

AATS Grantsmanship Workshop 2007

Hypothesis and Specific
Aims



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Specific Aims

- Entry point to your hypothesis or solution of a critical need
- Focus reviewer on main points in ~1 page
 - Introduction – *Definition of Problem/Critical Need*
 - Proposed Solution - *Your Objectives & Rationale*
 - Specific Aims - *Steps to addressing critical need*
 - Significance – *Novelty, Expectations & Impact*
- Reviewer will form general conclusion by the end of the Specific Aims



Introduction

There is a significant problem or unknown for which there is a critical need to solve, and solving this problem is aligned with the mission of the funding agency



Opening Sentence

- Convert reviewer to be your advocate
- Address two key points:
 - Identify what the grant is about
 - Immediately relate your goals to the mission of the funding agency



Opening Sentence - Example

Focus of grant: To identify lymph node metastases in patients with resectable lung cancer

Example #1: Lung cancer is the leading cause of cancer deaths among both men and women in the US.

- States the obvious, non-focused and does not tell what grant is about



Opening Sentence - Example

Option #2: Failure to identify regional lymph node metastases in the 40,000 US patients/yr with surgically resected lung cancer is associated with a 3-fold increase in recurrence and decreased overall survival.

- Focused, adds information, identifies problem, relates to mission of agency



Introduction

- State 3-4 key facts important to know
- Identify a critical problem that **MUST** be solved
 - not an interesting unknown you want to solve
- Why the grant is important to the funding agency



Proposed Solution

You and your colleagues have the Solution to the problem and can successfully address the critical need you have identified



Solution - Objectives

- Relate **purpose** of this proposal to the **critical need** (and **mission** of the agency)
- Identify **well-defined end-points** and a **specific plan** for accomplishing objectives
 - Careful: if objective is to test a hypothesis - you may not advance the field if your hypothesis is wrong
- **Realistic** objectives
 - “Cure cancer” vs. “Improve the staging and treatment of surgically resectable lung cancer”



Solution - Rationale

- What is importance of this project?
- What will this grant change?
 - What will we be able to do that we cannot do now?
- Formulate a true rationale relevant to the mission of the funding agency



Solution - Qualifications

- Why you and your colleagues are most qualified
- Highlight unique qualifications of team, quality or quantity of prelim data, skills, technologies etc.
 - “... through the development of a novel, we now have the unique ability to”



Specific Aims

Outline development of the **key steps**
to fulfill the **objective** and address the
critical need



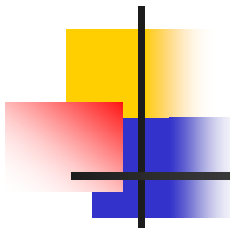
Specific Aims

- 2-4 Brief, Eye-catching “Headlines”
- Aims must address the critical need
- Logical flow from one aim to the next
 - **Avoid feasibility of one aim dependent on another**
 - i.e. Aim 1 requires development of an antibody
- Each aim covers several related experimental questions
- Avoid descriptions of techniques in the headline
 - Many PIs briefly describe approach under headline
- Avoid non-committal aims... “determine whether”



Specific Aim - Example

- AIM 1.** *Establish safety, feasibility and accuracy of NIR fluorescence image-guided SLN dissection in patients with Stage I and II lung cancer.*
- AIM 2.** *Compare detection of NIR fluorescence image-guided SLN identification and excision with conventional staging lymphadenectomy.*
- AIM 3.** *Assess the predictive value of the detection of “occult” nodal metastatic disease on subsequent disease recurrence.*



“We hypothesize that functional nanoparticles, which undergo cellular uptake and cause endosomal rupture, will afford enhanced targeted delivery of paclitaxel for the prevention of nodal metastases in lung cancer.”

SPECIFIC AIM 1: *Identify the key molecular and nanoscale characteristics of nanoparticles required for controlled release of paclitaxel in vitro.*

SPECIFIC AIM 2: *Characterize the efficacy of nanoparticle drug delivery for tumor cytotoxicity and lymph node trafficking in vitro.*

SPECIFIC AIM 3: *Assess the ability of paclitaxel-loaded functional nanoparticles to prevent the development of nodal metastases in lung cancer in vivo.*



Significance

Inform reviewers and funding agency of the **return on investment** and why this will be of **value** to society and the agency



Significance

- Statement of **innovation/novelty**
 - Novelty is one of the 5 key review criteria of NIH
 - Advocacy -- what makes your project better?
- Specific **expectations** to be fulfilled by proposal
- **Impact** of the findings from your proposal
 - How outcomes will fill the critical need
 - Must related to area and mission of opening sentence



Summary

Specific Aims focuses the reviewer (and you) on the main points of the grant

- Introduction – *Opening Sentence & Definition of Critical Need*
- Solution/Hypothesis - *Your Objectives & Rationale*
- Specific Aims – *Steps to addressing critical need*
- Significance – *Novelty, Expectations & Impact*