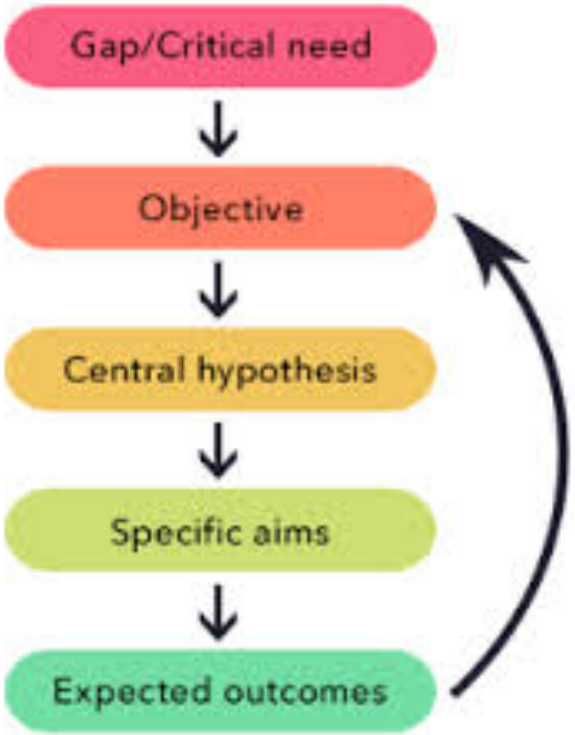
Scientific Writing IMB521:

Developing the Specific Aims Page



Deconstruct the Proposal

Specific Aims (1 page)- outline of the overall proposal; mini-, stand alone grant

Significance (~1 page)

- What is being studied?
- Why is it important?
- What is already known?
- What are you going to contribute to the body of knowledge?

Innovation (0.5 page)

- How is what you propose conceptually innovative?
- How is what you propose technically innovative?

Experimental Design (up to 10 pages)

- What are you going to do to address aims
- How will the data be analyzed and interpreted
- What are you going to do when things do not work

Future Directions (1 very brief paragraph) to tie your grant together with a cherry on top; *taken together what do these aims accomplish*

Specific Aims

- Most important page of the grant!

- Specific Aims should be written to create a partnership with the assigned reviewer(s) who will represent you at the study section.

- The aims page must provide a conceptual framework (why not how!)

- The aims page must convey everything important and novel about your application without a lot of detail –what makes you the perfect person to address this question

- Aims almost always are hypothesis driven!

- Plan to spend many hours and days and weeks on this as the rest of the grant

Pack in all in

Must accurately convey:

- the significance of your question
- background/rationale for the hypothesis
- the hypothesis/question
- what you have that makes yours the perfect lab to test this hypothesis
- what you are going to do?
- How will this research impact the field?

Specific Aims: Organization

Paragraph 1 (3-4 sentences)
Broadly identify the BIG picture, biological problem (pathogenesis, long-term objective)--significance

Paragraph 2 (to maybe 3)
Narrow the focus
Define the current knowledge and gap(s) in knowledge
What is the objective of this application?
What have you done to address this (preliminary data)?
What do you hypothesize?
Rationale

Paragraph 3: Aim 1
Paragraph 4: Aim 2
Paragraph 5: Aim 3

Paragraph 6 (3-4 sentences)
Sum it all up with **Impact**
What will this work deliver? How will it advance the field? Why should anyone care?

Presenting your hypothesis

Everything you write on your specific aims page should lead up to the hypothesis and then flow from it.

"I/We hypothesize that…."
- no mystery stories
- Underline it, bold it, or italicize it
- One sentence only; avoid "and"

Most proposals will have one large hypothesis that 2-4 Aims then address. Each aim, however, has its own subhypothesis/hypotheses.

Finding the Sweet Spot of Detail for Specific Aims

Nitty gritty details of methods that does not belong in aims":

Gene knockdown *not* transfection with lentiviruses expressing siRNA against the target

Analysis of gene expression *not* real time reverse transcriptase PCR or northern blots

Analysis of protein accumulation *not* western blotting or ELISA to detect expression

Measure replication *not* plaque assays, TCID50, infectious centers

You DO NOT have room for these details and they are for sure the details that do not matter

Aims should be active and conceptual

Aim 1. Determine, identify, define, map, elucidate, quantify, measure…

Avoid at all cost passive words such as:

Aim 1. Characterize, study, understand, describe….

<u>Aims can be cast as the following:</u>

1) An assertive statement

"Aim 1. Identify the genes involved in drug resistance"

2) A question

"Aim 1. What are the gene involved in drug resistance?"

3) A goal

"Aim 1. To determine the genes important in drug resistance."

Other tips:

- Do not use "see" "look"
- Do not use passive voice!!!

Aims should be active and conceptual

Synthesize your Aim statement to be conceptual

Instead of the statement representing “WHAT” you want to do, make it represent “WHY” you want to do it.

Instead of…
Aim 1. Determine the genotypic alleles frequencies of the AAA and BBB genes in a population that has been highly selected by frequent long-term drug treatment.

Try…
Aim 1. Identify candidate resistance alleles.

Formula for Specific Aims

The overarching goal:

Significance/Impact:

Overall Hypothesis:

AIMS

Rationale:

Hypothesis:

Approach:

What is to be gained:

Specifc Aims Mad Libs
(John Boothroyd)

There is a formula for a specific aims page and there should be little deviation

----- is an important disease.

Currently, we know little about -----. My overall goal is to determine how --- does ----. Based on ---- and ----, my hypothesis is that changes in gene expression regulate this process and I will therefore use a combination of genetic and biochemical approaches to study -----.

My specific aims are: 1, 2, 3...

Common Pitfalls to Kill a Grant

•Proposal is overambitious—you can't cure cancer

•Proposal is full of technical jargon...never assume that your reviewers are experts in your field

•Poor grammar, spelling, and adherence to defined formats. Neatness and attention to detail count.

•The success of subsequent aims is contingent on the outcome of previous aims.

•Don't overwhelm the proposal with experimental details. Focus on logic and rationale.

•Topic not focused (sometimes reviewers will say that a proposal is "diffuse")

•Too much background information, not enough rationale. Give only the background information that is necessary to understand the importance of the problem and the rationale for your proposed experiments.