How to build your research profile: Lessons in Publishing and Funding

Part 2: How to write grants and hopefully, get them funded!

Jane F. Reckelhoff, Ph.D.

Billy S. Guyton Professor
Director, Women’s Health Research Center
Director, Research, Office of Research
Professor of Physiology
University of Mississippi Medical Center
Funding– 2014

R01 Research Project Grant

NHLBI: 16.8% funded (3077 submitted)
NIDDK: 21.4% funded (2240 submitted)

From NIH RePORT
### Individual Training grants—NRSA 2014

**F30 MD/PhD Pre-doctoral NRSA**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Applications</th>
<th>Funding Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHLBI</td>
<td>68</td>
<td>32.4%</td>
</tr>
<tr>
<td>NIDDK</td>
<td>45</td>
<td>48.9%</td>
</tr>
</tbody>
</table>

**F31 Ph.D. Pre-doctoral NRSA**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Applications</th>
<th>Funding Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHLBI</td>
<td>48</td>
<td>35.4%</td>
</tr>
<tr>
<td>NIDDK</td>
<td>51</td>
<td>29.4%</td>
</tr>
</tbody>
</table>

**F32 Post-doctoral NRSA**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Applications</th>
<th>Funding Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHLBI</td>
<td>201</td>
<td>29.9%</td>
</tr>
<tr>
<td>NIDDK</td>
<td>186</td>
<td>39.3%</td>
</tr>
</tbody>
</table>
## CAREER DEVELOPMENT AWARDS --2014

<table>
<thead>
<tr>
<th>Type</th>
<th>Grants reviewed</th>
<th>Success rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>K22,23:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHLBI</td>
<td>12,77</td>
<td>8.3, 37.7%</td>
</tr>
<tr>
<td>NIDDK</td>
<td>64</td>
<td>32.8%</td>
</tr>
<tr>
<td>K08:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHLBI</td>
<td>78</td>
<td>39.3%</td>
</tr>
<tr>
<td>NIDDK</td>
<td>55</td>
<td>47.2%</td>
</tr>
<tr>
<td>K99:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHLBI</td>
<td>167</td>
<td>24%</td>
</tr>
<tr>
<td>NIDDK</td>
<td>48</td>
<td>21%</td>
</tr>
</tbody>
</table>

Data from NIH RePORT
How to write grants -- Where do I begin?

1. Make novel observation based on hypothesis

2. Further develop novel hypothesis

3. Write preliminary specific aims page

4. Get mentors, peers, senior investigators to review specific aims page and preliminary data

5. Write Research Strategy: Significance, Innovation, Approach

6. Repeat step 4 until grant is ready for submission
My advice:

1. Make novel observation based on hypothesis
   9 mos to 1 year prior to submission

Discuss with mentors, colleagues, read literature

Is this really novel?
Do I have the expertise to address questions?
   --Need collaborators, consultants?
How to write grants -- Where do I begin?

1. Make novel observation based on hypothesis

2. Further develop novel hypothesis

3. Write preliminary specific aims page

4. Get mentors, peers, senior investigators to review specific aims page and preliminary data

5. Write Research Strategy: Significance, Innovation, Approach

6. Repeat step 4 until grant is ready for submission
My advice:

2. Further develop novel hypothesis
6-9 mos prior to submission

Obtain as much preliminary data as possible

For “new” investigator, make sure you have preliminary data for all questions—shows feasibility
How to write grants -- Where do I begin?

1. Make novel observation based on hypothesis

2. Further develop novel hypothesis

3. Write preliminary specific aims page

4. Get mentors, peers, senior investigators to review specific aims page and preliminary data

5. Write Research Strategy: Significance, Innovation, Approach

6. Repeat step 4 until grant is ready for submission
My advice:

3. Write preliminary specific aims page—6-9 months prior to submission

Most important part of the grant !!

First:
Develop diagram to explain hypothesis
Example of Hypothesis diagram

Clearly defines problem and questions in your own mind

Should be
--as specific as possible
--as complete as possible

Figure 1: Possible mechanisms for hypertension in PMHAF:
My advice:

3. Write preliminary specific aims page

First paragraph: Clinical importance—prevalence of disease, knowledge lacking?
My advice:

3. Write preliminary specific aims page

Next 1-2 paragraphs:

Discuss preliminary data
My advice:

3. Write preliminary specific aims page

Second last paragraph:

State hypothesis: “As shown in Fig. 1 and based on our exciting preliminary data, the hypothesis will be tested that ....”

Italicize hypothesis – don’t bold it – “buzz words”

DON’T use words like: “to determine if”, “to evaluate”, “to measure”
“We will test these integrative hypotheses, using a combination of our unique model (novel transgenic animals) and state-of-the-art techniques in the following specific aims:

Use appropriate “Buzz words”

Aim 1: To test the hypothesis that .....  
Aim 2: To test the hypothesis that .....
4. Get mentors, peers, senior investigators to review specific aims page and preliminary data
   6 mos prior to submission (minimum)

Choose grant writing mentor team:
Senior investigators who are funded, have recently served on study section of granting agency
-- will provide constructive criticism,
-- make specific comments to improve specific aims page

Show preliminary data and questions that will be addressed for each aim—make sure you have enough preliminary data

Rewrite Aims page based on criticisms, re-review with team -- may take a few iterations to be it perfect
My advice:

5. Write Research Strategy: Significance, Innovation, Approach

Significance: can be used for modest amounts of background,
--save preliminary data for Research Design Section

Final: “data obtained will provide new paradigm for future translational research, therapeutic options
My advice:

5. Write Research Strategy: Significance, Innovation, Approach

Innovation:
Can be bullet pointed:

“1. Novel hypothesis will be tested…”
“2. Novel model, novel animals used” – explain
“3. Novel techniques” Or “state of the art techniques…”
My advice:

5. Write Research Strategy: Significance, Innovation, Approach

Approach:
Preliminary data
Restate specific aim exactly as on Specific Aims page

Rationale:
Preliminary data specific to that aim
Questions to be addressed, protocols
“Expected results, alternative experiments, and limitations”
“Significance and Innovation of studies”
“Future studies”
How to write grants -- Where do I begin?

1. Make novel observation based on hypothesis
2. Further develop novel hypothesis, preliminary data
3. Write preliminary specific aims page
4. Get mentors, peers, senior investigators to review specific aims page and preliminary data
5. Write Research Strategy: Significance, Innovation, Approach
6. Repeat step 4 until grant is ready for submission
Letter with submission:

Request **Institute** (NHLBI, NIDDK, other) if NIH
Contact program officer for their interest in your proposal – make sure you get the right Institute

Request **Study Section Panel** – listed on NIH website
Contact **Scientific Review Officer** – right Study section?

Potential NIH study sections -- lots of others
Hypertension and Microcirculation –
Pathobiology of kidney disease –
Molecular Biology of Kidney Disease –
My advice:

Look at grant writing not as a chore, use the time to solidify your ideas

Think about writing a review raising relevant questions
GOOD LUCK !!