TIPS FOR WRITING SPECIFIC AIM PAGE

1st Paragraph (Introduction): Identify the Critical Need

Opening sentence→knowns (current knowledge)→unknowns (gaps/unmet needs)→frame the problem/need. At the conclusion of this paragraph, the reviewers should: 1) understand that the research area is clinically relevant; 2) be up to speed with respect to the current knowledge in the field; and 3) understand that there is a gap in the knowledge base that constitutes an important solution to the problem.

Opening sentence: The opening sentence must be strong enough to grab reviewers' interest. It should be ‘big picture' in its scope. Begin the sentence that immediately establishes the relevance of your proposal to human health. Be careful—DO NOT open with something that the audience you are targeting would obviously know; tell them something that they were not aware of and that is compelling.

Knowns: present current knowledge that sets up the gap in the knowledge base or public health need that will drive your proposal.

Unknowns: identify the gap in the knowledge that you will fill or a research need that will be met by the proposed work.

Frame the problem/need: frame the gap/need section as an important problem that is relevant to the mission of the funding agency.

2nd Paragraph (What, Why, And Whom): Outline the Solution (Idea)

Long-range goal→objective in this application (central hypothesis)→rationale→and then concisely describe your approach (a brief overview)→demonstrate that you are well-prepared.

At the conclusion of the 2nd paragraph, the reviewers should understand: 1) what your continuum or trajectory of research is; 2) what the next step is along that continuum or trajectory; 3) why you think it will benefit the public health or the science for you to take that next step; and 4) why this is the best bet for how to take the next step.

Long term goal: Your career goal

Objective (More focus): The overall purpose of the project. The Primary hypothesis of this project (Most narrow) The central hypothesis should be followed by a sentence that describes the basis for its formulation. This can be based on your preliminary data or with support from the literature. Note: Russell and Morrison recommend having a central hypothesis but they are basic science researchers, so it may not be applicable to us, but use your own judgment.

Rationale: Scientific reason that you think this project as the best place to go next.

The rationale should be related to the mission of the funding agency.

Well-prepared: why you are most qualified to take this step. E.g., you and your team have the unique qualifications to do this work. Quality and quantity of preliminary data and unique skills, technologies, past success.

3rd Paragraph (Aim): Spell out the approach. Only up to 3-4 aims for R01 and only up to 2 for R21, only 1 for R03.

Adapted from Stephen W. Russell and David C. Morrison. The Grant application writer’s workbook (2009).
Specific aims: Avoid description of activities. Keep the aims conceptual

Aim #1: XXXX
   Working hypothesis followed by a sentence that describes the basis for its formulation
Aim #2: XXXX
   Working hypothesis (see description above)
Aim #3: XXXX
   Working hypothesis (see description above)

4th Paragraph (Payoff): Summarize expectations (Benefits to the Funding Agency)—the most important paragraph of the specific aim page

Innovation/creativity ➔ expectations ➔ impact/transformative

Tell the reviewers exactly what their return is on their investment. Also, indicate how the new knowledge will contribute to the mission of the funding agency.

Innovation, expectation and impact: What makes your project stand out from all others? Don’t write expectations in future tense (will). E.g., what will have been…(i.e., we anticipate….). Write how the collective positive outcome will fill the identified need, or why research is potentially transformative. Conclude this section with a statement such as “We anticipate that accomplishing these aims will provide the information necessary to XXX” “Success in this study can provide XXX”.

TIPS FOR WRITING SIGNIFICANCE AND INNOVATION

SIGNIFICANCE is defined as ”The positive effect that successful completion of your research project is likely to have by solving the important, NIH-relevant problem.”

Should include 3 parts. The significance page should be about a half a page.

Part 1: Expand paragraph #1 from your SPECIFIC AIM page by providing a critical analysis of literature. If possible, only use primary literature that substantiates and validates that there is an important problem, and that this research will contribute to the resolution of that problem. Conclude part 1 with a sentence that explicitly describes the expected outcome that this research will make. For example, the contribution of this proposed project to the resolution of this problem will be…..

Part 2. (This is the most important paragraph of this section, so italicize the entire part 2). Describe the statement of significance. Make part 2 a simple, direct statement regarding why the expected contribution is important. This sentence should reflect to the “purpose” of your study that was described in your SPECIFIC AIM page. Make it clear to reviewers why this work is necessary to do and why this work will generate information that will advance your field when acted upon. “The contribution of this study will be significant because ....”

Part 3. Discuss benefits derived from significance. The points that you make MUST relevant to NIH’s mission, for example, decrease morbidity/mortality, improvement in the quality of life, medical outcome, reduction of medical cost. These claims must discuss. Don’t just make a list without references. You do not need to have direct contribution to the benefits. Any fringe benefits (meaning outcomes that would be beneficial when extrapolated to other venues and/or filed.

INNOVATION is defined as “a new and substantially different way of addressing an important, NIH-relevant problem, which enables departure from the status quo.”

Adapted from Stephen W. Russell and David C. Morrison. The Grant application writer’s workbook (2009).
Should include 3 parts. The significant page should be about 0.5 page.

**Part 1.** Document with references what the norm has been to this point so reviewers will appreciate your claims of innovation. For example, If it is a new approach, you need to support that claim with discussion of, and reference to, previous approach why they were unsatisfactory.

**Part 2.** *This is the most important paragraph of this section, so italicize the entire part 2.* It should begin with the phrase “The proposed project is innovative because …..” Whatever you claim, it must result in positive impact.

**Part 3.** Describer positive impact that will advance the field. DON’T confused with outcome expected (see description above).

### TIPS TO WRITE APPROACH

**Approach**

- Each AIM
  - Introductory paragraph: (1/4-1/3 of the page)
  - Justification & feasibility
  - Research design
  - Expected outcomes
  - Potential problems & Alternative strategies
  - Time line
  - Future Directions

**Each AIM.** Verbatim Repeated from your specific aims section.

**Introduction.** Why the work under this aim must be done→aim (verbatim)→hypothesis (verbatim)→approach (one or two sentences of overall approach)→rationale (if you have one on your specific aim page)→summarize the overall outcomes and positive impact of this aim (general not detailed level)

**Justification and Feasibility.** Skip over this section. Write Research Design first then come back to write this section. The bulk of you citations should be in here. Only focus on justification of need for that part of the research. Citation of your own papers is an important means of establishing feasibility of the work in your hands (Page 96). Most data presented should be unpublished. Only include highly selected data that are relevant to your proposed project. Present actual data NOT summaries of data.

**Research Design.** Present and discuss activities that will be undertaken to accomplish the objective of a specific AIM. Use strong words, like “expect” and “can” and avoid suing weak words like “hope” and “try”.

“If you are still unsure about how much methodological detail to include, ask yourself the following 3 questions:

1) **Has anyone on the research team published using this methodology?** If so, reference the relevant paper” don’t describe the methodology in your application.

2) **Does my training make it obvious that I can do this?** For example, would a reviewer require a formally trained modelcular biologist to detail now RNA is extracted? We think not.

3) **Do I have preliminary data that make clear I can us the methodology?** This is a very important question, especially if you are a New/Early Stage Investigator, If no one on the team has published with the methodology and it isn’t obvious from the teams’ biographical sketches that on or more should be able to do it, then you need to consider inclusion of preliminary data that will validate that the methodology is feasible in your hands.

Adapted from Stephen W. Russell and David C. Morrison. The Grant application writer’s workbook (2009).
Those data will be presented under the Justification and Feasibility subsection, which would obviate the need to describe the method under Research Design." (Russell and Morrison, 2009, page 90)

Refer reviewers in the later aims to where is it first described in your proposal if anything is common to two or more of your aims.

**Expected outcomes.** (1/3 to ½ page). Make sure to include this section. Each aim should have an outcome. Now, it is time to pull all the outcomes of your research project together.

**Potential problems & alternative strategies (1/3 to ½ page).** Summarize the potential problems in one paragraph. Only chose the most important and probable problems that might occur. For each identified problem, address 1) the nature of the perceived problem and 2) the reason(s) why don’t think that problem is likely to arise, and 3) what alternative approach(es) you would employ, should the problem be encountered.

**Timeline.** Provide a timetable.

**Future directions.** Briefly summarize where you expect to be at the conclusion of this project. This should tie to your long-term goal in the Specific Aim section. Conclude this paragraph by telling the reviewers what you next steps are expected to be and why they will be important.

**INTEGRATION OF RELEVANT LITERATURE THROUGHOUT THE RESEARCH PLAN**

**Specific Aim Page.** Only cite the most important references which justify that there is a need for what is proposed.

**Significance.** Include highly selected citations of literature that details existence of the gap in the knowledge base/urgent need that will drive your grant proposal.

**Innovation.** Cite existing literature to provides the “platform” on which you will make your claim for innovation.

**Research Design.** Citation of your own paper is an important means of establishing feasibility of the work in yours hands.

**Future direction.** A few citations will add credibility to the Future Directions part of your Approach subsection.