

Guidelines for Writing and Reviewing a Research Grant Proposal

Primary goals of any research grant application:

1. Persuade reviewer of importance of work
2. Persuade reviewer of your ability to do the work
3. Describe study clearly and completely

Address all goals in every section of the proposal.

Note: These guidelines follow the conventional NIH application format, but can be adapted for any research proposal. Use this tool as a **checklist** when you write the proposal, and **give a copy to your reviewers** to guide their feedback. Recommended page lengths are based on a 13 page application.

SPECIFIC AIMS (1 page)	
Strategies	Content and organization
<ul style="list-style-type: none"> ➤ Lay out the plan for the whole proposal: refer to the essential elements of each section that follows ➤ Discuss importance of the work and why you are the one to do it. ➤ Outline the proposed work <p>Length: 1 page (maximum)</p>	<ol style="list-style-type: none"> 1. State the purpose of the proposed work (1-2 sentences). 2. State your general hypotheses or research question and explain the context from which it emerged (e.g., previous work or pilot data, special clinical interests, a problem in field). 3. Identify your research model, system or sample. 4. List the experiments or observations and what specific hypotheses they will test. 5. State how the specific aims will address the long term goals of your research program (1 paragraph).
RESEARCH STRATEGY (12 pages)	
SIGNIFICANCE	
Strategies	Content and organization
<ul style="list-style-type: none"> ➤ Review literature selectively and critically. ➤ Show how your proposed work will fill gaps in knowledge in your clinical or scientific field. ➤ Emphasize impact <p>Suggested length: 2 to 2.5 pages</p>	<ol style="list-style-type: none"> 1. State why work is important in broad context of public health or science (1 paragraph) 2. If appropriate, outline a conceptual model for the research (e.g., diagram of hypothetical causes and effects). 3. Review the state of knowledge in the field to justify choice of specific aims: <ul style="list-style-type: none"> ➤ Identify critical problem or barrier to progress ➤ Why does it matter? ➤ How will project will address this problem? 4. State how the field will be changed by the project
INNOVATION	
Strategies	Content and organization
<ul style="list-style-type: none"> ➤ Summarize points of novelty from Significance section <p>Suggested length: .5 to 1 page.</p>	<ol style="list-style-type: none"> 1. How will project challenge or shift current research or clinical practice? 2. Does the study use new concepts, approaches, or methods? 3. How will it improve on current methods or theoretical concepts or apply them in a new way?
APPROACH : RESEARCH DESIGN	
Strategies	Content and organization
<ul style="list-style-type: none"> ➤ Outline study design ➤ Explain rationale for selecting this design, including compromises ➤ Clarify how design addresses your primary questions/hypotheses ➤ Discuss implications of design limitations; offer alternative approaches <p>Suggested length: 4 pages</p>	<ol style="list-style-type: none"> 1. Summarize design: design graphic, list of outcome measures, timeline 2. Give rationale for design: Does it address the primary question efficiently? Is it feasible and economical? (Stick to pragmatic issues.) 3. Defend all critical choices in designing the study; explain compromises 4. Explain design limitations, including any contingencies among specific aims.

APPROACH: PRELIMINARY STUDIES [this section can be placed anywhere in Approach]	
<ul style="list-style-type: none"> ➤ Provide provocative data to support the choice of specific aims. ➤ Demonstrate your ability to do the proposed work: critical thinking skills and technical expertise. ➤ Demonstrate feasibility of study <p>Suggested length: 2-3 pages</p>	<ol style="list-style-type: none"> 1. Summarize and <u>critically</u> interpret preliminary studies 2. Document availability of and experience with required population or models or reagents 3. Document experience with proposed methods, or availability of experts 4. Address feasibility of challenging methods
APPROACH: METHODS	
<ul style="list-style-type: none"> ➤ Document previously published methods with citations only (consider a table) ➤ Devote space only to methods that are crucial and unpublished ➤ Offer alternative approaches to challenging experiments <p>Suggested length: 1-2 pages</p>	<ol style="list-style-type: none"> 1. Format for quick reference; organize around Aims 2. Use table to cite previously published methods 3. Emphasize strategy>details, eg, expected outcomes, data interpretation, pitfalls and contingencies 4. Offer alternative approaches* 5. Refer to letters of support for more details, if needed
APPROACH: ANALYSIS OF RESULTS	
<ul style="list-style-type: none"> ➤ Organize systematically in parallel with research design ➤ Offer alternative analytic approaches <p>Suggested length: 1-2 pages</p>	<ol style="list-style-type: none"> 1. Describe approach to data analysis and statistical methods. 2. Discuss predicted outcomes and their relationship to your key questions 3. Provide alternative approaches to analysis and interpretation
OTHER IMPORTANT DETAILS	
Presentation	
<ol style="list-style-type: none"> 1. Adhere to conventional organizational plan (as described above). 2. Write with clarity and focus; ask an intelligent non-expert to give you feedback. 3. Choose format and typography for legibility and quick reference (e.g. judicious use of white space, boldfaced headings). 4. Craft title and abstract that are succinct and informative. 5. Design tables and figures that are self-explanatory. 	
Risk Management	
<ol style="list-style-type: none"> 1. For a revised proposal, respond to previous reviewers' critiques with grace, tact and selective assertiveness. 2. Anticipate likely objections--philosophical, methodological, practical or fiscal--and deal with them proactively. 3. Include all appropriate references, taking into consideration your potential reviewers (check the rosters!). 4. Write a cover letter that either requests assignment to a specific institute and/or study section, or suggests the expertise needed for appropriate review. Defend your request with specifics. 	
Administrative issues	
<ol style="list-style-type: none"> 1. Justify budget carefully, including the role of all personnel, and match budget to timeline of project. 2. Identify and document access to essential facilities and expertise. 3. Make judicious use of supporting letters, and refer to them in the text. 4. Address sensitive ethical issues proactively. 	
NIH REVIEW CRITERIA	NIH: Common reasons for disapproval of grant applications
<ul style="list-style-type: none"> • Significance: importance of problem, new knowledge to be gained, impact on scientific field or clinical care and prevention • Investigators: investigator or team training, experience, past productivity • Innovation: novel concepts, approaches, methods, technologies, or interventions • Approach: conceptual/clinical framework, design, feasibility/risk management, methods, analytic plan, alternatives, human subjects protection and inclusion • Environment: supportive scientific environment, unique subject populations, collaborative arrangements, institutional support 	<ol style="list-style-type: none"> 1. Lack of new or original ideas 2. Diffuse, superficial or unfocused research plan 3. Lack of knowledge of published, relevant work 4. Lack of preliminary data and/or experience in essential methodologies 5. Uncertainty concerning the future directions 6. Questionable reasoning in experimental approach 7. Absence of an acceptable scientific rationale 8. Unrealistically large amount of work 9. Lack of sufficient experimental detail 10. Uncritical approach