Specific Aims – Do’s and Don’ts

John A. Peyman, PhD
National Institute of Allergy and Infectious Disease

William H. Robinson, MD, PhD
Stanford University School of Medicine
VA Palo Alto

Kelli D. Allen, PhD
Duke University Medical Center
Durham VA Medical Center

Advancing Rheumatology!
Specific Aims – Do’s and Don’ts

- Specific Aims are the central focus of an NIH research grant application

- Develop your Specific Aims carefully

- Do’s and don’ts of Specific Aims

- Aims combined with good ideas, good timing, good reviewers, and good luck make for successful grantsmanship and funding success
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Specific Aims

• Most important part of the proposal

• Should teach the reviewers about
  o Research objectives
  o Significance of the proposed studies
  o Central hypothesis
  o Experimental approach to test the hypothesis
Specific Aims

• An introductory paragraph that includes the “big picture” goal of the project:

To better understand the pathophysiology of [disease X]...

• A statement of the central hypothesis:

[Molecule Y] may play a role in the pathophysiology of [disease X].
Specific Aims

• Briefly how the proposed studies address an important scientific question and/or fill an important gap in our understanding of the “big picture”

The roles of [molecule Y] in the [component processes] of [disease X] have never been directly compared.
Specific Aims

• The general approach that will be used to test the central hypothesis

*Conditional knock-out mice will be used to delete the [molecule Y] gene before or after the development of a [disease X] phenotype in the [disease X] model.*
We will test the hypothesis that [molecule Y] is required for the development of [disease X] phenotype. Using conditional knock-out mice, we will delete the [molecule Y] gene before and after [disease X] initiation in mice. We will then measure [disease X phenotypes Z] in these mice, as well as in [molecule Y-replete] mice that received the [disease X-initiating] stimulus. If [molecule Y] is necessary for development of the [disease X phenotypes Z], we anticipate that [Z1 and Z2] will be reduced in the [molecule Y]-deficient mice, compared with the [molecule Y]-replete mice.
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Develop Your Specific Aims

Get Help

• Discuss your Specific Aims with colleagues

• Obtain collaborators and plan with them

• Learn about approaches different from yours

• Secure a mentor who can help you succeed

• Develop a network of your supporters and colleagues whom you support in their work
Develop Your Specific Aims

Communicate with the NIH

• Contact NIH staff at your planning stage

• Give yourself enough time to revise your Specific Aims appropriately

• Speak to a Scientific Review Officer about how your Specific Aims fit with a study section

• Get to know one or more Program Officers in relevant Institutes and Centers
Scientific Review Officers

• Organize and manage study section meetings

• Can advise you about
  o The particular study section you suggest for assignment in your cover letter

• Prepare summary statements
  o Combining critiques from the primary and secondary reviewers and the comments from the tertiary “reader” and other panel members

• Do not discuss your summary statement
Develop Your Specific Aims

Program Officers

• Are able to
  o Tell you if your project fits the Institute’s mission
  o Discuss summary statement and revision strategy
  o Suggest sources of information about funding
  o Help remove administrative bars blocking funding

• Do not
  o Write your grant application
  o Discuss your application at study section meetings
  o Fund your grant application
Develop Your Specific Aims

Know Your Audience

• Write the Specific Aims for the entire review committee, not for the “specialist” in your field

• Write for the Institute’s programs

• Learn about PA’s & RFA’s from multiple sources in the NIH and other funding agencies
Develop Your Specific Aims

Reviewers are there to help you

• Write Specific Aims to gain reviewers’ support

• Reviewers are never “wrong” or “right”

• They assess the material you included

• Comments are not about you as a person

• When you revise, improve the entire application
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Do’s and Don’ts of Specific Aims

• **Well-designed Aims**
  o More than one possible outcome is acceptable
  o Success is not dependent on any single outcome

• **Unacceptable Aims**
  o Only one possible outcome is interesting
  o Success of a subsequent aim is dependent on this outcome

• **Fatally flawed Aims**
  o Descriptive, unfocused, obvious, naïve, or uninterpretable
Do This

• **Well-designed Aim:** We will compare the roles of [cytokine A] in [disease B and disease C]

• **Reviewers’ comments:** Preliminary data involving [cytokine A] in disease support both the hypothesis and demonstrate the expertise of the investigator
Don’t Do This

• **Unacceptable Aim:** We will determine if [cytokine A] plays a critical role in the development of [disease B]

• **Reviewers’ comments:** Descriptive, rather than hypothesis-testing
Don’t Do This

- **Fatally flawed Aim:** We will identify [cytokine A] gene polymorphisms in biopsy tissues obtained from a cohort of 20 [disease B] subjects

- **Reviewers’ comments:** “Fishing expedition” and descriptive, if preliminary data were not presented
Don’t Do This

• **Unacceptable Aim:** The [cytokine A] gene polymorphisms identified in the previous Aim will be used to characterize the intracellular signaling of the [variant cytokine A].

• **Reviewers’ comments:** Dependent on a specific result from another Aim.
Do This

• In your revised application
  o Write a clear introduction section
  o Explain how you have modified your Aims
  o Update your preliminary results
  o Address all criticisms thoroughly
  o Accept the help of reviewers’ comments
  o Be positive, not abrasive!

• Plan several review cycles ahead
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Writing a Successful NIH Grant

Elements of Grant Success

- Good Ideas
- Good Timing
- Good Presentations
- Good Reviewers
- Good Luck
- Good Grantsmanship
Good Ideas in your Specific Aims

• **Significance**
  o Addresses an important problem

• **Innovation**
  o Builds upon knowledge base

• **Feasibility**
  o Preliminary data

• **Show your application to a colleague**

• **Get feedback on clarity of ideas and scientific significance**
Timing

- Take time to develop preliminary data for each Specific Aim

- Keep up-to-date
  - The literature
  - Experimental methods

- Avoid presenting ideas ahead of their time, or concepts that are out-of-date

- Plan ahead based on review calendar
Presentation of your Specific Aims

• Organize your Specific Aims clearly

• Strong experimental approach
  o Propose hypotheses based on preliminary data and what is known from the literature
  o Design Specific Aims to test the hypotheses
  o Describe expected outcomes of each Aim
  o Analyze the caveats in your approach
  o Include alternative plans for each Aim
Reviewers’ Perspective

• NIH grant reviewers are instructed to judge the:
  o Significance
  o Innovation
  o Qualifications of the investigator(s)
  o Approach
  o Environment and institutional resources

• Specific Aims provide much of this information on first reading
Reviewers’ Expect This

• Importance, novelty, and innovation

• Soundness of the Specific Aims

• Preliminary data supportive of each aspect of the proposal

• Feasibility of each experiment

• Best use of experimental methods

• Best selection of controls

• Best analytical/statistical methods
Win Over Your Reviewers

• Learn about the expertise on study sections

• Request a relevant study section

• Make your reviewers good reviewers
  o Tell a story with your preliminary data and your Specific Aims testing the hypotheses
  o Make it easy to read your application
  o Make it straightforward to find the parts
  o Convince reviewers to be your advocate
Luck

• Be “lucky” through hard work
  o Good Ideas
  o Good Timing
  o Good Presentation
  o Good Reviewers
  o Good Grantsmanship

• Prevent problems before they occur!

• Make your Specific Aims perfect!
Writing a Successful NIH Grant

Good Ideas + Good Timing + Good Presentation + Good Reviewers + Good Luck + Good Grantsmanship = ***NOTICE OF GRANT AWARD***
More Information

- **Grant Writing**
  - All About Grants Tutorials
  - New Investigator Guide to NIH Funding
  - NIAID Funding Opportunities and Concepts
  - NIAMS Funding Opportunities List
    [http://www.niams.nih.gov/Funding/Funding_Opportunities/filter.asp](http://www.niams.nih.gov/Funding/Funding_Opportunities/filter.asp)
  - How to Write a Human Subjects Application
More Information

• Electronic Submission
  o Electronic Application Resources
  
    o Finding Help – eRA Commons
      http://grants.nih.gov/support/index.html
  
    o Finding Help – Grants.gov
      http://www.grants.gov/help/help.jsp

• Grant Review
  o Center for Scientific Review - Overview of Peer Review Process
    http://grants.nih.gov/grants/peer_review_process.htm
More Information

• **Grant Management**
  o How to Manage Your NIAID Grant Award
    [http://www.niaid.nih.gov/researchfunding/grant/Pages/gm.aspx](http://www.niaid.nih.gov/researchfunding/grant/Pages/gm.aspx)
  
  o NIAMS Grant Policies & Guidelines

• **Other Topics**
  o Advice on Research Training, Career Awards, and Research Supplements
  
  o NIH Loan Repayment Programs

• **Example of a Useful University Web Site**
  o UPitt Web Page - Writing and Grantspersonship
    [http://www.oorhs.pitt.edu/Resources/WritingGrantsmanshipResources.aspx](http://www.oorhs.pitt.edu/Resources/WritingGrantsmanshipResources.aspx)