



HOW TO WRITE A GRANT: ONE PERSON'S APPROACH.

Plus

MANAGEMENT MATTERS

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STEP ONE: DEFINING THE QUESTION.

- READ, READ, READ - with pencil and paper at hand.
- Pose questions as you go - HOW, WHAT IS RESPONSIBLE FOR?
- Identify one interesting, important and novel QUESTION.
- Articulate your hypotheses, if appropriate, but BE CAREFUL NOT TO BIAS THE SCIENCE!
- Bounce these off of colleagues.
- Check out what you know.



STEP TWO: DEFINING THE APPROACH.

- Consider MULTIPLE approaches without regard to what is possible.
- Think about which would best enable you to address the question.
- Choose one or two that can FEASIBLY be used for your grant [balance innovation with practicality].



STEP THREE: PREPARING TO WRITE.

- Consult your program officer (always a good idea)
- READ, READ, READ.
- Sketch out the plan on paper.
- Have a balanced portfolio of low-risk, breakable and buttered with some high-risk, high-gain but not central to rest of grant.
- Sketch out the plan on computer.
- Enlist your collaborators (early!).




STEP FOUR: WRITING & STYLE ISSUES.

- Communicate (*talk*) to the reader.
- LESS IS MORE!! Keep within borders & leave spaces between paragraphs - (reviewer's mood is more important than your data)
- Abstract and/or specific aims will make or break you.
- No conditional words (might, could, should) - only I will do. If conditionals are tempting then explain I will do if...&O
- Avoid semi-waffle words (characterize, attempt, study) in goals. Better are I identify, I determine, I define.
- Spell-check and proofread!!!



STEP FOUR: WRITING & SUBSTANCE ISSUES.

- Why is this INTERESTING? BIOLOGY, BIOLOGY, BIOLOGY!
- Why is this IMPORTANT?
- What is NOVEL about what you are hoping to learn?
- What is INNOVATIVE about your approach (careful!)?
- What will we learn?
- Don't be over-ambitious in scope and/or approach.
- Have others read it in 15 minutes or less & do they get it?




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TITLE.

- short, sweet but broad enough to encompass unanticipated areas but not so broad that can't write another grant in related area.

ABSTRACT (NIH)

- two paragraphs.
- for lay audience.
- first is for the context (e.g., disease-relevance) and emphasize its importance.
- end first paragraph with question you will address.
- second paragraph is for approach you will use.
- this is PUBLIC information - do not reveal patentable ideas.



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BUDGET (NIH) [if not modular]

Personnel:

- PI should have significant percentage effort (20% minimum, depending on how big a program you want but don't be up all your % early on).
- keep in mind 5+ years out that total percent does not exceed 95% (max allowed). Don't defraud!
- include people by name, if possible; add their c.v.'s.
- include people who will not be paid off the grant as freebies.

Equipment:

- spread items over multiple years so doesn't inflate first year.
- match year of purchase to time-plan.
- ask for 50% cost for some big items - explain where other 50% will come from in justification.




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Supplies:

- divide into medium categories.
- total should not exceed 15-20k/fte (full-time-equivalent) unless unusual.

Other:

- VERY useful category - try to get things out of supplies so 15-20k rule not exceeded.
- include core facility charges, publication costs (page charges and reprints), equipment maintenance, photocopying lab notebooks, software, etc..




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Budget Justification:

JUSTIFY, JUSTIFY, JUSTIFY!!!

- personnel - what will each person do exactly - which sub-project.
- why do you need the technical support - what will s/he do
- equipment - why can't you borrow it? why aren't the six you have enough already? why is it needed full-time for THIS project?
- supplies - explain any special needs - impress that are keeping the amounts as low as possible - mention cost-saving measures.




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CV'S:

- Provide cv's for everyone who helps make the case for how the project is doable by you. NOTE: their other support will need to be provided and there are reporting requirements around key personnel).
- Include cv's for collaborators (and letters of support).

RESOURCES:


- List big stuff that makes the project doable by you.
- Be sure jives with equipment being requested!
- List core facility support available.
- Give square feet of space available.



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OTHER SUPPORT [for all key personnel]:

- Be inclusive.
- Divide overlap into scientific and budgetary.
- Explain VERY well why there is no overlap or what you will do if there is. [If both grants are funded, discussions will be held with the respective agencies and budgets (and specific aims?) reduced as appropriate to ensure there is no overlap.]
- List specific aims if you think it will help. for post-docs, explain that salary may be requested from fellowship applications but supplies will come from this grant.
- If their salaries are included on the grant and fellowship applications have been submitted, explain that an additional person will be hired if the apps are successful.




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TEXT (25 PAGES MAX)

Specific Aims [one full page]:

- Aims should embody the whole grant- the rest is fluff. Make these pure MEAT!!!! Sub-numbering helps keep it terse.
- Have a guaranteed useful and interesting outcome.
- Clear thread through whole grant - ideally ONE medium question and several related sub-questions.
- Set the scene with 2-3 sentences of background.
- State the QUESTION or GOAL (generally, you should not make the hypothesis the "lead" since the answer might be N/A after \$1M of tax money; if appropriate, make the hypothesis clear AFTER the question)
- Specific Aims MUST match *[verbatim]* headings in the grant!
- Give enough detail that can understand what will be done.
- Provide back-up strategies where needed.




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[Generic example]

---- is an important disease thatÉ. Currently, we know little about ---. My overall goal is to determine (understand) how --- does ---. My hypothesis is that changes in gene expression regulate this process and I will therefore use a combination of genetic and biochemical approaches to determineÉ. My specific aims are:


1. **Determine the genes involved in ----.** To do this, I will select mutants in --. That is, I will:
 - 1.a. Chemically mutagenize strain xx
 - 1.b. Select and clone mutants able to ---- by putting them through ---
2. **Analyze mutants identified in Aim 1 with respect to ---**
 - 2.a. Determine complementation groups through mating ...
 - 2.b. If complementation proves impossible, I will use molecular genetic means to accomplish this aim. That is, I will ----
3. **Pursue five mutants that represent different extremes of the phenotypes characterized in Aim 2 by:**
 - 3.a.



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Background:


- Give only what is needed to appreciate the context of the work.
- Tell what is known and then **what are the questions that are outstanding (in bold, if you like)?** Tell the reader this is a question you will address in your grant.
- Cite references by name.
- Don't jst self-cite (intellectual dishonesty).
- **Be sure you have conveyed:**
 - Why is your question **interesting**?
 - Why is it **important** to answer?
 - How is the question novel?
 - How is at least one approach innovative (balanced portfolio)?



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Preliminary Results:


- Ideally, by aim but not always possible.
- Proof-of-concept. **My plan is DOABLE. It is doable by ME** - now you just have to give me the money to do it.
- Aesthetics count.
- Don't overwhelm with minutiae.
- Keep fonts in figures big enough to read (NIH now mandates).
- Avoid color unless needed.
- Sometimes out of sequence Š i.e., give proof of principle for a 3rd year specific aim.



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Experimental plan:


- Specific Aims verbatim as headings.
- **Flow between sections.** [Having identified -- in Aim3, we next need to].
- Have a **Rationale or Approach** section that is a virtual stand-alone. Explain why your chosen strategy is best among the various alternatives.
- Then have an **Experimental detail** section for each. Provide detail on aspects that are not standard. What vector might be important. What strain or cell line surely is (and why you chose it). How to do a southern blot is not. Make clear where YOU have direct experience with a technique.



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Experimental plan (continued):

- Explain choices - how many will you choose and what criteria will you use to choose them. Be careful of mushrooming fishing expeditions (and mixed metaphors).
- Have **Pitfalls and Alternative Approaches** for each section. Describe any major hurdles that could prove problematic (but be careful they are not fatal and non-circumscribable). List back-up strategies and explain circumstances under which you will switch them. Give just enough detail that can stand alone.
- If something falls outside the scope of the grant, say so, but be sure it really does and you are not just using this as a fudge for something that is important but too risky.




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Conclusion:

- One sentence to start. [N] Through the experiments described above, I expect to determine [or we will learn]...]
- Emphasize, we have all of the techniques in hand or available throughout collaborators/consultants
- Then include future goals. [My long term goals is to use the information/clones/reagents generated in this five year period to next ...]

This provides context. Everything interesting should have a future!




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Time line:

- Show how the work will flow.
- BE CAREFUL THAT THIS MATCHES EQUIPMENT AND PERSONNEL JUSTIFICATION.

Appendices:


- Have letters from people who will provide any reagents not in hand.
- Have letters from collaborators.
- Have letters from advisors if non-standard techniques or equipment.
- Do NOT include extra data. Only data that is already included but doesn't incorporate into text well (should not be an issue these days).



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Addenda:


- Possible to send to NIH after submission and before review.
- Two pages maximum is best.
- Give data that establish proof of concept and feasibility.
- Update on papers published/accepted since original submission.
- Don't go overboard!



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KEY THINGS YOU MUST GET ACROSS:

- BIOLOGY, BIOLOGY, BIOLOGY!
- Why is this INTERESTING?
- Why is this IMPORTANT?
- What is NOVEL about what you are hoping to learn?
- What is INNOVATIVE about your approach?
- What will we learn?
- Don't be over-ambitious in scope and/or approach.
- Communicate! PEOPLE are reading your grant. But don't be familiar.




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NIH Mentored Career Awards (NK0).

<http://grants2.nih.gov/training/kawardhp.htm>
<http://grants.nih.gov/training/careerdevelopmentawards.htm>


- Intended for transitioning from post-doc to faculty.
- Many types but most important are K01, K08, K22 and K99.
- All require (a) mentor(s) and are transferable to a new institution.
- Can hold a K award and later get an RO1 (just reduce % effort on the K award to 50%).
- K01 are for any doctorate-holder, require change of field.
- K08 are for clinically trained (MD or DVM) people, last 3-5 years, require 75% research effort and pay very well (!).
- K22 are for people CURRENTLY ON a NIH training grant, are a mini-RO1 and definitely increase marketability.
- K99 are new and for any post-docs, regardless of nationality. Sweet but unclear how many!



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K awards: Special Notes


- Emphasize training plan (include this course!!)
- Emphasize career path of past trainees
- Get a second mentor if primary mentor's track record is not long



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Management Matters.


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Outline


- Managing people
- Managing time
- Managing money
- Managing being away
- Managing meetings



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Managing people = how to hire


- First steps:
 - Know what you're looking for
 - Get the word out you're looking to hire
 - Assume God's gift until proven otherwise
- DDD - Do Due Diligence:
 - ~Always interview (and pay - it's worth it)
 - Always call best reference, best known to you:
 - "S/he sounds great but no-one's perfect; if you had to identify one weakness, what would it be?"



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Managing people = how to keep


- Know and support *their* career goals
- Treat with respect and equality
- Make *your* expectations known
- Give feedback
- Pay a fair, equitable (transparent) wage



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Managing people = how to fire

- Document problems
- Be fair: give warnings in writing
- Steer **before** you push
- Make it a "constructive" process (as much as possible...)



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Managing Time

- Budget your time in proportion to importance
- Organize your time and stick to it
- Make/use/keep deadlines
- Working at home is OK (if you deliver!)
- Don't sacrifice excellent at the feet of perfect: keep control of how much time a given task is worth and takes



Managing Time (2)

- It's what you produce not how long you take to do it...
- Know whose "time" it is (you, partner, family, work, friends)
- Be flexible and make use of gaps
- Relax efficiently



Managing Money

- Judge time/effort ratio before applying
- Pay attention to the big picture first
- Then drill down
- Academic budgets are moving targets - pencil and paper are your best friends!
- Work in total dollars, not direct costs



Lab budgets are hard because:

- Multiple, overlapping "financial years"
- Arrivals/departures only loosely predictable
- Incremental funding often possible (fellowships)
- Renewal not guaranteed



One Solution:

- Burn rate best guide
- Create artificial, uniform financial year for all
- Calculate monthly budgets for each grant and sum of all grants
- Track monthly expenditures for each and sum
- Review personnel assignments and adjust
- Factor in comings/goings and fundability of individuals



Name	Drugs	MoreDrugs	Bugs	Bi g. Bugs	Tot a l
Number	A112345				
Fun d No.	253849	-3			
Star t	4/1 /04				
Cycle	4/1 /06				
Stop	3/3 1/09				
Bal ance on 1/1/06 = 1	39,450				
Inco ming	240,0 0 0				
Mo nths in @6	9				
Proje ted A.m.t = 2	180,0 0 0				
Sum 1 + 2 = 3	219,4 50				
Avai l./m onth (line3/ 12)	18, 288				
Jan.	18,340				
Feb.	21,445				
Mar.	23,083				
Bal ance	158,5 82				
Revised Avai l/mo.	17,620				
Apr.					
May					
Jun.					
Bal ance					
Revised av a il/m.o.					
Jul.					
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Name	Drugs	MoreDrugs	Bugs	Big Bugs	Total
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Jun.	16,587				
Bal a nce	103,7 5 3				
Revised av a il / m o.	17,292				
Jul.	15,868				
Au g.	17,582				
Se p.	17,895				
Bal a nce	52,408				
Revised av a il / m o.	17,469				
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Managing Being Away

- name & empower decision makers (temp or on-going, money auth incl?)
- determine 'what's a fire'
- communicate frequency and nature of your check ins
- discuss your travel plans in advance & relevance to work/goals
- notify your contacts when you'll be away and when you'll return [and voicemail and email]

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Managing Being Away (2)

- decide when you can and cannot be away & how much travel is right
- use your travels to support your mission & network
- organize new contacts, information and material upon return for future use



Managing Meetings

- Decide who *needs* to be there
- Set an agenda that is clear and complete
- Distribute in advance and welcome additions
- Remind day before
- **Enter knowing what you want to get out of it**
- Start “on time” (declare what that is if recurring)



Managing Meetings (2)

- Budget time
- Direct the conversation in a balanced way
- Take good notes
- Bring items to closure, stating conclusions reached (“what we’ve decided then, is...”)
- Articulate next steps (“so, in terms of next steps, I will..., Shirley will...”)
- End on time!



Good Luck and Enjoy!!