

Academic versus Grant Proposals

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SPH/KCCR/KNUST

4
EDITION

PROPOSAL WRITING

Effective Grantsmanship



Soraya M. Coley
Cynthia A. Scheinberg


Sage Sourcebooks for
SAGE
The Human Services



A FEW TIPS!!!

- You are not alone.....
- If you are a student then concentrate on finishing your thesis
- Grants help you to complete your study and make you obtain favour with your boss so give it a try!
- The essentials of academic proposal and grant writing are the same
- So what is the difference between academic and grant proposal writing.....????

Proposal vs Grant vs Protocol

- Proposal: putting forward or stating something for consideration
- Grant: to bestow or transfer formally 
- Protocol: detailed plan of a scientific or medical experiment, treatment, or procedure

“In language clarity is everything”



PROPOSAL DEVELOPMENT-KNUST/SPH

Abstract/executive summary (320-350 words)

Chapter one – Introduction

Background Information

Problem Statement

Rationale of Study

Hypothesis/Conceptual Framework

Research Questions

General Objective

Specific Objectives

Chapter two – Literature Review

(Write sections using main study variables)

Chapter three – Methodology

Study Methods and Design

Data Collection Techniques and Tools

Profile of Study Area

Study Population

Study Variables

Sampling Techniques and Sample size

Pre-testing

Plan for Data Handling

Ethical Consideration

Limitations of Study

Assumptions

Chapter four– Data Analysis Plan

Data Analysis Plan

Statistical Methods

Dummy Tables

Chapter five – Work Plan & Project Administration

Time Table of key activities with assigned responsibilities

Chapter six – Budget and justification

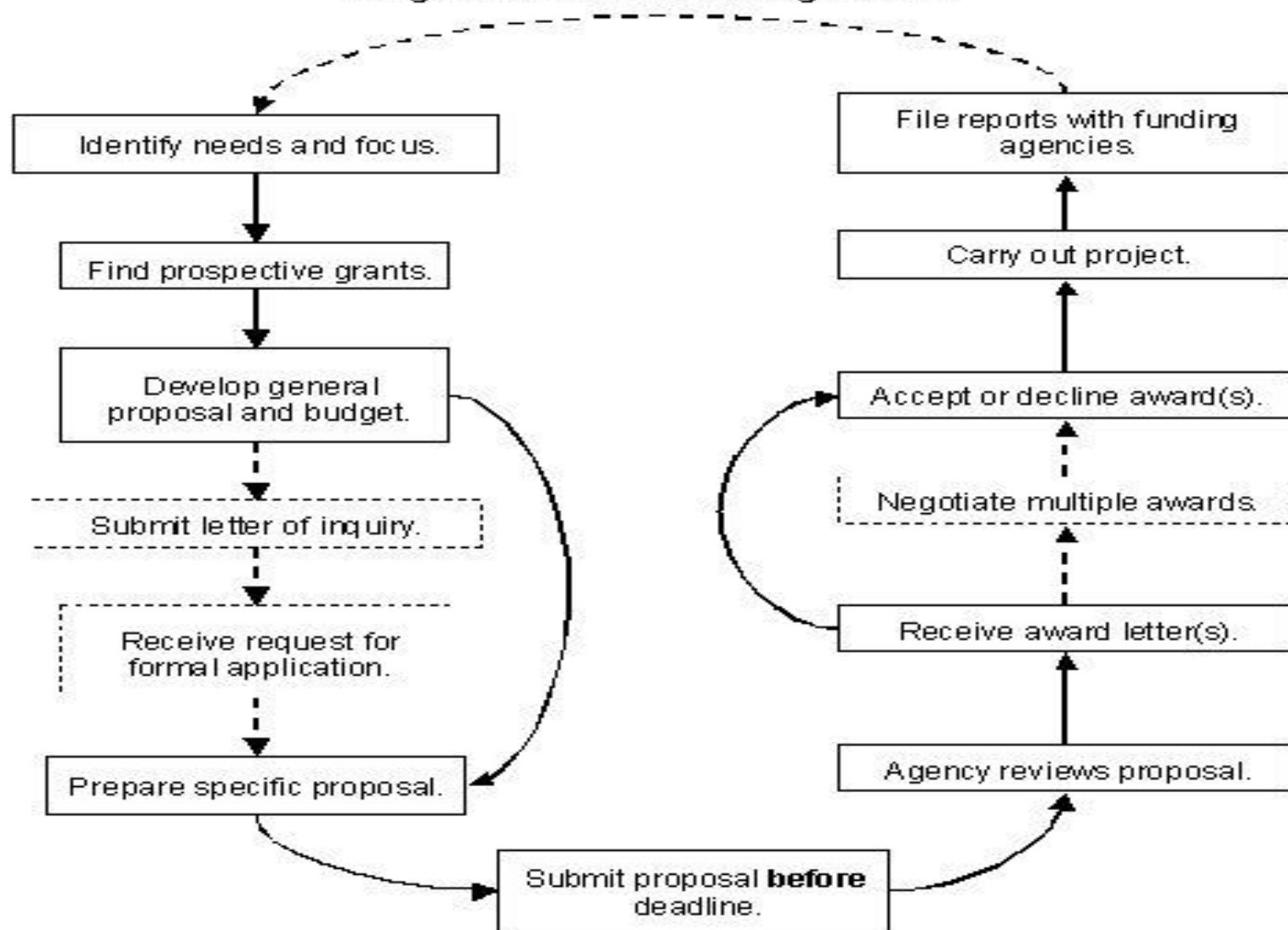
References

Appendices

BEFORE YOU BEGIN.....



Diagram 1. The Grant Writing Process



----- Dashed lines indicate possible additional steps.

Types of Funding Opportunities

- RFA = Request for Applications
- RFP = Request for Proposals (same as RFA)
- Subject specific funders
- Geographic preference
- Ethnic / Gender preference
- International collaboration (Beware!)

Getting Started

- Read instructions carefully
- **Do not write for yourself**; Never assume that reviewers will know what you mean
- Refer to pertinent literature
- State rationale of proposed investigation
- Clear hypothesis or research question
- Address the review criteria
- Present an organized, lucid write-up
- Share proposal with colleagues for comment

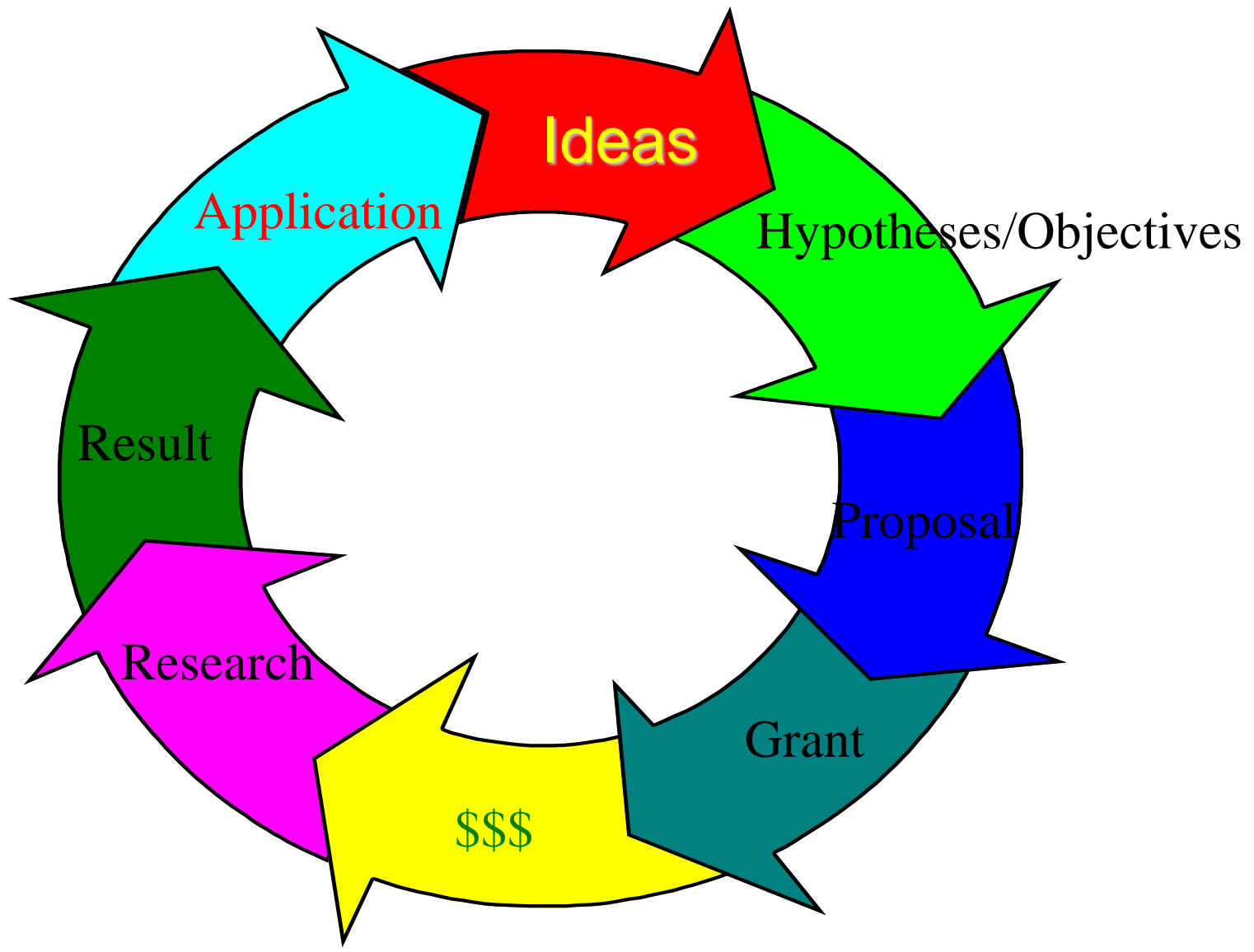
Be sure that you are ready for the race!!!



Getting Started

- Identify potential idea
- Identify funding sources
- Critique and refine your ideas
- Write your proposal

Proposal Planning and Writing 2nd edition, Oryx Press, 1998



What's Needed To Write A Proposal?

- Ideas
- Time management
 - How long does it take?
 - Become efficient
 - Schedule blocks of time
- Collaboration-decide on who does what?
Allocate responsibilities clearly.....

The “Idea” is Paramount to the Success of the Grant

- Lack of a good idea is cited as single most important reason for grant application failures.
- Good is no longer good enough. Your idea needs to be “outstanding”
 - Compelling
 - Novel
 - Well communicated to reviewers

What's Needed to Identify a Great Research Idea?

- NEED the 3 C's to develop a research idea:
 - **Curiosity** to investigate and question situations
 - **Critical thinking skills** to refine your curiosity into a clearly stated idea
 - **Courage** to have “bad ideas”

Identifying Research Ideas

- Where do research ideas come from?
- How do you stimulate the development of ideas?
- How do you assess whether your idea is a good idea for a research proposal?
- How do you transform an idea into a research proposal?

Generation of Ideas

- Where do ideas come from?
 - Practice (patient/management/teaching, whatever)
 - Literature
 - Data
 - Networking
 - Lectures
 - Conversation
 - Theses
 - Newspapers etc., etc.,

Idea Development/Refinement

- Finding a “Great Idea” is difficult
 - Idea lists...
 - Group meetings...
 - Flip charts
 - What if scenarios?
 - Email prospective collaborators...
 - Tie on...ideas to other people’s ideas
 - Focus groups
 - Consultants

Developing a Great Idea!

- General process of creativity
 - Preparation and awareness: investigate problem in all directions, defining the problem, gathering information, chew on it
 - Incubation: drop the problem out of your mind
 - Idea will appear out of nowhere

Researching Your Idea

Questions to Ask Yourself

Is this a good idea?

1. Has it been done?
2. Who cares?/So what?
3. Can it be addressed using appropriate research methods?
4. Will it stimulate interest by others and the sponsor
5. Is it feasible/practical/doable?
6. Is it fundable?

Making Ideas Fundable

- Understand sponsor's needs
- Identify multiple potential sponsors
- Look at the issue from all angles
- Incorporate your idea into other more fundable ideas..

Research Ideas

- Sponsor's perspective:
 - Looking for ideas that will require a limited amount of funding and can solve important problems in a short period of time (i.e., low investment that will yield a high/quick pay off)
 - Looking for ideas/proposals which reflect their priorities

Transforming Ideas into Proposals....

- Seek constructive feedback
 - Often overlooked due to poor time management
 - Have more than 1 consultant
- Selecting a consultant
 - Absolute trust
 - Familiar with field (sometime reach beyond)
 - Open, honest, good mentor

Seek Feedback Regarding the Idea

- Foundation for the idea- (i.e., principle known)
- Gap in knowledge that idea would fill (i.e., principle unknown)
- Central hypothesis
- Rationale, why the work needs to be done
- Expected outcomes
- Why are the outcomes important?

What are Reviewers Looking for in a Grant Application?

- Significance
 - Is the question important? Will it advance science?
- Approach
 - Is the conceptual framework and design appropriate for the aims
- Innovation
 - Are the aims original or innovative
- Investigator
 - Does the investigator have the appropriate expertise
- Environment
 - Is there evidence of institutional commitment?
 - Has the project been built upon synergistic, collaborative relationships

What are Reviewers Looking for in a Grant Application?

- Reasonableness of the budget
- Adequacy of protection for human, animal or environment
- Other possible items:
 - Adequacy of plan to include both genders, minorities
 - Consideration if children have been included in relevant studies

Preparing to Write.

Write with the Reviewers in Mind!

- Write clear, simple sentences
- Make sure words convey exact meaning
 - It is essential we define x
- Be specific
- Beware of grammar issues
 - Do not use nouns as adjectives
- Avoid weak words
 - if we are able, try, believe, hope, might, could, should
 - Whether
- Misused words
 - Complement vs compliment, led vs lead, principle vs principal, rationale vs rational, which vs that
 - Plural vs singular form of the word

You' ve got the idea now what?

Identify the Type of Proposals, Protocols, etc.. Needed

- Types of proposals/protocols:
 - Every organization has its own needs. Think about where this is going and what the purpose of the document is.
 - Examples: executive summaries, industry protocols, federal grants, foundations
 - Follow directions for the specific organization

Components of a Research Proposal

- Cover letter
- Table of contents
- Title page
- Abstract-1/2 page
- Introduction including; statement of problem, purpose of research, and significance of research-5-6 pages
 - aims/hypotheses/obj.
 - background
 - significance
- Preliminary data (evidence investigator is qualified, aims appear well founded)
- Description of research (methods/approach including analysis plan) 7-8 pages
- Institutional resources
- References
- Personnel
- Budget

Transforming the Idea into the ..

- Long term program goals
- Specific aims
- Project objectives
- Testable hypotheses

Components of the Specific Aims Section

- Introductory paragraph*
 - Opening sentence (WOW), important knowns, gaps to be addressed, framing gap as a problem
- What's going to be done
 - Long term goal and aims
 - Objective of this application- what will be accomplished?
 - Central hypothesis or needs statement
 - Rationale

Relationship of Specific Aims to Hypotheses

- Each aim should be focused by a specific working hypothesis
- Often use a brief sentence following aim to state the hypothesis
 - The working hypothesis for this aim, based on data presented under preliminary studies, is...
- Often use a broad aim, narrow or focused hypothesis and then in methods section outline alternatives you would turn to if hypothesis is invalid

What vs Why Specific Aims

- What aims tell the reviewer what you plan to do.
 - Determine....
 - Measure...
 - Correlate
 - Often viewed as “fishing expeditions”
- Why aims tell the reviewer why you are going to do what you plan to do.
 - Imparts significance of work

“What” Aims

- “Determine genotypic allele frequencies of the XXX and YYY genes in patients with diabetes.”
- “Determine the genetic basis for insulin resistance in diabetics.”

“Why Aims”

- “Identify candidate resistant alleles”
 - “The working hypothesis for this aim, supported based on data presented under preliminary studies, is that specific alleles of the XXX and YYY genes explain the development of insulin resistance. The approach used to test this hypothesis will be comparisons of genotypic allele frequencies in patients with insulin resistance as compared to non-insulin resistance. We expect that the candidate genes will be increased in the resistant population.”

a. Specific Aims

The long-term goal of the proposed research is to develop a molecular mechanistic approach to carrier mediated drug absorption and to enhancing drug membrane transport to improve oral drug delivery and drug efficacy. Oral drug delivery is still the preferred route and most cost-effective mode of drug administration. At the present time, our molecular understanding of membrane transport is evolving at a very rapid pace due to advances in molecular biology, human genetics, and bioinformatics. This proposed project will extend the advances that have been made in our understanding of mucosal cell peptide and peptidomimetic absorption to the cellular and molecular level. We will design new prodrugs for enhanced absorption based on this molecular and cellular understanding of mucosal cell transport and hydrolysis and extend this molecular level approach to absorption variability and optimization in human subjects and to enhancing drug efficacy.

The specific aims of the proposed research are:

1. Synthesize and characterize a diverse range of anti-viral and anticancer prodrugs using amino acid and peptide analogues. Determine their conformation preferences and estimated physical properties for subsequent correlation with transport and hydrolysis results.
2. Determine the structure transport characteristics, K_t , K_i , J_{max} , for these new prodrugs of nucleoside agents in human intestinal epithelial cell lines over expressing the hPEPT1. **Correlate these transport characteristics with conformation and physical property estimates. Evaluate prodrugs exhibiting good transport specificity in several cancer cell lines for enhanced efficacy.**
3. Determine structure hydrolysis relationships in cell culture systems expressing esterase activities and isolate, identify and clone the esterase enzyme(s) responsible for hydrolysis of these amino acid peptide prodrugs. Develop antibodies and quantitative analytical approaches to measuring enzyme levels and correlate with expressed levels in cells and intestinal tissue.
4. Determine the human intestinal membrane permeabilities, P_{eff} , in vivo for valacyclovir and acyclovir and the effect of inhibitors, cephalixin and food (high protein meal) on the absorption of the peptide carrier mediated prodrug, valacyclovir. Correlate these permeability phenotype results with the molecular descriptors of transport and hydrolysis, hPEPT1 and esterase enzyme levels, **to establish a mechanistic basis for absorption rate and absorption variation in humans.**

A3. SPECIFIC AIMS

SA1: Determine the effect of hawthorn on myocardial function in an aortic constriction model of heart failure.

As the heart undergoes a transition from compensation to failure there is a significant decline in function that occur secondary to the changes in myocardial structure including alterations in contractile proteins and calcium handling proteins. Therefore, the goal of this section is to understand the role of hawthorn on myocardial function as the heart transitions from a compensated state to heart failure.

SA2: Determine the effect of hawthorn on the development of fibrosis in an aortic constriction model of heart failure. The goal of this section is to document the change in fibrosis as heart failure develops over time. To document the changes in fibrosis, hydroxyproline, a measure of collagen content will be assessed biochemically. Expression of mRNAs encoding extracellular matrix components will also be evaluated.

Overall, this proposal will determine the effect of hawthorn on myocardial function and subsequently on what are known to be key biochemical effectors in the development of myocardial dysfunction and heart failure: fibrosis; contractile protein and calcium handling protein alteration. This study will clearly establish the role of hawthorn, if any, on the expression of genes and proteins that contribute to the development of heart failure. These findings will provide substantial insight into the mechanisms of hawthorn's effect on the pathophysiology of heart failure and its potential as an important therapeutic modality for the treatment of heart failure.

The proposed studies represent a fundamental, comprehensive and molecular mechanistic approach to understanding peptide carrier mediated drug absorption in humans and to exploiting the intestinal peptide transporter and esterase enzymes for improving drug absorption and drug delivery. These studies will provide a foundation for designing optimal drug analogues and prodrugs that exploit molecular transport and prodrug metabolizing mechanisms for improved oral absorption and drug efficacy.

Specific Aims

- Wrapping up the specific aims section
 - Brief outline of significance
 - Why the research is innovative
 - Expected outcomes
 - Impact- (general terms, then expand on in significance section)

Writing Specific Aims/Objectives

- KEEP THEM SIMPLE
- S--specific
- I-- immediate (why do this project now..)
- M--measurable (what quantitative/qualitative info will you gather)
- P--practical (realistic/feasible)
- L--logical (build to achieving goal)
- E--evaluable (significance, who will you assess impact)

Refining Your Specific Aims

- Are your aims descriptive vs why? Fishing vs hypothesis driven?
- Do the aims link to the central hypothesis?
- Is each aim tied to a working hypothesis?
- Is each aim needed?
- Is there a relative balance between specific aims with effort and anticipated outcomes?
- Does the ability to meet one aim depend on the outcome of another?

Objectives

- To compare the effective intestinal permeability (P_{eff}) of valacyclovir and acyclovir.
- To determine the interindividual variability in P_{eff} of valacyclovir and acyclovir estimated from the steady state perfusion periods
- To examine the correlation between P_{eff} and the extent of in vivo absorption for valacyclovir and acyclovir.

Hypotheses

- Statistically testable
- Null vs Alternative Hypotheses
- Yes/No hypotheses??

Converting Objectives into Hypotheses

The objectives must be transformed into prospectively defined comparisons (hypotheses):

Objective:

L-ACE controls blood pressure better than captopril

Hypotheses:

What is the parameter?

Mean Change in BP from baseline to follow-up

What we are trying to show is

Mean Change in BP is greater for L-ACE than for captopril

Where should you state your hypothesis?

- Specific aims
- Research plan
- Abstract

- Do not rely on the hypotheses/aims section to state your problem. The statement of a problem should be clearly elucidated up front but then interwoven throughout the grant (esp. in terms of historic info, preliminary data and significance).
- Do not be too grandiose!

Background and Significance Section

- Thorough up to date concise summary of the issue
 - Data known to date
 - Unknowns
 - Significance of the problem
 - Impact of answering the research question

Problems with Specific Aims and Significance

- **Problems with specific aims:**
 - Too ambitious, too much work proposed
 - Unfocused aims, unclear goals
 - Limited aims and uncertain future directions
- **Problems with significance:**
 - Not significant nor exciting nor new research
 - Lack of compelling rationale
 - Incremental and low impact research

Reasons for Rejections

- Outcomes nebulous
- Objectives are global purposes rather than specific, measurable, achievable activities
- Realism of some objectives is questionable
- Confusing, nonspecific, nonmeasurable objectives
- Objectives are stated as activities

WEB Resources

- Grantwriting 101:

<http://www.grantscape.com/omaha/grants/services/101.html>

- Oryx Press:

<http://www.oryxpress.com/miner.htm>

- The scientist:

http://www.the-scientist.library.upenn.edu/yr1998/jan/prof_980119.html

- **Designing and Conducting Health Systems Research Projects volumes I&II** *Corlien M. Varkevisser Indra Pathmanathan Ann Brownlee*

Background and Introduction

- Start with a good idea!
 - ◆ Poor ideas will not be successful regardless of how well they are “packaged”
 - ◆ Good ideas are often not funded because they are not packaged well
 - ◆ For every good idea that is funded, there are others that aren't – not packaged well
- Then improve the packaging!

Things To Do

- . Find the right program for you and your idea
 - ◆ Main purpose of program (funding priorities) - does your idea fit in mainstream or on the fringe
 - ◆ Find out where abstracts of previously funded projects are great source of information
 - ◆ Call the Program Manager to discuss your idea relative to the program priorities

Things To Do

Find the right program for you and your idea

- ◆ Best approach is to find program in your area of expertise and determine program priorities, then develop idea to fit within the program
- ◆ Don't waste time applying to the wrong program ... square pegs do not fit in round holes
- ◆ Eligibility restrictions?

Things To Do

Become a “student” of the RFA

- ◆ **Understand the main goals of the program**
- ◆ Does your idea fit within these goals?
- ◆ Don't hesitate to call the Program Manager
- ◆ Understand the directions outlined in the RFA on how to assemble the proposal

Things To Do

Develop a timeline for proposal preparation

- ◆ Develop a timeline that will allow for completion of proposal ahead of submission deadline
- ◆ If you rush preparation of the proposal, it will show - reviewers will notice and will not be kind

Things To Do

Understand criteria used to evaluate proposals

- ◆ RFA normally contains the criteria that will be used by reviewers to evaluate your proposal
- ◆ Understand these criteria BEFORE you begin preparing your proposal
- ◆ Provides a greater understanding as to where to put the greatest efforts during proposal preparation

Things To Do

- Understand the review process and reviewers
- Reviewers are looking for proposals they can champion and those they can dismiss

Abstract

- Most important section of the entire proposal is the Project Summary or Abstract
- Summary captures the essence of your proposal – must be clear, concise, well articulated and logical
- Typically the only section that every reviewer reads

Background

- ◆ Background establishes the need for the project
- ◆ Requires knowledge of what others have done
- ◆ The need can be readily identified with the priorities of the program make sure you say it in the proposal!

Develop an overarching hypothesis

- ◆ A testable idea or notion
- ◆ Basic premise for the proposal
- ◆ Once formed and focused, it should drive the rest of the proposal
- ◆ Bigger than the specific aims or objectives

Goals or Aims

- Goals reflect major priorities of the program
- If objectives are accomplished, you will attain goals
- If methodology is followed, objectives will be attained
- Expected results are directly related to overall goals and priorities of the program

Specific Aims

- ◆ Compelling
- ◆ Clearly hypothesis-driven

Objectives

- **S**pecific
- **M**easurable
- **A**ttainable
- Realistic
- **T**ime-bound

Methodology & Expected Outcomes

Overarching hypothesis

Specific aims or objectives that test the hypothesis

Methodologies with associated timelines

Expected outcomes and impacts

Consistency

- Make explicit the connections between your research questions and objectives, your objectives and methods, your methods and results, and your results and dissemination plan.

Prepare budget with a strong justification

- ◆ Compute amount of time personnel will spend carrying out each portion of the project
- ◆ Unreasonable budgets hurt proposals - they create skeptics within reviewer ranks
- ◆ Keep budgets within guidelines in the RFA - they are judged on the degree of reasonableness

Evaluation Plan

- The proposed evaluation plan will keep you on track to successful completion of the project
- The probability of success is acceptable
- That the proposal **NEEDS** to be **FUNDED**

Obtain critical input from experienced and successful colleagues

- ◆ One who has significant expertise in the topic area
- ◆ Another who has only passing familiarity (or less) with the subject matter
- ◆ A third who is an excellent writer

High probability of success

- ◆ Focused
 - Not a fishing expedition
- ◆ Feasible
 - Solid preliminary data
 - Letters from experts expressing support and willingness to help

Clarity of Message

- ◆ Not a mystery novel - deliver message fast
- ◆ Proposed studies yield information that is unique; other approaches do not work as well
- ◆ Relevant to the 'big picture'
- ◆ Key to convincing reviewers to support your proposal rather than that of your competition

Make the proposal textbook quality

- ◆ avoid typographical, grammatical, spelling errors
- ◆ use readable font
- ◆ include sub-headings, include lots of spacing
- ◆ use high quality figures

Helpful Hints

- Provide sufficient detail for evaluation
- Present pitfalls, provide alternative solutions
- Don't pad the budget, keep it lean but adequate

Helpful Hints

- The one-page Project Summary or Abstract should be a work of art!
- Clarity is everything!
- Proofread, Proofread, Proofread!
 - ◆ Electronic spell-checkers won't catch everything!

A strong research application...

- Has well-defined Specific Aims
- Proposes new, interesting & focused Hypothesis Driven studies.
- Promises to Advance Knowledge.
- Provides supporting Preliminary Data.
- Has an appropriately detailed Design.
- Documents appropriate scientific Expertise.
- Has a reasonable & justified budget.

What Reviewers Look for in Applications

- Significance and impact
- Exciting ideas
- Clarity
- Ideas they can understand -- Don't assume too much
- Realistic aims and timelines -- Don't be overly ambitious
- Brevity with things that everybody knows
- Noted limitations of the study
- A clean, well-written application

NIH Review Criteria

- Overall Impact
 - Assessment of the likelihood for the project to *exert a sustained, powerful influence on the research field(s) involved*
- Core Review Criteria
 - Significance – *Research Strategy*
 - Investigator(s) – *Biosketch; Personal statement*
 - Innovation – *Research Strategy, Innovation*
 - Approach – *Research Strategy, Approach*
 - Environment – *Resources, Environment*

Review criteria each scored from 1-9

Most Common Criticisms

- Poorly written
- Not well justified
 - ◆ scientific problem
 - ◆ experimental model
 - ◆ relevance to program priorities or purpose
- Lacks convincing preliminary data

Most Common Criticisms

- No hypothesis or poorly presented
- Not hypothesis-driven, studies are descriptive
- Objectives don't address hypothesis
- Objectives lack focus, too diffuse

Most Common Criticisms

- Approaches and methods lack detail needed to evaluate potential for success
- Investigator lacks expertise with given approach
- Expected results not presented, interpreted
- Pitfalls not addressed, alternative solutions not presented

Most Common Criticisms

- Overly ambitious, too much or too difficult to accomplish in reasonable time-frame
- Time-line unrealistic for successful completion of proposed project
- Resubmitted proposal did not address concerns identified during previous review

Common Problems in Applications

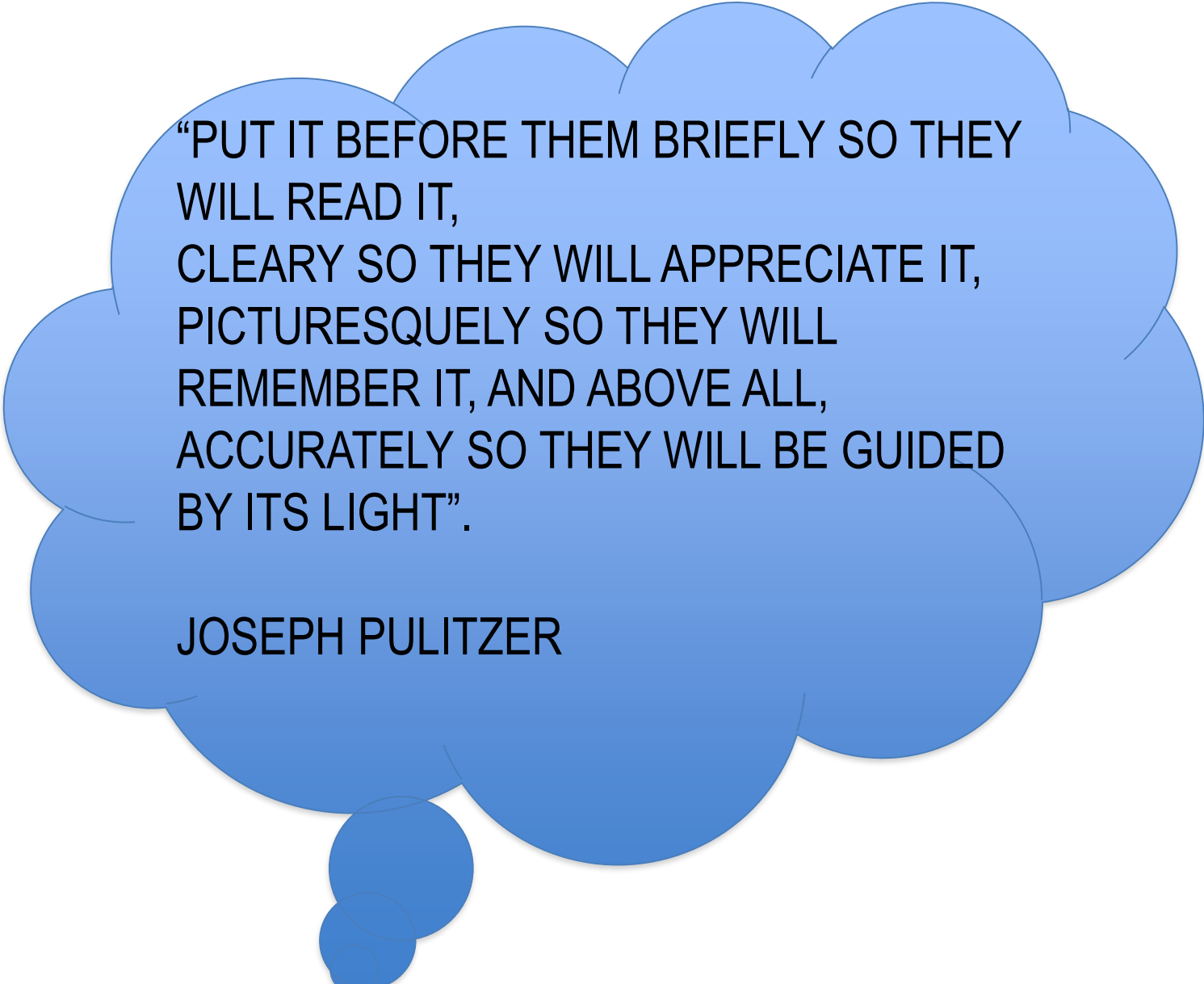
- Lack of new or original ideas
- Absence of an acceptable scientific rationale
- Lack of experience in the essential methodology
- Questionable reasoning in experimental approach
- Uncritical approach

Common Problems ... Cont

- Diffuse, superficial, or unfocused research plan
- Lack of sufficient experimental detail
- Lack of knowledge of published relevant work
- Unrealistically large amount of work
- Uncertainty concerning future directions

Reasons You are Likely to Succeed

- Strong Rationale
- Based on published literature of applicant or others
- Based on preliminary data of applicant
- Based on novel and exciting idea
- Appropriate Specific Aims
- Logical scientific questions to test hypotheses
 - Clear and uniquely related to hypotheses
 - Focused and achievable in grant period

A large, light blue thought bubble with a darker blue outline, containing text. The bubble has several smaller, overlapping circles at the bottom, suggesting it is part of a chain of thoughts. The text inside is in a bold, black, sans-serif font.

“PUT IT BEFORE THEM BRIEFLY SO THEY
WILL READ IT,
CLEARLY SO THEY WILL APPRECIATE IT,
PICTURESQUELY SO THEY WILL
REMEMBER IT, AND ABOVE ALL,
ACCURATELY SO THEY WILL BE GUIDED
BY ITS LIGHT”.

JOSEPH PULITZER