accepted abbreviations
- List words that inform reviewer of content and mission relevance
- Arrange words/abbreviations into a compelling, informative title that fits the space
- *Emphasize the product of the research, not the process*

GENERAL TIPS ON THE PROJECT SUMMARY©

- It is probably *the* most important section during review, because it will be read by all reviewers, not just those assigned
- It must be written in plain English, because it must be interpretable by laypersons

GENERAL TIPS ON THE PROJECT SUMMARY©

- Write it last, *but not at the last minute*
- Do not use it to summarize past accomplishments or to review background material
- Should be a stand-alone section
- Becomes part of the public domain; protect what you don't want revealed

TIPS ON WRITING THE PROJECT SUMMARY©

- Use minimums for font & margins; auto-hyphenate
- Do not write in the first person
- *Open with gap or need that drives the proposal*

TIPS ON WRITING THE PROJECT SUMMARY©

- Highlighted sentences from Specific Aims section & Significance and Innovation subsections will create a linear flow of logic when copied and pasted, one after the other, into a separate file

- Embellish with aims & key approaches/ methods

- Conclude with the statement of significance

- Edit to read well and to fit space allowed (30 lines)

TIPS ON WRITING THE PROJECT NARRATIVE©

- Purpose: to establish project's relevance to public health

- Accordingly, begin first sentence with something like, 'The proposed project is relevant to public health because ...'

- Limited to no more than 2-3 sentences

- NIH SF 424 *Application Guide* requires that this part of the proposal be written in "plain, lay language"

MAJOR CHANGES REGARDING 'SELLING' YOUR IDEA TO NIH©

- Research Plan shortened; review of literature and preliminary data sections removed
- Sections of the proposal now linked to each of the five core review criteria
- Greater emphasis on quality of content and less on detailed description of approach
- *Switch to a 9-point evaluation scale*
- *Standardization and shortening of reviews*
- Emphasis on funding New Investigators – sooner
- Greater emphasis on the fastest path to funding, especially if triaged: reapply or switch to some- thing else?

CHANGE IN APPROACH TO SCORING APPLICATIONS

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

ADAPTED FROM NIH Reviewer Guidelines:
http://grants.nih.gov/grants/peer/guidelines_general/scoring_system_and_procedure_a5.pdf

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CONTENT OF SUMMARY STATEMENT VERY DIFFERENT©

Standardization and shortening of reviews
- Bullets/short statements, rather than narrative
- Template used to standardize and maximize quality of comments
- Reviewers required to concentrate on strengths and weaknesses, rather than descriptive detail
- Each core review criterion must be scored 1-9 (even for unscored [triaged] applications)
- Each reviewer's scores precede his/her critique, which allows applicants to: (i) identify main weaknesses easily; (ii) assess uniformity of review

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CONTENT OF YOUR NIH SUMMARY STATEMENT©

- Program Officer's contact information
- Résumé - summary of discussion (not received if triaged)
- Description
- Critique #1, *with core criteria scores*
- Critique #2, *with core criteria scores*
- Critique #3, *with core criteria scores*
- Budget paragraph
- Administrative note (optional)
- Study section roster, including name of SRO

CONTENT OF YOUR NIH SUMMARY STATEMENT

OVERALL IMPACT

Overall Impact	Please limit text to ¼ page

Strengths
- High potential impact in clinically important area of safe blood transfusion.
- Highly qualified investigators with complementary expertise ensure likely success.
- Novel application of incident reporting methods now in use in other fields could lead to improved public confidence in blood supply.
- The study will bring a rigorous, systematic approach to the current error reporting process, which is empiric and lacking in evaluation.

Weaknesses
- Lack of representation of non-academic transfusion medicine practitioners may make incident reporting less effective in non-academic hospital setting.
- Not enough time is allotted for aim one work and aims two and three too dependent on success of aim one work lessens confidence that work can be successfully completed.

CREATE TABLE TO ASSESS UNIFORMITY OF REVIEWS©

Scores for a Discussed Application

| *Review*	**Signif.**	**Invest.**	**Innov.**	**Appro.**	**Envir.**
One	8	4	6	5	4
Two	2	2	2	3	2
Three	2	3	2	5	2

MAJOR CHANGES REGARDING 'SELLING' YOUR IDEA TO NIH©

- Research Plan shortened; review of literature and preliminary data sections removed
- Sections of the proposal now linked to each of the five core review criteria
- Greater emphasis on quality of content and less on detailed description of approach
- Switch to a 9-point evaluation scale
- Standardization and shortening of reviews
- *Emphasis on funding New Investigators – sooner*
- Greater emphasis on the fastest path to funding, especially if triaged: reapply or switch to something else?

GRANT WRITERS' SEMINARS AND WORKSHOPS

The average age at the time of the first R01 or equivalent increased by over five years between 1980 and 2007
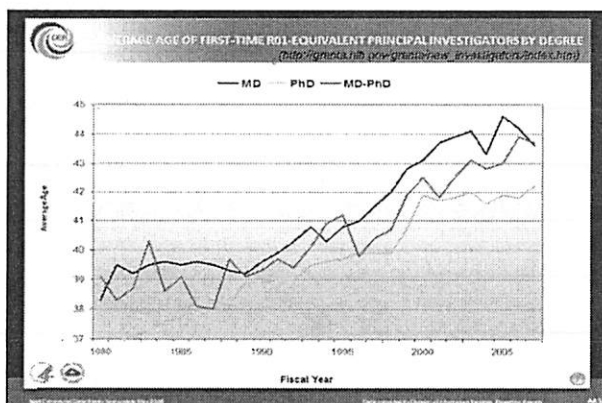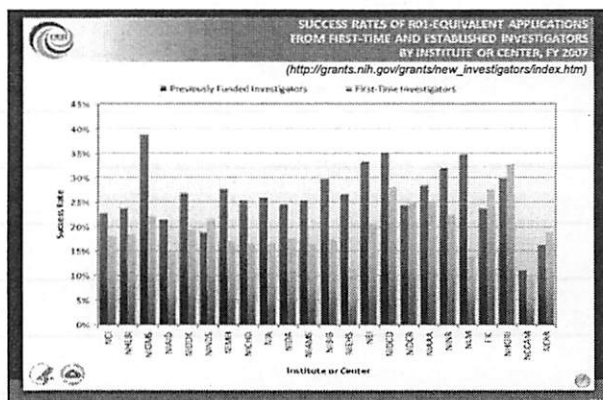

GRANT WRITERS' SEMINARS AND WORKSHOPS

In FY 2007 the average age at the time of the first R01 was:

MD or MD/PhD: 43.8 years
PhD: 42.6 years

GRANT WRITERS' SEMINARS AND WORKSHOPS

Fewer new investigators were being funded at the R01 level, compared to established investigators

SOLUTION: EARLY STAGE CLASS OF NEW INVESTIGATOR

- Intent: Fund sooner and equalize rate of R01 funding for new and established investigators
- New class of New Investigator: Early Stage Investigator, defined as within 10 years of terminal research degree or medical residency
- ESIs will be emphasized among New Investigators
- ESI applications will be clustered for review
- Clustering is limited to R01s; R03 & R21 will not be clustered for review

CAPITALIZE ON BEING AN EARLY STAGE INVESTIGATOR

- Register in the eRA Commons
- Update prior eRA Commons profile to reflect date terminal research degree/medical residency completed
- Extension of eligibility can be obtained
- Success in obtaining R01 grant support (or equivalent) terminates eligibility as an ESI

SECTIONS THAT ARE OF PARTICULAR RELEVANCE TO ESI©

REVIEW CRITERION	SECTION OF PROPOSAL
SIGNIFICANCE	Research Strategy Significance subsection
INVESTIGATOR(S)	Biographical Sketch *Personal Statement*
INNOVATION	Research Strategy Innovation subsection
APPROACH	Research Strategy Approach subsection
ENVIRONMENT	Facilities & Other Resources Contribution to Success *Commitment to ESI* *Facilities*

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- *Greater emphasis on the fastest path to funding, especially if triaged: reapply or switch to something else?*

TRIAGE IS PARTICULARLY HARD TO OVERCOME NOW©

- Triage now based on preliminary impact scores of assigned reviewers
- Applicant receives reviewers' scores for each of the five core review criteria, but does not receive their preliminary impact scores

SCORES FOR A 'TRIAGED' APPLICATION©

Choices: Resubmit or Switch

Review	Signif.	Invest.	Innov.	Appro.	Envir.
One	4	2	2	4	1
Two	4	3	4	5	2
Three	3	2	3	7	1

TRIAGE IS PARTICULARLY HARD TO OVERCOME NOW©

- A résumé is not received if the proposal is triaged
- The Program Officer has no additional information to provide
- Critiques may not cover all that is wrong
- Only one resubmission now allowed
- Recommendation #1: switch to a new grant mechanism, if possible

NIH SMALL RESEARCH GRANTS (R03)

- *Basis for triage: insufficient preliminary data*
- Switch to R03, which has as its main purpose the development of preliminary data
- The following Institutes and Centers allow unsolicited R03s: NHGRI NIDA NIA NIAAA NIAID NIBIB NICHD NIEHS NIMH NINDS NINR
  See Program Announcement PA-10-164 *(http:// grants.nih.gov/grants/guide/pa-files/PA-10-064.html)*
- See PAs & RFAs of other Institutes/ Centers, except NEI and NCMHD, which do not sponsor R03 at all

NIH EXPLORATORY / DEVELOP-MENTAL GRANTS (R21)

- *Basis for triage: risk of failure*
- Switch to R21, which has as its main purpose support of High risk/impact research – see *http:// grants1.nih.gov/grants/funding/r21.htm*
- These Institutes/Centers allow unsolicited R21s: NEI NHLBI NHGRI NIA NIAAA NIAID NIAMS NIBIB NICHD NIDCD NIDA NIDCR NIDDK NIEHS NIMH NINDS NINR NLM NCAAM (see Program Announcement PA-10-069; *http:// grants.nih.gov/grants/guide/pa-files/PA-10-069.html*)
- See PAs & RFAs of other Institutes/Centers

SWITCHING GRANT MECHANISMS AS A STRATEGY©

Switching from the R01 to another grant mechanism allows you to start over with respect to your two tries – original and one resubmission – when you return to the R01 level

In other words, this approach 'erases' the previously triaged proposal

TRIAGE IS PARTICULARLY HARD TO OVERCOME NOW©

Recommendation #2: switch to an entirely new application

WHAT CONSTITUTES A 'NEW' APPLICATION?©

- Objective, central hypothesis and aims differ
- Other content differs substantively
- Questions asked/concepts addressed differ
- Change of PI

WHAT CONSTITUTES A 'NEW' APPLICATION?©

- Objective, central hypothesis and aims differ
- Other content differs substantively
- Questions asked/concepts addressed differ
- Change of PI

What won't qualify as 'new?'
- Changing the title
- Rewording, but not changing, the aims
- Requesting a different review panel
- Requesting consideration for funding by a new Institute or Center

GRANT WRITERS' SEMINARS AND WORKSHOPS

PREPARATION OF THE APPLICATION

- Internal Review -

IN-HOUSE REVIEW OF YOUR APPLICATION©

KEY POINT!

- Don't take criticism personally.

- "Take the teaching, not the teacher."

RESUBMITTING YOUR APPLICATION©

- Put the reviews in a drawer and don't think about it for a week

- Think about the reviews in the context of the funding agency

- Call the program officer, and listen

- Revise and resubmit your application based on reviewer and program officer feedback

ANY WELL-TRAINED PERSON CAN BECOME FUNDED©

YOUR KEYS TO SUCCESS

- Your Idea!

- Your Commitment!

- Your Proposal-Writing Skills!

DO YOU REALLY WANT TO COMPETE?©

- Understand for yourself exactly what level you want to "play" in this academic "game"

- Remain committed to a focused long term goal, and avoid excessive diversification

- Conscientiously get to know target funding sources, and the contacts relevant to those funding sources (Program Officers)

DO YOU REALLY WANT TO COMPETE?©

- Be prepared to spend your entire academic career looking for funding opportunities

- Always be mentally prepared for rejection

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EXAMPLES

CONVERSION OF 'WHAT' RESEARCH OBJECTIVES/SPECIFIC AIMS TO 'WHY;' ELIMINATION OF EXTRANEOUS DETAIL FROM 'HEADLINES' AND WORKING HYPOTHESES

'WHAT' (will be done?):

1. Determine genotypic allele frequencies of the AAA and BBB genes in a closed, unselected avermectin/milbemycin-naive helminth population.

The _working hypothesis_ for this research objective is that a population of helminths naive to AM drugs will contain a diversity of AAA and BBB alleles, including resistance-associated alleles, which will be present in low frequency.

2. Determine genotypic allele frequencies of the AAA and BBB genes in a population of helminths that have been highly selected by frequent long-term treatment with AM drugs.

The _working hypothesis_ for this research is that intense AM-selection pressure will genetically select for worms that carry AAA and/or BBB alleles that increase their ability to survive treatment, even if these alleles are at too low a frequency to convey phenotypic resistance.

3. In parallel with research objective (2), select for alleles that convey AM resistance by frequent AM treatment of population of helminths previously naive to AM drugs.

The _working hypothesis_ for this research is that frequent AM treatment of sheep infected with AM-naive helminths will cause a shift in genotypic allele frequency, whereby those AAA and/or BBB alleles that increase worm survivability in the face of drug treatment will increase, while other alleles will remain the same or decrease in frequency.

4. Determine the genetic basis for AM resistance in helminths.

The _working hypothesis_ for this research is that full-length promoter/gene sequences of AAA and/or BBB alleles that demonstrate strong selection in response to AM treatment will reveal specific AM resistance-associated mutation(s).

'WHY' (will it be done?):

1. Identify candidate resistance alleles (combination of #s 1-3, above).

The _working hypothesis_ for this research objective is that genotypic alleles that are responsible for resistance will be increased in an AM-selected, compared to an AM-naive, population of helminths.

2. Establish which candidate alleles are causally related to AM-resistance in helminths (restatement of #4, above).

We _hypothesize_ that full-length promoter/gene sequences of AAA and/or BBB alleles that are strongly selected by treatment with AM will confer resistance when introduced into AM-naive helminths.

EXAMPLES
HYPOTHESIS-DRIVEN BEHAVIORAL RESEARCH – initial Version

SPECIFIC AIMS

The primary purpose of the proposed research is to evaluate an innovative smoking cessation strategy, the Cognitive Therapy/Harm Reduction (CT/HR) group, for women of childbearing age who are addicted to cigarettes. It is hoped that this intervention will yield better smoking cessation rates than traditional brief interventions. The specific aims of the research are:

1. Train therapists and nurses employed at a chemical dependence (CD) treatment program to conduct CT/HR smoking cessation groups and brief interventions, respectively;

2. Recruit 220 women from this CD program who indicate a desire to receive smoking cessation assistance and randomly assign them to one of the two interventions.

3. Collect data upon admission, at discharge, 2 weeks, 1 month, 3 months, 6 months, and 1 year post-treatment by means of follow-up questionnaires and saliva cotinine levels, in order to compare the effects of the two interventions.

4.

The proposed study will be a collaborative effort involving the University of Buckeye Medical Center Department of Family Medicine, and the Women's Center of City Central Hospital. The Family Medicine Department is a clinical training program housed in a large multi-specialty hospital. The department has an outpatient addiction treatment program, an inpatient addiction consultation service, and a multi-specialty addiction education program. The WC provides residential treatment for chemically dependent women, operated by DCCCA. DCCCA is a 501(c)(3) corporation that provides a variety of services to economically disadvantaged women in the state of Ohio. They have a large program evaluation component consisting of five staff and extensive hardware and data processing resources. The target population in this study will be women smokers of childbearing age enrolled in chemical dependence (CD) treatment programs. The rational for the research is that, if women of childbearing age would stop smoking, cancer rates would fall. WC, like many other chemical dependence treatment programs, has adopted a smoke-free policy. As a result they have experienced significantly increased requirements for effective smoking cessation strategies. They have therefore welcomed the proposed study (see attached DCCCA letter of support). The proposed study will employ a randomized two group design in which participants will be assigned to eithe innovative treatment (CT/HR) provided by therapists or a brief smoking cessation intervention conducted by nurses. The dependent variable in this study will be smoking status at the end of treatment and at five follow-up visits (2 weeks, 1 month, 3 months, 6 months and 1 year). Self-reported smoking status will be validated by means of saliva cotinine analysis.

The Principal Investigator and all key personnel are well-qualified to carry out this study. She is an associate professor of Family Medicine and Psychiatry who, for the past ten years, has intensively investigated therapeutic approaches to the treatment of addictions. She has authored or co-authored more than 30 publications and chapters, as well as co-authored a comprehensive textbook on the role that cigarette smoking has in the causation of cancer. Dr. Suarez (Co-Investigator) is a professor of Family Medicine and Obstetrics/Gynecology. He is also director of the Family Medicine residency training program. He has actively taught, researched and practiced family medicine, obstetrics and gynecology, and behavioral medicine for the past 15 years. He has authored or co-authored over 20 publications, and presently is editing a textbook on women's health for primary care physicians. Dr. Johnson (Project Trainer) is a licensed psychiatrist who has worked with the Principal Investigator for the past two years to develop the CT/HR program. The three consultants to the proposed research are internationally recognized in their areas of expertise (see attached Biosketches). Dr. Bronner will contribute to this research in the areas of harm reduction and addiction research design. Dr. Wilmington will contribute in the areas of smoking cessation research design and instrumentation. Dr. Smith-Jones will provide expertise in the areas of cognitive therapy and pyschotherapy design. The combined expertise of these three consultants will ensure the integrity of the conceptual, methodlogical and measurement features of this research.

EXAMPLES

HYPOTHESIS-DRIVEN BEHAVIORAL RESEARCH – Revision

SPECIFIC AIMS

Although cigarette smoking is well recognized as one of the leading causes of lung cancer among men and women, it is increasingly recognized that women who smoke are at greater risk of developing early menopause, osteoporosis, and cardiovascular disease, especially stroke among those who use birth control pills. Importantly, smoking by expectant mothers has also been associated with spontaneous abortion, perinatal mortality, stillbirth, excess bleeding during pregnancy, pre-term delivery, low birth weight and sudden infant death syndrome. Although smoking prevalence has, in general, declined modestly during the last decade, it has increased dramatically among women, especially younger women. Those who continue to smoke have become increasingly dependent on nicotine, a fact that has led to a wide range of complex physiological and psychosocial problems. Given these this rise in smoking in the face of antismoking advertising, innovative new strategies will be required to help those who want to stop smoking. Lack of such strategies is a major problem, because, until they become available, it is likely that there will be little, if any reduction in the numbers of persons who smoke, together with attendant health-care problems.

Our *long-term goal* is to reduce the incidence of smoking-related disease, such as lung cancer, through the use of behavioral modification strategies designed to reduce the use of cigarettes. The *objective of this proposal*, which is the next step toward attaining our long-range goal, is to evaluate the effect of an innovative intervention strategy, Cognitive Therapy/Harm Reduction, on the smoking habits of young women. The *central hypothesis* of the proposed research is that sustained intervention of this kind will yield better rates of smoking cessation, and fewer relapses, than will traditional, brief interventions that are currently in use. We have formulated this hypothesis, based on the results of supportive preliminary studies that will be detailed in the Approach section. The *rationale* that underlies the investigation is that identification of a more efficacious intervention strategy will allow more nicotine-addicted women to quit smoking permanently, which, in turn, will translate into a significant reduction in tobacco-related disease and the associated costs of health care. We are well prepared to undertake the proposed research, because we have assembled a research team that uniquely combines the diverse range of basic, psychosocial, statistical and clinical expertise that will be needed to reach a definitive outcome. Finally, our collaboration with the Women's Clinic, a facility that is known for its smoking cessation programs will facilitate accrual and follow-up of 220 nicotine-addicted women. We expect to test our central hypothesis and to achieve the objective of this application by pursuing the following three *specific aims*:

1. **Optimize the training of therapists and nurses in their use of the Cognitive Therapy/*Harm Reduction* approach.**
    The *working hypothesis* for this aim is that full effectiveness of participating personnel will not be achieved without a combination of didactic training *and* practical experience.

2. **Determine the extent to which time of exposure to the Cognitive Therapy/Harm Reduction intervention affects the rate of smoking cessation.**
    We *hypothesize* that at least 3 months exposure to CT/HR will be required to maximize returns.

3. **Conduct a randomized clinical trial of the optimized Cognitive Therapy/Harm Reduction intervention.**
    The *working hypothesis* is that the CT/HR intervention will produce significantly greater rates of smoking cessation compared to the current best practice, 'Teach and Test' approach, with markedly less recidivism during the 1-year follow-up period.

The proposed research is *innovative*, because the new approach of Cognitive Therapy/Harm Reduction has not been applied to the problem of tobacco addiction. Our *expectations* are that personnel will have to have at least 2 months of practical experience, in addition to classroom training, before they will become maximally effective in the application of CT/HR. Similarly, it is expected that at least 3 months of intervention will be needed before the full effect of the approach will be seen. Determining the minimal amount of training and experience necessary for personnel, as well as the shortest time of exposure to the intervention needed to maximize its effect will be important steps, because they will optimize the conditions under which CT/HR is applied and make it maximally cost-effective.

Overview and Objectives- Trade Routes to the East

The recent development of trading with markets to the East has provided significant potential opportunities for individuals and governments in European countries to gain access to novel new products, as well as to grow economically. Based upon the establishment of viable trade routes to the Orient, pioneered by the Italian, Marco Polo and his colleagues, citizens of Europe are increasingly demanding the rich silk textiles, exotic teas, spices and other food products from the East. As a consequence, such goods demand premier prices, and forward-thinking entrepreneurs and governments can be expected to gain great wealth by capitalizing upon these opportunities to gain significant market share. Unfortunately, established trade routes to the East are currently extremely perilous and involve treacherous mountain passes, dangerous river crossings and threats from armed bandits. As a consequence, only ~15% of merchandise intended for European markets from the East actually reaches its destination. In addition, the risk to the lives of those involved in these trade routes is exceptionally high, and it is becoming increasingly difficult to recruit merchants willing to commit resources to such ventures. As a consequence, there exists a critical need to identify alternative trade routes that can be used to more cost-effectively and efficiently bring goods and merchandise from the East to markets in central Europe. In the absence of such alternative strategies, trade with the East will continue to be a challenging and economically-risky practice.

The *long-term goal* of our research is to establish Spain as the economic center of the European marketplace, thus bringing prosperity and economic wealth to both its citizens and the government of Spain. Our *objective in this proposal* is to identify and establish the viability of an alternative route for the efficient exchange of goods between Europe and the East. Our *central hypothesis* is that the earth is, in fact, a sphere, and that ships sailing to the West will reach the Orient by an all-seas pathway, thus creating an economically viable, readily sustainable, and far superior trade route relative to existing overland trade routes through eastern Europe and central Asia. We have based our central hypothesis upon preliminary findings that, in contrast to "flat earth" proponents, ships sailing to the West beyond the visible horizon have not yet fallen off the edge. In addition, there exist fragmentary reports that the Norwegian explorer, Eric the Red, discovered in 997A.D. a continent three-month sail to the west of Iceland. Our *rationale* for this project is that its successful completion would place Spain in a superior position to capitalize upon its extensive merchant marine inventory of galleons and trade ships to become an economic super-power in 15th century Europe. We are well prepared to complete the work outlined in this proposal, since the P.I., Capt. C. Columbus, has thirty-five years previous sailing experience in command of numerous vessels in international waters. Further, he has received extensive previous training in global astrological navigation from the British Navy. Finally, he has already recruited 165 able-bodied seamen willing to sign on the proposed voyage. To successfully complete the objectives outlined in this proposal, two specific goals are proposed:

Specific goal #1: *Establish an all-seas trade route with eastern markets in the Orient* Our *working hypothesis* is that, by sailing due West by Southwest from the shores of Spain, we will be able to reach the city of Shanghai within 4 months after setting sail from Spain

Specific goal #2: *Enhance Spain's coffers by returning from eastern markets with marketable goods and merchandise from the East* Our *working hypothesis* is that a total of three galleons, returning from this voyage laden with exotic textiles, spices and foods from the East, will provide a tenfold return to Spain on the initial investment in this exploration

This project is *innovative* in that, to date, every single trade route from Europe to eastern markets has involved overland pathways through eastern Europe and central Asia; this would therefore be the first all-seas trade route to such markets. At the completion of this project, it is our expectation that we will have established a novel, economically-advantageous and relatively safe trade route that will markedly enhance Spain's stature and economic well-being within the European community. This will ultimately be of enormous financial benefit the security and stability of the government of Spain.

Useful Resources on the Web

NIH

Everything you need to know about the new review criteria and scoring system
http://enhancing-peer-review.nih.gov/

Reviewer guidelines
http://grants.nih.gov/grants/peer/reviewer_guidelines.htm
Especially read "Overall Impact versus Significance"

25 Helpful Hints for New Investigators from NIGMS Staff
http://www.nigms.nih.gov/Research/Application/Tips.htm

NCI's Short Guide to the Preparation of NIH Grant Applications
http:deainfo.nci.nih.gov/extra/extdocs/gntapp.htm

NIAID 'All About Grants'
http://funding.niaid.nih.gov/ncn/grants/default.htm

URL for K Kiosk
http://grants.nih.gov/training/careerdevelopmentawards.htm

URL for F Kiosk
http://grants.nih.gov/training/F_files_nrsa.htm

Link to NIH listserve
http://grants1.nih.gov/grants/guide/listserv.htm

Link to NIH RSS feeds
http://grants.nih.gov/grants/guide/rss_info.htm

Center for Scientific Review's resources for applicants
http://cms.csr.nih.gov/ResourcesforApplicants

CSR's video on peer review
http://cms.csr.nih.gov/ResourcesforApplicants/InsidetheNIHGrantReviewProcessVideo.htm

OER's "Frequently used links"
http://grants.nih.gov/grants/documentindex.htm

Resources for new applicants.
http://grants.nih.gov/grants/new_investigators/resources.htm

NIH Vertebrate Animals checklist
http://grants.nih.gov/grants/olaw/VASchecklist.pdf

NIAID's page of checklists for applications involving research with human subjects
http://funding.niaid.nih.gov/ncn/grants/charts/checklistshs.htm

HHMI

Lab Management
http://www.hhmi.org/resources/labmanagement/

AAAS

GrantsNet
http://sciencecareers.sciencemag.org/funding

NSF:
"A Guide for Proposal Writing"
 http://www.nsf.gov/pubs/1998/nsf9891/nsf9891.htm

"Broader Impacts: Representative Activities"
 http://www.nsf.gov/pubs/2004/nsf042/bicexamples.pdf

"The 2002 User-Friendly Handbook for Project Evaluation"
http://www.nsf.gov/pubs/2002/nsf02057/start.htm