

Proposal Development

You describing the experiments

The reviewer reading them

PART III



Proposal Development

What is a Grant?

- *form of sponsorship for a project*
- *Classified according type of activity supported*
 - research
 - training
 - service
 - ...
- *Type of granting agencies*
 - Government
 - Private Foundations
 - Business/Industry

Getting Started

- *Success depends on many factors*
 - Excellent match b/w project and mission of funding source
 - Good research idea
 - carefully designed approach
 - well crafted proposal!

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Successful grant getters need

- research skills
- Salesmanship
- Communication skills
- Ingenuity and flexibility
- Administrative skills
- Good interpersonal skills
- Persistence, dedication, patience
- Political awareness & action
- Integrity

Successful grant getters should understand

- nature of review process (know your audience!!)
- concept of writing for reader
- how to follow instructions!
- basic elements of good expository writing

- to inform, explain, describe, or define the author's subject to the reader

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Beginning proposal writers should know about

- Fellowships
- Grants
- Cooperative agreements
- Contracts
- Direct Costs
- Indirect Costs (overhead)
- Awards for new investigators
- Types of granting agencies
- How to identify available grants
- Information to gather before deciding to apply

Proposal Development

Parts of the grant application

1. *Face Page: Title (set # of characters), dates of project period, proposed costs IACUC approval*
2. *Abstract page*
3. *Key Personnel*
4. *Table of Contents*
5. *Budget: personnel (role, % effort, salary, benefits), equipment, supplies, travel, tuition reimbursement*
6. *Biographical Sketches: PI, other key personnel (2 page limit)*
7. *Other support*
 - *Are the investigators qualified? Have they shown competence, credentials, and experience?*
8. *Resources and Environment*
 - *Are the facilities adequate and the environment conducive to the research?*
9. *Research Plan*
 - Specific Aims
 - Background and Significance
 - Progress Report/Preliminary Studies
 - Research Design and Methods
 - Human Subjects
 - Vertebrate Animals
 - Collaborators/Consultants
 - Consortium/Contractual Arrangements
 - Literature Cited
10. *Appendix: manuscripts published, in press*

Proposal Development

Eight Basic Questions Reviewers Ask

- 1. How high are the intellectual quality and merit of the study?*
- 2. What is its potential impact?*
- 3. How novel is the proposal? If not novel, to what extent does potential impact overcome this lack? Is the research likely to produce new data and concepts or confirm existing hypotheses?*
- 4. Is the hypothesis valid and have you presented evidence supporting it?*
- 5. Are the aims logical?*
- 6. Are the procedures appropriate, adequate, and feasible for the research?*
- 7. Are the investigators qualified? Have they shown competence, credentials, and experience?*
- 8. Are the facilities adequate and the environment conducive to the research?*

Assume reviewers are: tired, irritable (no compensation), speed reading, not necessarily experts in your area...

Proposal Development

Planning the Research Plan

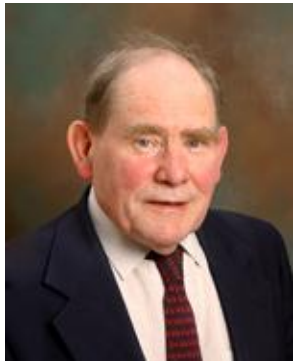
- **Proposal Idea**: most important part of grant!
 - major subject and content of proposed research
 - **innovative**
 - **clear rationale**
 - **obvious significance/timely**
 - **focused: specific problem or set of related problems**
 - **well designed/thought out: logical sequence of experiments**

1960's

- established existence of mRNA
- demonstrated that nt sequence in mRNA determines order of aa in protein
- with Crick, proposed that nt triplet in mRNA codes for single aa
- Lasker Award - 1971

1970's

- Lasker in 2000, Nobel Prize - 2002



“they had come to the conclusion that although I had done a few things in the past I was out of my depth in the particular area chosen and although they admitted that I had some scientific expertise they felt that I should seek some help.”

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Planning the Research Plan

1. *What is the hypothesis to be tested or question answered?*
 2. *Is the work original? – detailed search*
 3. *Are you aware of what has been done in this area? (Background)*
 4. *Why is the work worth doing? (Significance)*
 5. *What is the long-range goal?*
 6. *What are the specific aims?*
 7. *Do the specific aims accomplish the long-range goals?*
 8. *Is the methodology innovative/create or at least “state of the art”?*
 9. *Who will do the work? (reputation of PI and personnel)*
 10. *Why should agency let you do the work? (unique qualifications)*
 11. *How long will the work take? (feasibility of project in time proposed)*
 12. *How much and is cost appropriate? (justification)*
 13. *Do you have facilities to carry out proposed work? (project site)*
 14. *What are expected results?*
 15. *What are your contingency plans? (alternative approaches)*
 16. *What is the cost/benefit ratio for project? (maximum return for minimum investment)*
- *How well does your project goals match the goals of the funding agency?*
 - *What is agency funding?*
 - *review abstracts of funded grants*

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Writing the Research Plan

- 1. Do you show originality?*
- 2. Do you plan ahead?*
- 3. Do you think logically?*
- 4. Are you up to date in the area?*
- 5. Do you have good analytical skills?*
- 6. Do you recognize limitations and pitfalls?*
- 7. Do you think about alternative approaches in the event project doesn't go as planned?*
- 8. How meticulous are you – is the proposal crafted with care (grammar, typos, figures, etc...)*

9. Create an Outline:

- Accuracy*
- Clarity*
- Consistency*
- Brevity*
- Emphasis*
- Style*
- Tone*
- Presentation*

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Writing the Research Plan

Abstract: helps orient reviewer and what other members of panel will have read (half page)

1. *state broad long-term objectives*
2. *State specific aims*
3. *Reference relationship to goals of agency*
4. *Describe research design and methods concisely*
5. *Do not summarize past accomplishments*
6. *Do not use first person (I, me; only applies to abstract only)*
7. *Do not exceed space*
8. *Succinct and accurate description of proposal!*

Specific aims: *MOST IMPORTANT PAGE OF APPLICATION!!!* hypothesis driven?? (1 page)

1. *state broad long-term objectives*
2. *State overall goals of immediate proposal*
3. *Significance of these goals*
4. *State specific aims,, each with one **key** hypothesis to be tested*
5. *Don't include weak aims! (don't be overambitious...)*
6. *Ensure Aims are related, but not necessarily dependent.*
7. *Must have sold reviewer by the end of this page!!!*

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Parts of the grant application

9. Research Plan

- **Background and Significance:** should provide an *informed* discussion of work in field and *highlight gaps* in the field your research is intended to fill. (2-3 pages)

1. Briefly outline background for proposal
2. Overview importance/relevance/timeliness of field
3. Critically evaluate field and identify gaps in knowledge
4. Specify how proposal aims to fill the gap(s)
5. State importance of work by relating specific aims to long term objectives
6. Summarize hypotheses, rationale and approach (background and preliminary data)

Formatting

- Use Models & Figures!!!, must be informative & relevant
- Pay attention to style, discrete sections, clear bold for headings, concluding sentences, italics to highlight imp. pts (speed reading), spacing, indenting...
- clear forceful statements at the end of paragraphs

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Parts of the grant application

9. Research Plan

- **Preliminary Studies:** establish experience, competence, and feasibility to complete proposed work.

1. Provide **pertinent** data (obtained by you!!!)
2. Establish your competence and feasibility of proposed aims
3. *Reference your published work*
4. Highlight data to support your overall premise - that your hypotheses are likely correct
5. Don't preempt your own work, tell them what they need to know, but not that you've already done the experiments proposed in the aims!

Formatting

- Present DATA in clear, understandable, readable format
- Make figure understandable with minimal effort – place info in figure, not legend
- Data must be informative & relevant
- Pay attention to style, discrete sections, clear bold for headings, concluding sentences, italics to highlight imp. pts (speed reading), spacing, indenting...
- Specify question - experiment performed to answer question – result/data - **CONCLUSION DRAWN!**

Proposal Development

Parts of the grant application

9. Research Plan

- **Research Design and Methods:** Tell the reviewers how you plan to accomplish the specific aims

1. Identify model(s) that your research is designed to test
2. Describe experimental strategy to accomplish aims, at a level of detail that feasibility can be judged (ie. why better than other approaches, controls, how data collected, analyzed, etc.)

Be Innovative

3. Limitations/difficulties and *alternatives* to approaches being used (be your own best critic)
- *indicates you are objective and critical, and diffuses reviewer's critique*
4. Interpretations of possible outcomes
5. Identify how outcomes relate to proposed objective/model
6. Summarize hypotheses, rationale and approach (background and preliminary data)
7. TIMETABLE (1/3 of page) – indicates you understand and are *realistic* about work proposed!
8. Collaborations – letter of collaboration – they understand project and their role in it.

Formatting

- Use Figures (ie flowcharts, graphics etc), must be informative & relevant
- Pay attention to style, discrete numbered sections, make sure aims are reiterated and *structure is parallel to specific aims section*. DON'T OVERUSE SUBHEADINGS
- Don't repeat identical procedures – describe once then refer back to
- Reference, don't describe common procedures

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Parts of the grant application

9. Research Plan

- **Research Design and Methods:** Tell the reviewers how you plan to accomplish the specific aims

RATIONALE

FEASIBILITY

EXPERIMENTAL DESIGN

ANTICIPATED RESULTS, POTENTIAL PITFALLS, ALTERNATIVE APPROACHES

You describing the experiments

The reviewer reading them

PART III



Proposal Development

LESSONS

1. Start Early!
2. Framing exercise



3. SMART goals/aims:

- specific
- measurable
- attainable
- realistic
- timely

4. Carve out dedicated writing time!



5. READABILITY IS KEY!



“You had me at ‘Hello’!

6. EDIT, EDIT, EDIT
JUSTIFY, JUSTIFY, JUSTIFY
REVISE, REVISE, REVISE

7. Work with mentors and
Office of Sponsored
Programs!