CLINICAL RESEARCH IN HEART FAILURE:

OPPORTUNITIES FOR EARLY CAREER

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Necessary Skills for a Clinical Research Career

- Ability to identify a good research project
- Establishing a research team
- Ability to design a protocol
- Knowledgeable about IRB submission
- Success enrolling
- Familiar with data collection and analysis
- Skill in writing: papers and grants
- Dealing with journals

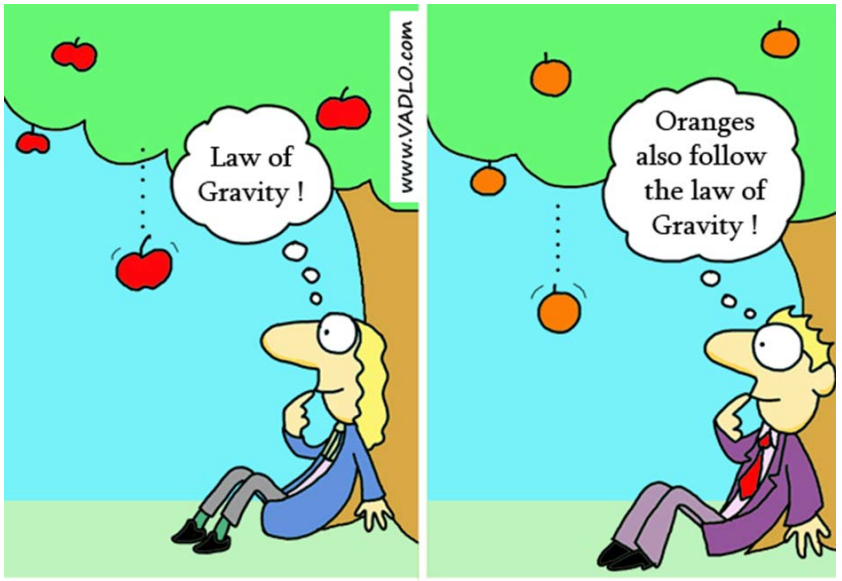
Identify a good research question

- Scientifically relevant - “hot”
- Feasible to study – and not overpopulated
- Fundable
- In an area that will have long-term interest for you
- Intriguing to both you and your clinical and research colleagues
- Lends itself to some smaller less ambitious projects as well as long-term larger questions

Importance of this cannot be emphasized enough!

Identify a good research project

- Spend time thinking
- Identify several projects
- Run ideas past experienced physician-scientists
- Think about
  - Time frame needed to carry out project
  - Resources necessary
  - Scope



Timeline

- Fellow to Instructor or Assistant Professor
- Assistant Professor to Tenured Associate Professor

Hedge your Bets

- Academic success requires a continuous pipeline of projects and publications
- Small secondary projects not dependent on funding are key to maintaining the pipeline
- High-impact papers from your prior level of training, supervision of a student, resident or fellow in a systematic review, meta-analysis or small original research project can be worked on in parallel with your first grant proposal(s).
- Consider identification of several avenues of investigation, ideally related or similar.
- Identify every funding opportunity and apply for them all.

Establish a research team

- The successful physician-scientist cannot do this alone.
- Spend time thinking about what your research team will look like –
  - Large/small?
  - Bench research or clinical epidemiology?
- Hire your first research assistant or laboratory technician as soon as possible
  - What qualifications are necessary?
  - Think about how you will spend your time, and what this person could do to accomplish the things you don't have time for
  - IRB application skill, protocol design, grant applications, technical skills, people skills

Designing a research protocol

- Before you get your first job, you must learn to put a protocol together effectively.
- Before you write your first grant, you must learn to put a protocol together thoughtfully.

Research Protocol Development Form Your name:_____

(NB: not all sections are applicable to all studies, e.g., observational studies or evaluation of a diagnostic test.)

Study Title:

Research Question:

Study Hypothesis:

Independent (Intervention) Variable(s):

Dependent (Outcome) Variables(s):

Extraneous (Potentially Confounding) Variables (list multiple):

List inclusion and exclusion criteria for your study:

Inclusion Criteria	***Exclusion Criteria***
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.

Study Design *(e.g., RCT, cohort, cross-sectional):*

Developed: 1995. Updated on: 11/8/2012

Research Protocol Development Form (2) Name:_____

Sampling (yes or no; method to be used):

Randomization? (if yes, how?):

Study Measurements *(e.g. Hct, PO_2, pain)* *How measured (ABG machine, VAS, etc.)*

Baseline/initial:

1.

2.

3.

4.

Post Intervention *When (timing)*

1.

2.

3.

4.

Are the Primary Study Measurements or Scales Validated? (if so, how?)

Sample Size Calculation *(discuss with research preceptor or statistician as needed):*

How many patients will you need to perform your study and adequately answer your question?

These calculations generally require information about:

1. The desired alpha (usually 0.05)_____ and desired beta (usually 0.1 or 0.2)._____
2. The type of data of the dependent (outcome) variable:_____
    a. If categorical data, the expected prevalence of the outcome:_____
    b. If quantitative data, the expected variance (e.g. SD) in the variable_____
3. The amount of difference (effect size) in the primary outcome measure that you wish to detect in your study: _____

How many study subjects are estimated to be needed in each group and total?

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Common Protocol Mistakes

- No primary hypothesis
- No primary outcome variable
- No sample size or power calculations
- Hypothesis not testable by proposed experiments

IRB submission

- There is an art to this. Learn the art.
- Speak to members of the IRB. They know the workings of your committee and the common pitfalls.
- Learn the standard language that is necessary for all clinical research protocols.
- Learn your IRBs “hot buttons”

Success Enrolling

Data collection

- Know what you are going to collect before your start.
- Spend time on case report forms.
- Scour the literature – what other factors might you have neglected that are important in this area of investigation?

Data analysis

- Enlist the help of a biostatistician early, ideally prior to beginning data collection.
- In clinical research, a t test is rarely adequate.
- Learn something about biostatistics. Particularly if you are interested in correlations or associations, the biostatistics are quite complex.
- At the NIH, all human research protocols (R01) have a biostatistical reviewer

Writing: Papers and Grants

- To be successful in academic research, you must learn to write concisely and clearly.
- If you do not want to spend your career writing, this is not the career for you.

Dealing with Reviewers - Journals

- Is my paper accepted?
  - Acceptance
  - Rejected but would be considered with minor revisions
  - Rejected but would be considered with major revisions
  - Kind rejection
  - Firm rejection
  - Rejected by editors without peer review

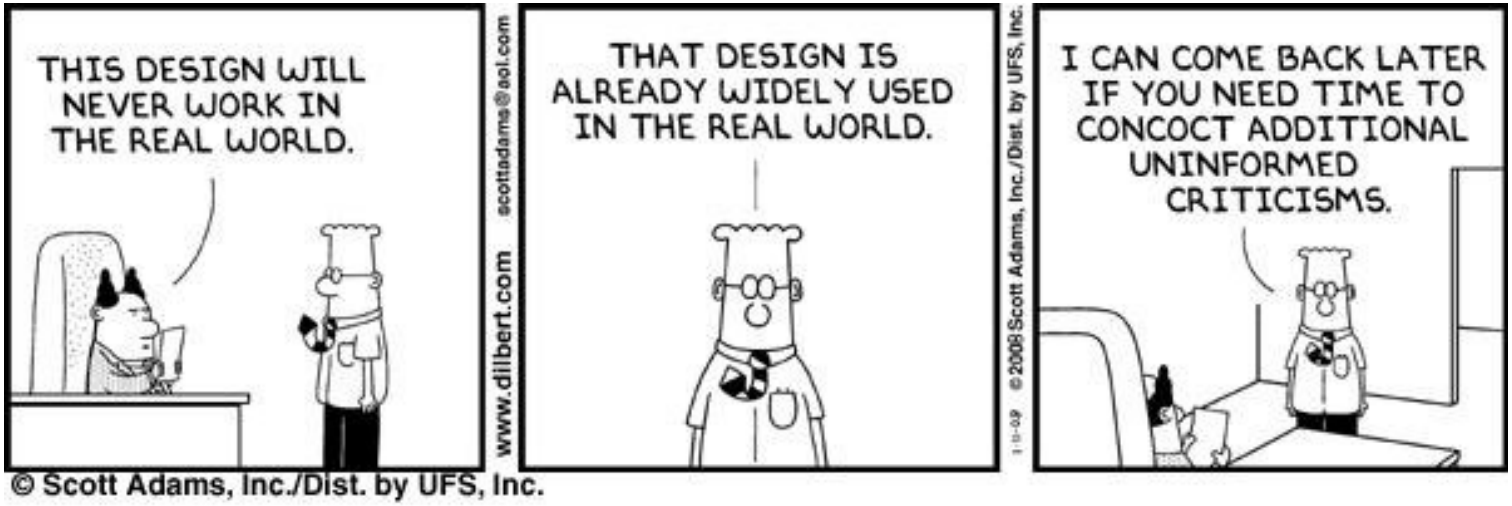
Dealing with Reviews – NIH and others

- Summary statement
  - Summarizes the discussion that provides the basis for your impact score
  - Not an exhaustive critique
  - Does not list every point reviewers found problematic
  - Not a document stating what you need to do to get a better score
- The Program Director is Always Available to Assist

Dealing with Reviews – NIH and others

- The reviewer is always right - Assume comments are helpful
- Assume more flaws exist in the application than cited
- Be grateful not defensive
- Be open-minded and learn – look for overarching themes
- Determine if the application is worth fixing
  - Major flaws
  - Lack of reviewer enthusiasm
  - Fixable problems

What if the Reviewer is Wrong?



What if the Reviewer is Wrong?

- Poor presentation
- Grantsmanship
  - Poor presentation results in reviewers:
    - Missing a point
    - Misunderstanding
    - Concluding you are a careless scientist
    - Concluding there is lack of involvement of mentor or collaborators

Major Flaws in Research Grant Awards

- Work has already been done
- Hypotheses not supported by data
- Methods are not suitable
- Insufficient statistical power
- Lack of past productivity or insufficient evidence of collaborative interaction of investigators
- Poor resources or facilities

Major Flaws in Training/Career Awards

- Mentor lacks relevant expertise
- Mentor overcommitted
- Training plan lacks sufficient detail to develop candidate
- Research project is weak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GET TO YOUR HEAD.
NEVER LET FAILURE
GET TO YOUR HEART.
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