

San Diego Nathan Shock Center Grant-Writing Workshop

From idea to fellowship/grant application



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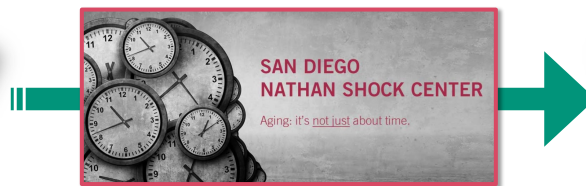
SBP Sanford Burnham Prebys
MEDICAL DISCOVERY INSTITUTE
Office of Education, Training, & International Services

Zoom, March 26, 2021

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Outline of today's workshop

1. How do I **develop an idea** for possible funding?
2. How can the **Nathan Shock Center Pilot Grant** mechanism support the development of my idea/project?
3. How do I **write a compelling fellowship or grant application** on my project?



Preliminary data, e.g., via NSC cores/pilot grants

*Disclaimer:
Based on personal
experience/opinion!*



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1. How do I **develop an idea** for possible funding?



DISCLAIMER:

No amount of 'window dressing' (grantsmanship) can overcome a bad/non-compelling idea.

i.e., your idea needs to be **NOVEL & IMPORTANT!**



How to develop an (irresistible 😊) idea for your grant application



- Define niche area to develop
(need to drive the field significantly forward)
- Collect and critically analyze relevant background information
(comprehensively review literature (and NIH Reporter online))
- Generate a preliminary idea that addresses your chosen problem
(idea has to be novel and compelling)
- Assess idea's potential for success and modify it, if necessary
(Do I have the ability to pursue the idea? Know and play to your strengths)
- Seek constructive criticism from knowledgeable colleagues
(Get feedback from people you trust and respect)
- Refine your idea to maximize its impact
(Listen and learn from feedback)

*Know that this
is a PROCESS!*

How much preliminary data do I need?

- Need enough data to **establish feasibility!**
 - As an independent investigator, you need to show you have the tools, reagents and the expertise to carry out the proposed work
- Need enough data to have a **strong foundation!**
 - While foundation can be based on literature/published data, some preliminary data are almost always part of establishing the basis for your specific project



*Maybe SDNSC
can help out!*

2. How can the **Nathan Shock Center's Pilot Grant** mechanism support the development of my idea/project?



San Diego Nathan Shock Center Pilot Grants

- Annual call for especially **junior investigators** and for established investigators seeking to join the field of aging research
- **6 x \$15K pilot awards** to be spent on projects in research cores; awardees will be matched with a senior mentor
- The **3-page proposal** includes:
 - Scientific abstract (≤ 150 words)
 - Significance of the proposed research
 - Experimental approach
 - Budget
- **References**
- **NIH-style biosketch**



Watch out for next call later in 2021!



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3. How do I write a compelling fellowship or grant application on my idea/project?



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Mechanisms for funding

National Institutes of Health (NIH):

- Research Training and Fellowships (T & F series)
- Career Development Awards (K series)
- Research Grants (R series)
- Program Project/Center Grants (P series)

For overview: https://grants.nih.gov/grants/funding/funding_program.htm

R grants:

- R21 – “exploratory” research grant, 2 years, modular budget (\$275K)**
- R01 – “basic” project research grant, 5 years, modular (\$250K/yr) or non-modular budget**

**non-US citizens can apply if in US lab



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Mechanisms for funding

Some aging-interested private foundations in US:

- American Federation for Aging Research (AFAR)/ Glenn Foundation for Medical Research
- The Larry L. Hillblom Foundation
- American Cancer Society
- American Association for Cancer Research
- American Heart Association
- American Diabetes Association



GLENN FOUNDATION
FOR MEDICAL RESEARCH



Study local websites for specific mission, funding tracks, deadlines, eligibility, instructions etc.!



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What is an outstanding research application?

- New and original set of ideas that will propel the field
- Hypothesis driven with carefully considered outcomes
- Mechanistic studies addressing an important problem
- A focused, incisive and feasible research plan
- A view to the future of this line of research
- A PI who has a strong track record that ensures success
- A strong research environment that can facilitate proposed work

What gets it **FUNDED**?

One key point, really:

It convinces reviewers of all of these points!

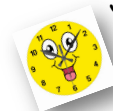
*IMPACT to the field
is key!*



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Preparing your research plan

- Make **list of bullet points** to outline specific research questions related to research idea
- Work these into **tentative Aims, make diagrams of Aims** (ie., logical representation of idea - if space permits, use in grant; also use to present/discuss grant outline with others)
- Generate/acquire **essential preliminary data** to support **technical feasibility and conceptual foundation**
- **Acquire key reagents** (e.g., mouse strains) and **arrange collaborations** where documented expertise is necessary (be realistic but at the same time don't do too many)
- **Start writing proposal** (at least 2-3+ months to timeline!)



*Writing ALWAYS
takes longer
than you think!*



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Three important goals to accomplish in research plan of grant

Proposal needs to convince **ALL REVIEWERS** that:

- Your research addresses an **important scientific question**
(i.e., it is competitive for funding)
- You are the **right person** to carry out this research
(i.e., you have the (documented) skill set to do the proposed research)
- You are using the **right system** to address your question
(i.e., your chosen model organism provides unique advantages)

*Keep in mind
when writing!*



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Specific Aims (or abstract)

Many reviewers may only read this, so **THE MOST important:**

- The Specific Aims page is the focal point for the reviewers and study section.
- Include a general statement of the problem being addressed and why it is important
- Include a short description of problem and background summary (one paragraph)
- State hypotheses and how proposed experiments will fill gaps in our knowledge
- Include an outline of the individual aims and methods to be used, expected outcomes and the long-range significance.
- Aims should clearly and succinctly outline the proposed research.

*SUPER DUPER
important!*



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Research Strategy (R mechanism: 6-12 pages)

Required components (which are also review/score-driving criteria for R grants):

- **Significance:** Premise* of proposal (e.g., preliminary data*), potential of the work to advance the field
- **Innovation:** Originality of approach (conceptual and technical).
- **Approach:** Feasibility of ideas and methods, rigor** needs to be clearly stated

*/**, now explicit score drivers in NIH grants:

- **Premise/Rigor of Prior Research:** Foundation or basis for proposed research; can be published work, or own preliminary data – be sure to reference correctly, if it is not your data!
- **Rigor and Reproducibility:** Explain application of scientific methods used in performing and interpreting experiments, including sample size, number of repeats, statistical methods, etc. – if too little space, at least provide clear referencing here!
- **Biological Variables:** Sex as a biological variable should be factored into design, analyses and reporting

*Speak clearly to these!
(in all types of
Applications)*



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Research Strategy (R mechanism: 6-12 pages)

Significance:

- Typically 1-2 pages, can include figures
- State Premise/Rigor of Prior Research of the grant (explicit score driver)
- Include succinct and focused Background for the non-expert
- Preliminary data: state enabling and exciting findings up front, but not to much to make proposed Aims "confirmatory"
- Bring together ideas and results (yours and others)
- Identify gaps and unanswered questions in the field that your proposal will resolve

Innovation:

- State technical and conceptual innovation, e.g., in bullet points

*Direct score drivers –
speak clearly
to these!*



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Research Strategy (R mechanism: 6-12 pages)

Approach:

Suggested construction of Aims:

- **Overview and rationale** - minimal background to define problem. State hypothesis and how it will be tested.
- **Experimental design** - logical, clear methodology with controls; insert feasibility data (note: preliminary data ≠ statistically unsound data). Explicitly comment on rigor.
- **Possible outcomes** - expected and unexpected (null hypothesis); should not be confirmatory; do not assume that the reviewers will draw the desired conclusion - spell it out.
- **Pitfalls and alternative approaches** - only discuss shortcomings that can practically be addressed; opportunity to emphasize "focus."
- **Brief summary** - Note milestones/deliverables.

often missed points!



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Research Strategy – The End

Suggested additional components to include, e.g., at the end of proposal:

- **Time table**

Shows that you have considered how this research will realistically be carried out.

K99	6	12	18	24	R00	30	36	42	48	54	60
Aim 1A					Aim 2A						
Aim 1B					Aim 2B						
Aim 1C					Aim 3						

or

TIME TABLE

Aim 1: Marker construction, TEM, and selective autophagy analysis will be done in Yr 1-4.

Aim 2: Tissue-specificity- and overexpression studies will be done in Yr 1-4.

Aim 3: Proteomics optimization in Yr 1, candidate studies will be done in Yr 2-3, screens & follow-up in Yr 2-5.

- **Future studies**

Shows that you have a long-term vision, and helps avoid **overambitious plan**

-> Probably the MOST common mistake committed by junior grant writers!



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Investigator - Biosketch (max. 5 pages)

Utilize **green sections** to demonstrate your passion, commitment, accomplishments, and contributions to the field:

- **Personal statement** (do not make too long, tailor to application – add up to 4 references)
- **Positions and Honors** (and other experiences)
- **Contribution to Science** (max. 5 sections with up to 4 references; PubMed URL with all references, can note total)
- **Research Support**



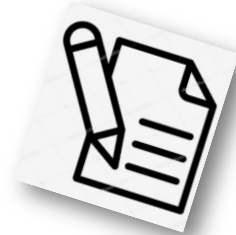
Keep your CV & biosketch updated!



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Letters of Support

- **All parties important for success of application should contribute letters, including collaborators, cores** (ask directors to write letters), **consultants, key reagent providers** etc.
- **Always offer to write draft letters!** (note that this can be quite a bit of work as letters need to be read differently)
- **Potential caveat:** conflicts of interest for reviewers at same institute!



*For personal letters:
Senior better
than junior!*



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Some practical tips about proposals

Contents

- Clear read - logical flow with crisp, short sentences; free of jargon and avoid use of 'loaded' words (e.g., 'this fascinating phenomenon')
- Use graphics to illustrate concepts and simplify complex experimental schemes
- Explicitly comment on score-driving concepts, i.e., impact, novelty, etc.
- Use compelling arguments aimed to convince non-experts in the field
- Reviewers are not omniscient, but will not admit ignorance...

Form

- Use white space for readability
- Set Font settings to 'exactly 12' instead of 'single'* – gives some extra space that is better used as 'white' (easier on the eyes)
- Use (but don't overuse!) formatting, i.e., underline, italics, bold – use wisely
- Do NOT make figures too small, and the legends smaller than 8-9 points (Why? Reviewer is likely to be >40 yrs old ☺)

*Form matters almost
as much as contents!*



- *Credit to Tom Randy via Anne Brunet, Stanford

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Pipeline: From application to reviews



- Years of research by YOU.....
- Months of writing by YOU...
- Hours of reading/reviewing by reviewers..
- Minutes of discussion on panel! *

Make proposal easy to read & understand!!



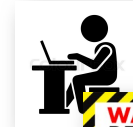
*Link to video of mock NIH study section:
<https://www.youtube.com/watch?v=Iz8hKeR6VIE>

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Some information relevant to NIH grant applications

Timeline: R grants

	• R01: On the 5s		• R21: On the 16s	
	Cycle I	Cycle II	Cycle III	
R01 (new)	Feb. 5	June 5	Oct. 5	
R01 (resubmit)	Mar. 5	July 5	Nov. 5	
R21	Feb. 16	June 16	Oct. 16	
R21 (resubmit)	Mar. 16	July 16	Nov. 16	



Core components: R grants

Scientific files:

- Specific Aims
- Research Strategy
- References
- Project Narrative
- Project Summary
- Introduction

Non-Scientific files:

- Coverletter (for CSR only)
- Biosketch
- Equipment
- Facilities
- Budget Justification
- Research Sharing Plan
- Plan for Resource Authentication
- Letters of Support



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More info and Acknowledgements

"Tell me and I forget; show me and I remember; involve me and I understand"

- source unclear; attributed to Xunzi or Confucius

- **"The Grant Application Writer's Workbook"**

Russell and Morrison, NIH

Disclaimer: Some of the specific suggestions made in these slides were proposed in this reference.

- **Use peers/mentors**
- **Attend courses/seminars**

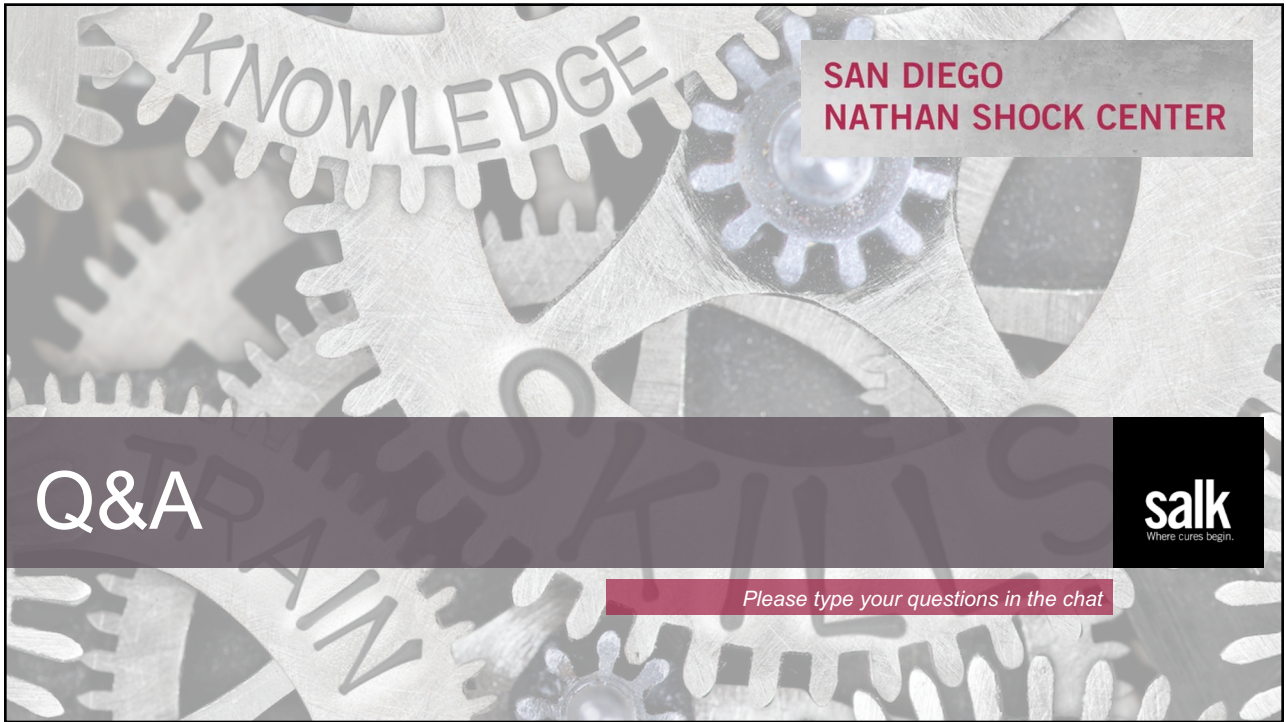
Special thanks to Drs. Robert Rickert, Joey Davis,
& Nisha Cavanaugh, SBP for various slides etc. ©

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Good Luck!

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Q&A

salk
Where cures begin.

Please type your questions in the chat