Collaborative Science

Ethical Issues in Collaborative Science

Preface

- This module ignores academic-industry collaborations.
- This module focuses on academic collaborations.

On the Rise

- Collaborative Science including collaborative research is on the rise.
- Driven in part by the grant writing process.
  - NIH's R01 grant application process requires listing collaborators.
  - Generally assumed that modern research is multidisciplinary which entails collaborators.

Types of Collaboration

- Collaboration falls into two "kingdoms":
  - Active collaboration
    - Two or more parties who participate in the design, implementation, and conduct of research.
    - Participate in data analysis, the confirmation or rejection of the hypotheses, determine and evaluate the research aims.
  - Passive collaboration
    - Providing "supplies" necessary for conducting the research.
    - Supplies include but is not limited to:
      - Transgenic mice
      - Reagents
      - Enzymes
      - Antibodies
      - Computer code or software

Passive Collaboration

- NIH and other agencies generally do not consider passive collaboration to be genuine collaborative research.
- NIH guidelines stipulate that passive collaboration does not deserve coauthorship or co-inventorship status.
- Passive collaboration should be handled primarily by material transfer agreements.

Passive Duties

- Vendors are expected to provide adequate instruction on the use and preparation of said materials.
- The vendor will guarantee the authenticity of the materials as described and requested.
- The consumer will pay for costs related to preparing and shipping the materials.
- The consumer may “credit” passive collaborators via acknowledgments.

Passive to Active Duties

- A vendor may become an active collaborator.
  - For example,
    - If the vendor learns of the study design and recommends a different material (reagent, transgenic mouse, etc.) than the originally requested material.
  - Implementation of the suggested change constitutes an active collaboration as the recommendation directly effects study design and methodology.

Active Collaboration

- Falls along a spectrum from full collaboration to minimal, limited collaboration.

Full Collaboration

- Full collaboration occurs when two or more parties equally contribute to study design *or* implementation:
  - Development of project aims
  - Discussion and development of methodology
  - Generation of test hypotheses

Limited Collaboration

- Limited collaboration:
  - Implementation of research without design input
- Limited collaboration raises certain ethical questions, for example:
  - Do technicians count as collaborators?
- One proposed answer is “depends upon if they conduct data analysis rather than simple performance of data collection”.

Secondary Issues

- Authorship order
  - Journals are beginning to stipulate clear guidelines for authorship order.
  - Some journals restrict the number of co-authors.
    - Did 25 people really contribute in a meaningful way?
- Data ownership
  - Universities require researchers to sign a contract specifying who owns the data.
- Co-inventors
  - The Center for Ethics and Values in the Science offers a

Motivations for Collaborations

- In practice, 4 common motivations for collaboration that may be ethically problematic:
  - The Super Powers Team
  - Blackmail
  - Mutual Protection Pack
  - Non-aggression Pack

The Super Powers Team

- Dr. Xin and Dr. Yang are both preeminent researchers in their respected fields. They join forces to research.
  - Fanciful example:
    - Richard Dawkins, biologist, and Neil deGrasse Tyson, astrophysicist, join forces to research whether life on Earth was seeded by interstellar material.
  - Such collaborations are rare.

Blackmail

- Dr. Xing holds a monopoly on material (transgenic mouse, reagent, software code, etc.) needed for conducting research. Dr. Xing demands that Dr. Yin include her as a collaborator in exchange for providing the necessary materials.

Mutual Protection Pack

- Dr. Xin, Dr. Yang, and Dr. Zang all work in the same field. Dr. Xin and Dr. Yang learn, say from a poster presentation at a conference, that Dr. Zang is close to completing his research. Dr. Xin and Dr. Yang join forces to beat Dr. Zang to publication.

Non-aggression Pack

- Dr. Xin and Dr. Yang both work in the same field (genetics) and are interested in the same problem (ethnic differences in disease). They join forces rather than compete with one another.

Ethical Issues

- The ethical issues involved differ for each type of motivation leading to collaboration.
- Some ethical issues apply to all motivations.
  - Non-confirming data
  - Misinterpretation or misrepresentation of data
  - Work ethics

Non-confirming Data

- Interdisciplinary collaborative science is like a puzzle. Sometimes pieces don't fit together. This occurs when one set of data doesn't confirm the test hypotheses or data from one lab contradicts data from another lab.
- How should a PI or lead author handle non-confirming data?
  - Re-run the trials?
  - Throw out the data?
  - Include the data as a supplemental figure?
  - Publish the data in a separate paper?
  - Whose data do you publish?

Surprise Data

- Some times the data is totally unexpected. The picture that is the puzzle may change as a result.
- What does one do with unexpected data?
  - The data may result in a re-ordering of the project's aims.
  - The data may entail new aims.
    - The new aims are not the project currently funded.
      - Published aims often differ from the funded aims. Is that ethical?

Authorship

- Coauthors have been known to acquire retractions or post-publication corrections.
- Conducting research is collaborative; that collaboration extends to the authoring of research.

Misinterpretation or Misrepresentation of Data

- Usually one person in a collaborative project is assigned the task of writing the paper for publication (ignoring the issue of ghost authors).
- No one person is an expert in all fields contributing to interdisciplinary collaborative research.
- The writer may misinterpret or misrepresent data from a discipline in which she is not familiar.
- The writer may also edit data she did not collect.
- Best practice would be for each team leader to review the paper prior to submission for publication.

Work Ethics

- Outline each collaborator's duties up front
- All parties know everyone's duties
- Set clear deadlines for each collaborator
- Utilize progress reports
- Expect complications
  - Set guidelines for dealing with problems

Individual Issues

- Following is ethical issues arising within each type of collaboration.

Super Power Issues

- Interdisciplinary research is common but rarely do “big names” collaborate.
  - Researchers working on cures for Parkinson’s involving stem cells may require a neurologist, a microbiologist, and a geneticist collaborators.
- Larger projects require more collaborators.
- More complicated projects may require more collaborators.
- Narrowly focusing the project’s aims might reduced the number of needed collaborators.

Blackmail Issues

- This motivation is why NIH stipulated guidelines regarding material transfer agreements.
- The gold mine of research is creating the next big invention that others may need in conducting research.
- Grant money goes to the universities more so than the salaries of researchers. Researchers and universities may benefit from intellectual property.
- The quest for monopolistic intellectual property may overshadow the research.
  - See the Anil Potti and Joseph Nevins case

Mutual Protection Pack Issues

- Scientists who collaborate in order to beat-out another team to publication often results in sloppy research.
- Experiments must be rushed.
- Plagiarism in grant applications is more likely.
- If one collaborator is a senior editor on a journal, conflicts of interest may arise such as publishing in that journal so that the submission is not blind reviewed or fully peer reviewed.
- Post-publication corrections or retractions are more likely.

Survival Skills

- Junior scientists learn negative examples when mutual protection packs form.
- Empirical data suggests that when junior researchers receive mentorship training in survival skills, misconduct is *more likely* to occur (De Vries 2006).

Aggressive Science

- Schwartz (2011) writes,
  "Many scientists believe that the constraints imposed by industry consultation and collaboration on free and open discussion of research projects are already having a deleterious effect on science. For many of us, the pleasure of doing science lies in formal and informal discussion and exchange of results and ideas with colleagues. That pleasure would be compromised or vanish entirely if each idea were fenced in as the exclusive intellectual property of one person."
- The issue of intellectual property is independent of aggressive research motivated by negatively affecting another team.
- Junior researchers are too familiar with others photographing their poster presentations and stealing their ideas.

Can one own an idea?

- Collaborative research arising in the "mutual protection pack" method is probably not motivated by good science or solving a scientific problem.
- The motivation is most likely one's own notoriety or publication record.
- Misconduct or bad science is most likely to arise in this context.
- The issue, in this context, isn't really about owning an idea and the idea being stolen.

Rallying the Troops

- Researchers in the same field often form teams of collaboration repeatedly working together on different projects.
- Teams may fall into differing, warring theoretical camps when, for example, the underlying cause of a disease is unclear.
  - Example:
    - The relation between stem cells and tumors.

Non-aggression Pack issues

- Collaborative science conducted in this manner is often more trustworthy.
- Rather than competing the two groups of researchers decide to cooperate.
- Each scientist's reputation and integrity is now linked to the other.

Making Collaborations Work

- Open and full communication is key to efficacious and successful collaborations.
  - ORI estimates that most ethical issues arising within collaborative science can be avoided by open and frequent communication and by clearly designating responsibilities from the outset.
- ORI recommends all data be shared and problem-solving a joint enterprise (Schwartz 2011).