

# Specific Aims – Do's and Don'ts

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# 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**
  - Research objectives
  - Significance of the proposed studies
  - Central hypothesis
  - 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.*

# Anatomy of a Specific Aim

- **3-5 sentences that describe**
  - What you are going to do
  - How you going to do it
  - What you expect to find

*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

# Develop Your Specific Aims

## Scientific Review Officers

- **Organize and manage study section meetings**
- **Can advise you about**
  - The particular study section you suggest for assignment in your cover letter
- **Prepare summary statements**
  - 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**
  - Tell you if your project fits the Institute's mission
  - Discuss summary statement and revision strategy
  - Suggest sources of information about funding
  - Help remove administrative bars blocking funding
  
- **Do not**
  - Write your grant application
  - Discuss your application at study section meetings
  - 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**
  - More than one possible outcome is acceptable
  - Success is not dependent on any single outcome
- **Unacceptable Aims**
  - Only one possible outcome is interesting
  - Success of a subsequent aim is dependent on this outcome
- **Fatally flawed Aims**
  - 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**
  - Write a clear introduction section
  - Explain how you have modified your Aims
  - Update your preliminary results
  - Address all criticisms thoroughly
  - Accept the help of reviewers' comments
  - 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  
Reviewers**



**Good  
Timing**



**Good  
Luck**



**Good  
Presentations**



**Good  
Grantsmanship**





# Good Ideas in your Specific Aims

- **Significance**
  - Addresses an important problem
- **Innovation**
  - Builds upon knowledge base
- **Feasibility**
  - 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**
  - Propose hypotheses based on preliminary data and what is known from the literature
  - Design Specific Aims to test the hypotheses
  - Describe expected outcomes of each Aim
  - Analyze the caveats in your approach
  - Include alternative plans for each Aim

# Reviewers' Perspective

- **NIH grant reviewers are instructed to judge the:**
  - Significance
  - Innovation
  - Qualifications of the investigator(s)
  - Approach
  - 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**
  - Tell a story with your preliminary data and your Specific Aims testing the hypotheses
  - Make it easy to read your application
  - Make it straightforward to find the parts
  - Convince reviewers to be your advocate

# Luck

- **Be “lucky” through hard work**
  - Good Ideas
  - Good Timing
  - Good Presentation
  - Good Reviewers
  - Good Grantsmanship
- **Prevent problems before they occur!**
- **Make your Specific Aims perfect!**

# Writing a Successful NIH Grant



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**\*\*\*NOTICE OF  
GRANT AWARD\*\*\***



# More Information

- **Grant Writing**

- All About Grants Tutorials  
<http://www.niaid.nih.gov/researchfunding/grant/pages/aag.aspx>
- New Investigator Guide to NIH Funding  
<http://www.niaid.nih.gov/researchfunding/grant/pages/newpiportal.aspx>
- NIAID Funding Opportunities and Concepts  
<http://www.niaid.nih.gov/researchfunding/ann/pages/opps.aspx>
- 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  
<http://www.niaid.nih.gov/researchfunding/sci/human/Pages/hshandbook.aspx>



# More Information

- **Electronic Submission**

- Electronic Application Resources

<http://www.niaid.nih.gov/researchfunding/qa/pages/applyelec.aspx>

- Finding Help – eRA Commons

<http://grants.nih.gov/support/index.html>

- Finding Help – Grants.gov

<http://www.grants.gov/help/help.jsp>

- **Grant Review**

- Center for Scientific Review - Overview of Peer Review Process

[http://grants.nih.gov/grants/peer\\_review\\_process.htm](http://grants.nih.gov/grants/peer_review_process.htm)

# More Information

- **Grant Management**

- How to Manage Your NIAID Grant Award  
<http://www.niaid.nih.gov/researchfunding/grant/Pages/gm.aspx>
- NIAMS Grant Policies & Guidelines  
[http://www.niams.nih.gov/Funding/Policies\\_and\\_Guidelines/default.asp](http://www.niams.nih.gov/Funding/Policies_and_Guidelines/default.asp)

- **Other Topics**

- Advice on Research Training, Career Awards, and Research Supplements  
<http://www.niaid.nih.gov/researchfunding/traincareer/Pages/advice.aspx>
- NIH Loan Repayment Programs  
<http://lrp.info.nih.gov/>

- **Example of a Useful University Web Site**

- UPitt Web Page - Writing and Grantspersonship  
<http://www.oorhs.pitt.edu/Resources/WritingGrantsmanshipResources.aspx>