"10 Easy Ways to Commit Research Misconduct & Create Havoc in the Lab"

By: Chris Pascal, Director of Office of Research Integrity

1) Don’t review the raw data prior to publication; accept summary data or prepared tables and graphs instead.

2) On a project where expected results have not been achieved over several months, demand significant results to meet a publication deadline.

3) Hire a new post-doc, but leave him/her without guidance or supervision.

4) Tell your staff to do the right thing, but do the convenient thing when it is expedient.

5) Publish results of a team research project, but leave out two members who made substantive contributions.

6) Provide no guidance or standards for keeping laboratory data.

7) Tell your lab members to ask questions, but don’t make yourself available because you are too busy.

8) Have a large lab of junior scientists and provide little guidance or supervision.

9) Drop data points in order to “clean up” your graph or table without a clear rationale.

10) Tell your lab tech what results you expect from the experiment and that you need them now.

Recent Research Misconduct Cases

- Aug 24, 2006: Dr. Kui Zhu, Cleveland Clinic
  - Fabricated/falsified data
  - Debarred from contracting with U.S. Govt

- University of Iowa Anesthesia Researchers
  - Fabricated/falsified data
  - University of Iowa found no misconduct

- Dr. Eric Poehlman, University of Vermont
  - Fabricated/falsified data from 1992-2002
  - 1 year prison sentence; debarment

Responsible Conduct in Research

- Protects research subjects and assets.
- Maintains integrity of scientific process.
- Reinforces public support of science and medicine.
- There is no room for misconduct in the search for “TRUTH”.

Why does integrity in all aspects of research matter?”
So What is Research Misconduct?

“Lying?”
“Cheating?”
“Stealing?”
“Copying?”
“Misrepresenting?”
“Fudging?”
“Cleaning Up Data?”

Research Misconduct Defined

“Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.”

Office of Science and Technology Policy, Federal Policy on Research Misconduct, 2000
DHHS Public Health Service Policies on Research Misconduct, 2005

Terms Defined

Fabrication is making up data or results and recording or reporting them.
Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
Plagiarism is the appropriation of another person’s research ideas, processes, results, or words without giving appropriate credit.

Research misconduct does not include:
- Honest error or differences of opinion
- Authorship disputes
- Misallocation of resources

Evidentiary Standards

“A finding of research misconduct requires that:
1. There be a significant departure from accepted practices of the relevant research community; and
2. The research misconduct be committed intentionally, knowingly, or recklessly; and
3. The allegation be proven by a preponderance of the evidence.”

The Possible Range of Events

“Honest Error” → “Negligent Error” → Misconduct “Error”

- variability
- haste
- intentional or knowing or reckless

- instrument
- carelessness
- FFP

- technique
- inattention
- NO EXCUSE

Institutional Responsibilities

- Appoint a Research Integrity Officer (RIO)
- Maintain a Research Misconduct Policy
  - UNMC Policy 8003 “Research Integrity”
- Provide policy education to all researchers
- Respond to allegations
- Conduct Inquiry, Investigation, & report to federal funding sources
Reporting Suspected Research Misconduct at UNMC

- Contact Research Integrity Officer (RIO)
  - May informally discuss concerns
- RIO determines if suspected misconduct falls within definition; if yes
- RIO sequesters research records
- RIO notifies respondent of specific allegations in writing
- Inquiry conducted – initial fact-finding to determine whether allegation warrants an investigation
  - RIO may appoint committee that includes subject matter experts

Responding to Research Misconduct Allegations at UNMC

- Inquiry report created containing recommendations to Deciding Official (Vice Chancellor for Academic Affairs)
  - End proceeding or
  - Proceed to Investigation
- Investigation: determine if misconduct has occurred, and if so, who is the responsible person and how serious the misconduct is
  - Notify any federal funding sources (Office of Research Integrity (ORI) for Public Health Service grants)

Responding to Research Misconduct Allegations at UNMC

- Investigation report created with recommended findings to Deciding Official who:
  - (1) determines if the institution accepts the report; and
  - (2) determines appropriate institutional actions in response to the findings
- Final investigation report submitted to federal funding agencies (ORI for PHS grants)

ORI Review

- Determines if proceedings were conducted in accordance with regulation
- May conduct additional analyses & develop the evidence
- Decide whether research misconduct occurred, and if so, who committed it
  - No: case closed
  - Yes: Make settlement recommendations to HHS
- Respondent can contest HHS charges & request a hearing through Administrative law process

Disposition of Allegations Received by ORI, 2005

<table>
<thead>
<tr>
<th>Allegations made to ORI</th>
<th>265</th>
</tr>
</thead>
<tbody>
<tr>
<td>No action possible now or no action</td>
<td>159</td>
</tr>
<tr>
<td>Pre-inquiry assessment of allegations by ORI</td>
<td>64</td>
</tr>
<tr>
<td>Referred to other federal agencies</td>
<td>26</td>
</tr>
<tr>
<td>Handled by NIH</td>
<td>14</td>
</tr>
<tr>
<td>Received by NIH &amp; referred to ORI</td>
<td>2</td>
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</tbody>
</table>

Types of Allegations in Closed Cases 2005

<table>
<thead>
<tr>
<th>Allegation</th>
<th>Inquiry</th>
<th>Investigation</th>
<th>ORI findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabrication</td>
<td>---</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Falsification</td>
<td>3</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Falsif./Fabric.</td>
<td>---</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Plagiarism</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4</td>
<td>18</td>
<td>8</td>
</tr>
</tbody>
</table>
The Bottom Line:

“Whatever the rationalization is, in the last analysis one can no more be a little bit dishonest than one can be a little bit pregnant.”

Honor in Science, p 14
Sigma Xi, The Scientific Research Society
1997

Change of Topic:

Authorship

Things Have Changed In Academia

> Increased number of investigators
> Reduced number of “tenure track” positions
> More focus on applied versus basic research
> More collaborative & interdisciplinary research
> Increasingly complex technology - IP issues
> “Big Science” versus “Little Science” mentality
> Clinical productivity has increased importance
> A perception that teaching is devalued
> “Publish and/or Patent and/or Perish”

Pressures cause people to do foolish things, including “scientific misconduct”

Research Misconduct Rules DO NOT:

Apply to misallocation of funds, sexual harassment, and discrimination (covered by other laws);
Limit limit application of other laws (including criminal);
Apply to authorship disputes (except for plagiarism);
Apply to other than federally supported research except as required by University Policy.

But DO Apply to:
Misrepresentation of personal credentials (i.e., the C.V.)

Misrepresentation* of Authorship Among Applicants to Training Programs

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Year</th>
<th>Applicants</th>
<th># with pubs</th>
<th># pubs total</th>
<th>% pubs invalid</th>
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</thead>
<tbody>
<tr>
<td>Pediatrics¹</td>
<td>'95</td>
<td>404</td>
<td>147</td>
<td>401</td>
<td>19.7</td>
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<tr>
<td>Radiology²</td>
<td>'92-'95</td>
<td>201</td>
<td>87</td>
<td>261</td>
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<tr>
<td>Gastroenterology²</td>
<td>'95</td>
<td>236</td>
<td>53</td>
<td>92</td>
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<tr>
<td>Emergency Medicine¹</td>
<td>'96</td>
<td>350</td>
<td>113</td>
<td>276</td>
<td>20.4</td>
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<tr>
<td>Orthopaedics¹</td>
<td>'98-'99</td>
<td>213</td>
<td>64</td>
<td>138</td>
<td>18.0</td>
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<tr>
<td>Internal Medicine²</td>
<td>'02-'03</td>
<td>497</td>
<td>234</td>
<td>634</td>
<td>25 - 1.8</td>
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<tr>
<td>Emergency Medicine²</td>
<td>'02-'03</td>
<td>173</td>
<td>47</td>
<td>133</td>
<td>13.3</td>
</tr>
</tbody>
</table>

*Non-existent or unverifiable journals or books, non-existent articles/chapters, alts, not papers, “in press” but never appeared, inaccurate author position. Ref 6 used different methods

7. Acad Emerg Med 9:992, 2004

Listen carefully when you take that new junior faculty position.

A Closer Look at Publication Data

From the Chronicle of Higher Education, 2000
"Explosion" of the Scientific Literature
MedLine Search - Total Indexed Articles

![Graph showing the "Explosion" of the Scientific Literature](image)

The Proliferation of Authors per Paper

![Graph showing the proliferation of authors per paper](image)

Average Number of Authors per Article
Journals of APS: 1960-2004

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Journals of APS: 1960-2004

![Graph showing the average number of authors per article](image)

Title Page of Science Article

![Image of a title page](image)

Authorship - Extreme Example

Science Vol 287, Pages 2185-2195, 2000

"The Genome Sequence of Drosophila melanogaster"

> 195 authors overall
> Adams, followed by 30 other authors in an unknown relational order (13 Celera; 11 LBL-Berkeley; 2 MHG-Berkeley; 4 other).
> Followed by 150 other authors in alphabetical order: from Abril to Zhu (100 Celera; 11 LBL; 11 Baylor; 3 MHG; 35 more from 29 other institutions).
> Followed by 5 "senior authors": Smith, Glubs, Myers, Rubin and Venter (the "most senior" of the "seniors").
> 34 Different organizations (Corporate, University, Government); listed in order of author appearance.
> First page of article was almost completely the Title and Author list; Participating institutions were listed on the second page.
“What kind of flowers do you suggest for a colleague who was the 97th author on a paper in the journal Science?

Modified from Chronicle of Higher Education, 1999

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**Genome sequence of the human malaria parasite Plasmodium falciparum**

*Salami Publication or Specialized Professionals?*

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**Genome of the Honeybee: Aphis mellifera**

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**Authorship in Large Research Groups**

Identification of Large Study Groups in “Original Contributions” to JAMA

1991 — 6% of 172
2001 — 22% of 185

Approaches to Authorship:
1. Author A, B Author, C Author for the GROUP Investigators
2. Writing Group for the Complex Research Project
3. The CLINICAL TRIAL INVESTIGATORS
Is there a pattern in authorship lists?

> Being the “First Author” is still most important.
> Being in the first few authors of a long list is probably important.
> Being the last author or near last author in a long list is also probably important.
> Being in the middle of a large group of authors means very little.
> There is no real convention in authorship listing

Guidelines for the Conduct of Research in the Intramural Research Program (NIH)

“... individuals who have assisted in the research by their encouragement and advice or by providing space, financial support, reagents, occasional analyses or patient material should be acknowledged in the text, but not be authors.”

“Oh yeah? Well my mom’s department publishes more scholarly articles than your mom’s department!!”
Some Scenarios

“Pressure from the top”

You have just taken a relatively junior position in a very well established research group at a new institution. A few months later, as you are preparing a paper for publication in Nature based mostly on work from your previous location, you ask the well known section chief to review the paper prior to journal submission. The chief carefully reads the paper and makes many critical or constructive comments. You also notice that he has added his name to the author list and a final note volunteers to cover the page charges if the article is accepted.

“What do you get with Authorship? (1)”

A highly respected scientist in Korea has made significant progress in a controversial research area dealing with embryonic stem cells and cloning. He asks a highly respected scientist in America to join him in a major study that should lead to rapid publication and a great deal of public visibility. The American collaborator agrees to work with the Korean scientist and goes to his laboratory to participate in the research. The American scientist returns home and later that year gets a copy of a paper that heralds big breakthroughs in stem cell science. The paper is soon published in Science with headlines worldwide. They all celebrate big time.

“What do you get with Authorship? (2)”

A Korean scientist is accused of improprieties related to how he sought egg donors for the stem cell research projects (technicians/post-docs). The American scientist asks the journal Science for his name to be withdrawn as an author of the high-profile paper. The journal refuses to do that. The Korean scientist is accused of more extensive misconduct (falsification, fabrication and plagiarism - all three) related to not only the Science publication but others as well. Ultimately, the Korean scientist is found to be guilty of misconduct and loses his job and reputation. The papers are withdrawn. The US investigation finds the American scientist did not commit misconduct and he goes on with life.

Further Reading:
1. “Complainant Issues in Research Misconduct: The Office of Research Integrity Experience”, Chris B. Pascal, Department of Research Integrity, U.S. Department of Health & Human Services

“You scratch my back, I’ll scratch yours”

You have a newly funded NIH grant and just read a paper that described a recently developed transgenic mouse that would greatly facilitate your work. The scientist who produced the mouse would be happy to provide some animals for your project at no cost except shipping. All you are asked to do is to include him as the second author on any resulting paper that uses the one-of-a-kind strain. The scientist is too busy to have any additional involvement in the project.

NOTE: You can easily substitute patient samples for transgenic mice!!
MORE Further Reading - Authorship