

Scientific and Academic Misconduct

Bioengineering 100
Fall 2016

What is academic misconduct?

Scenarios 1-3

A Rutgers study showed...

Additional survey data from McCabe:

Number responding

Graduate Students

Undergraduates*

% who admit cheating on tests:

17%

17%

% who admit cheating on written assignments:

40%

40%

% Total who admit written or test cheating:

43%

43%

*Excluding first year students, code schools, and two year schools. Surveys conducted between Fall 2002 and Spring 2011 by Donald McCabe

Data provided by International Center for Academic Integrity

What is scientific misconduct?

‘Magical’ approach to... accepted *Nature* paper?

› I am afraid I cannot recommend the current manuscript for publication until a comprehensive study on the identity, quality, mutational load, and epigenetic remodeling occurring in the cells is shown. As it stands, and whereas this reviewer does not doubt the data presented, the process can be summarized as a “magical” approach and none of the conclusions related to “next-generation” or applications in regenerative medicine is supported experimentally.
›

- Quote from a purported *Nature* reviewer in early 2013

January 29, 2014

nature International weekly journal of science

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Acid bath offers easy path to stem cells

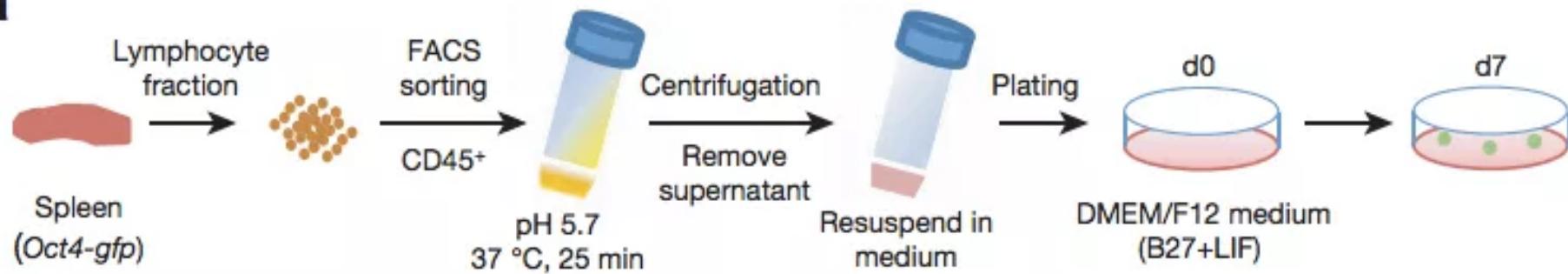
Just squeezing or bathing cells in acidic conditions can readily reprogram them into an embryonic state.

David Cyranoski

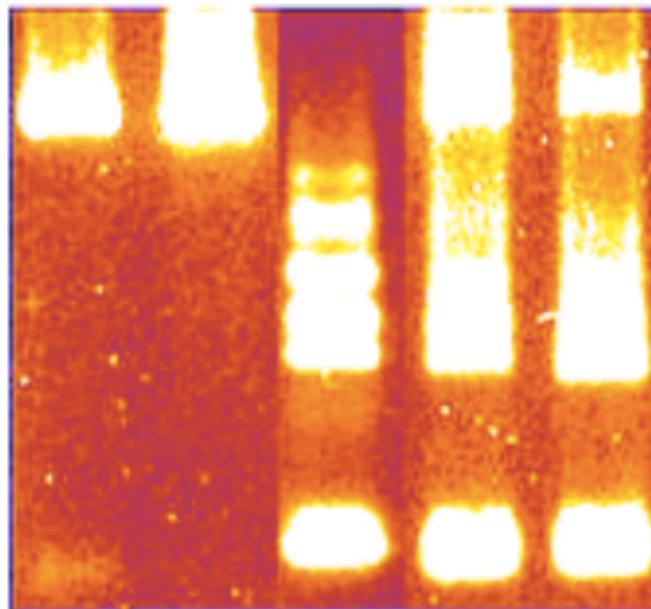
29 January 2014 | Updated: 17 September 2014

Stimulus-triggered acquisition of pluripotency (STAP)

a



Feb. 4th: Splicing of DNA gel in Fig 1i

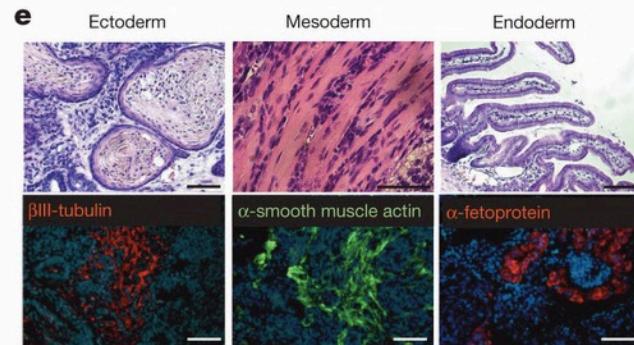


Pubpeer.com commenter posts false color of original image, with brightness and contrast tweaked

Feb 14: Duplication of figures?

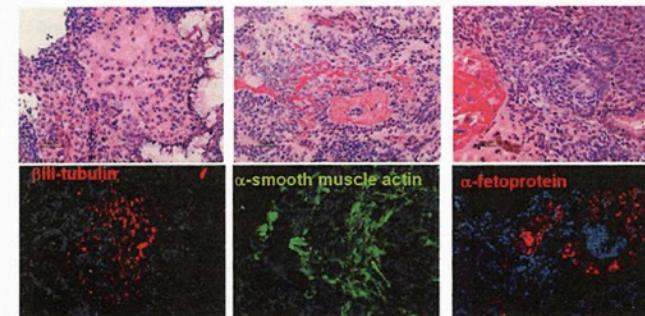
Haruko Obokata, et al.
Nature 505, 641–647 (30 January 2014)

Fig. 2e



Haruko Obokata
Doctoral dissertation (Feb 2011)

Fig. 14



similar

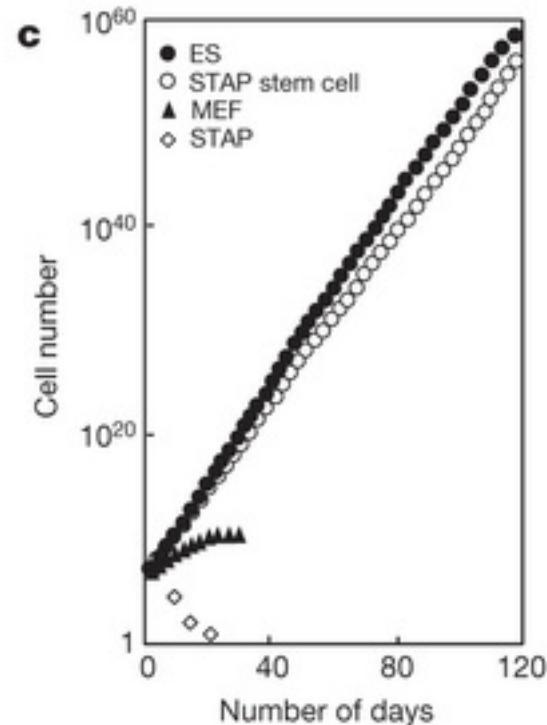
Figure 14 Teratoma like mass from bone marrow spheres contained nerve expressing betaIII-tubulin (left)(ectoderm), muscle expressing desmin (middle)(mesoderm) and duct like structure expressing AFP (right)(endoderm).

For details, visit <http://stapcells.blogspot.com>

RIKEN, Nature begin STAP investigations...

April 1: RIKEN summary report

- Figure 5c (shown right) fabricated
- Figure 2c fabricated



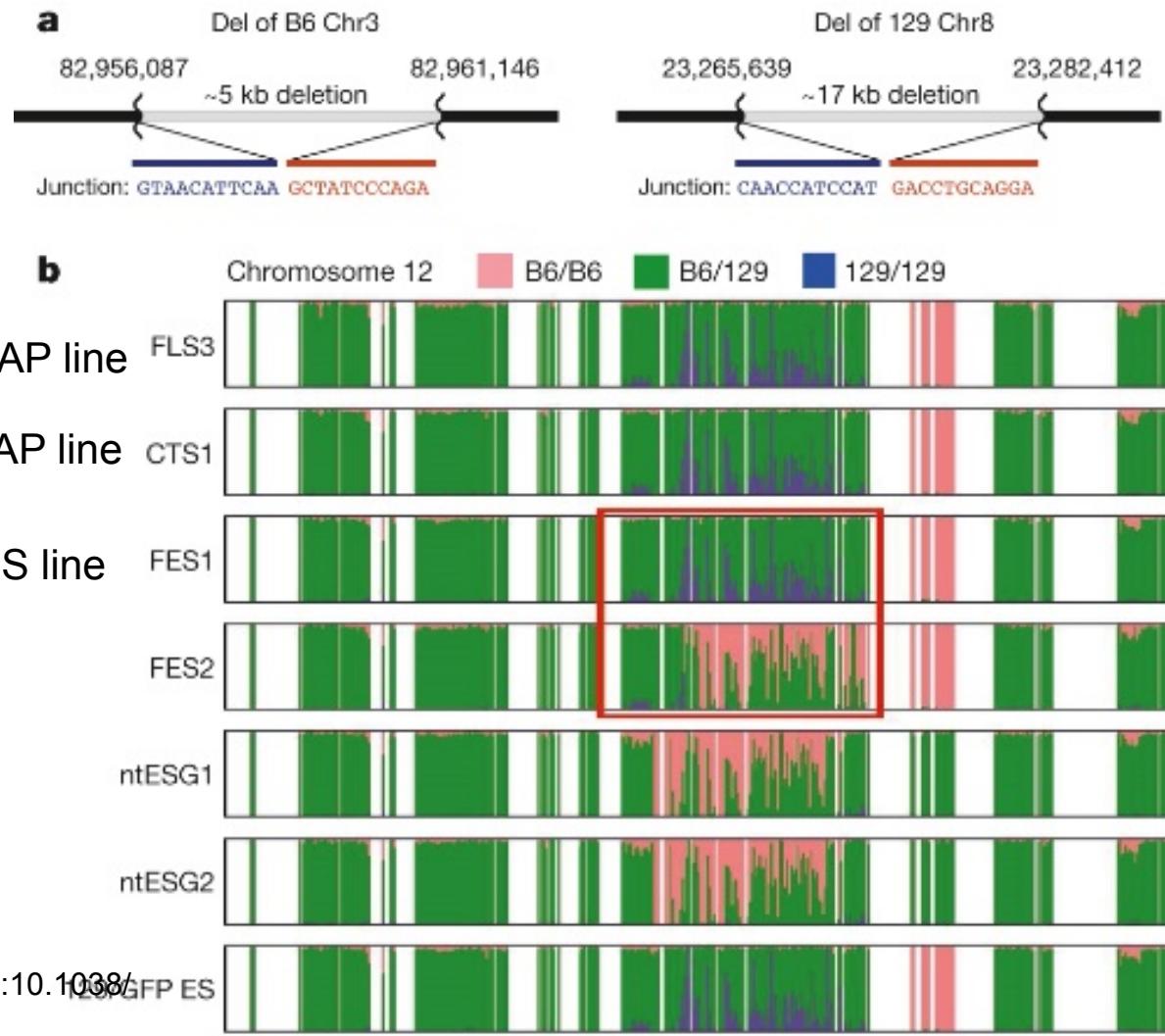
RIKEN summary report

- STAP cells were actually embryonic cell lines.
 - a) The three STAP stem cells, FLS, GLS, and AC129, were actually derived from the three ES cells FES1, GOF-ES, and 129B6F1-ES1, respectively.
 - b) The FI stem cell CTS was actually derived from an ES cell FES1.
 - c) It is highly probable that the chimera mice claimed to be developed from STAP cells were actually developed from ES cells FES1.
 - d) It is highly probable that the teratomas claimed to be developed from STAP cells were actually developed from ES cells FES1.
 - e) The STAP cell samples given to GRAS for Chip-seq analysis were actually 129B6F1-ES1 cells.

July 2: Retraction of both papers

- August 5: Yoshiki Sasai (3rd author) commits suicide
- September 3: Vacanti (senior author) and Kojima (collaborator) post new STAP protocol
- December 18, 20: Obokata cannot replicate results, steps down from position

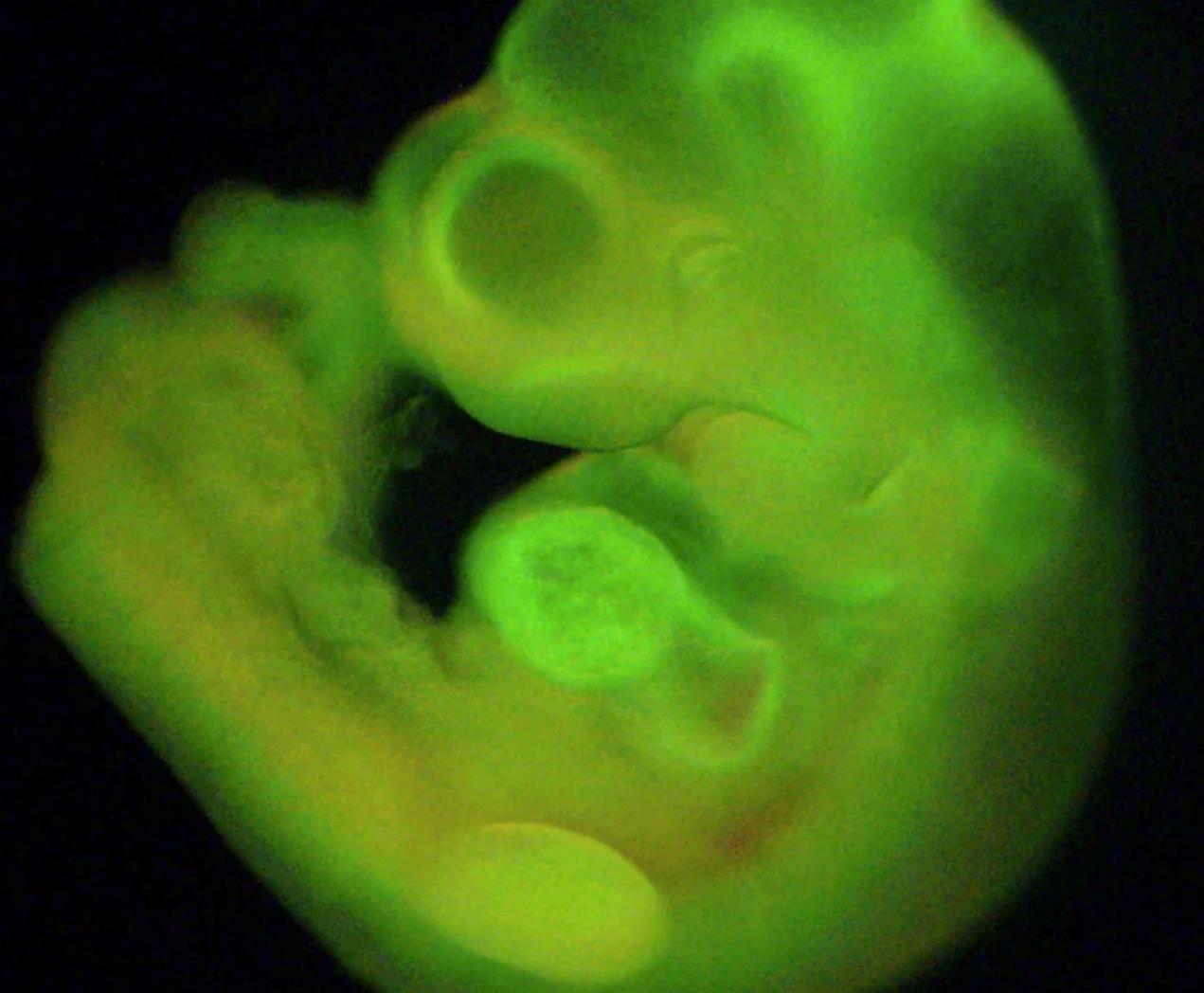
Sept 2015: Nature publishes refutations of STAP

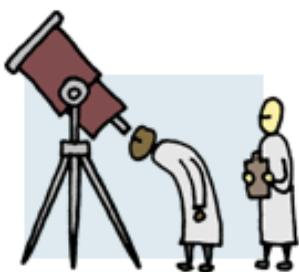


January 28, 2016: Obokata publishes book

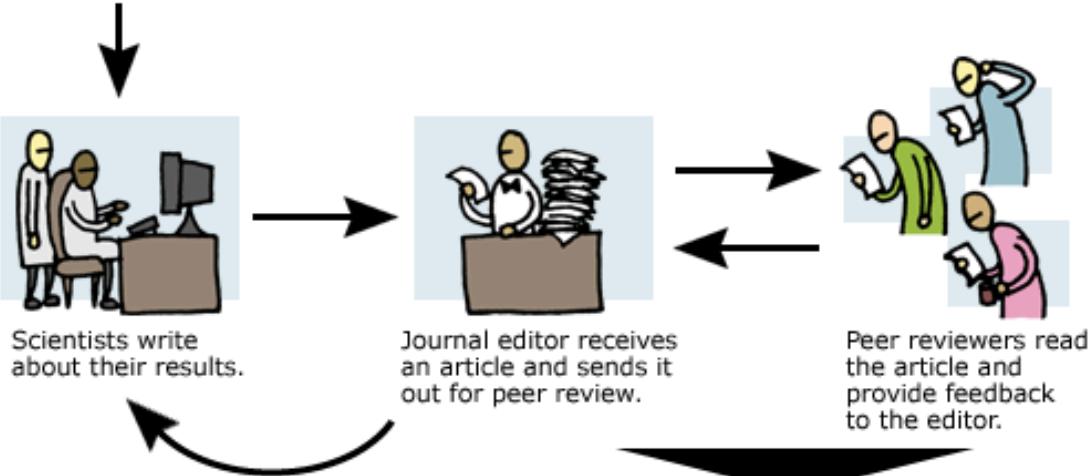
- Claims she was framed by Wakayama







The peer review process



Editor may send reviewer comments to the scientists who may then revise and resubmit the article for further review. If an article does not maintain sufficiently high scientific standards, it may be rejected at this point.



If an article finally meets editorial and peer standards it is published in a journal.

- Highly regarded journals like Science and Nature accept <10% of submissions

Impact Factor

- Average number of times published papers are cited up to two years after publication <http://www.sciencegateway.org/rank/index.html>

Your (real) Impact Factor

$$\text{Impact Factor (corrected)} = \frac{\# \text{ times your work is cited} - \# \text{ citations that actually trash your work} - \# \text{ times you cited yourself (nice try)} - \# \text{ times you were cited just to pad the introduction section} - \# \text{ citations the editor pressured the author to include to increase the journal's impact factor}}{\# \text{ original articles you've written} + \# \text{ articles you were included in out of pity or politics} + \# \text{ not-so-original articles you've \underline{written} copied and pasted}}$$

THE AUTHOR LIST: GIVING CREDIT WHERE CREDIT IS DUE

The first author

Senior grad student on the project. Made the figures.



The third author

First year student who actually did the experiments, performed the analysis and wrote the whole paper. Thinks being third author is "fair".



The second-to-last author

Ambitious assistant professor or post-doc who instigated the paper.



Michaels, C., Lee, E. F., Sap, P. S., Nichols, S. T., Oliveira, L., Smith, B. S.



The second author

Grad student in the lab that has nothing to do with this project, but was included because he/she hung around the group meetings (usually for the food).

The middle authors

Author names nobody really reads. Reserved for undergrads and technical staff.

The last author

The head honcho. Hasn't even read the paper but, hey, he/she got the funding, and their famous name will get the paper accepted.

What percent of scientists have falsified, fabricated, or otherwise modified/altered data to improve outcomes?

What's the prevalence?

- 2% of scientists admit to fabricating, falsifying, or modified/altered results to improve outcomes
- 14% have personal knowledge of a colleague who has fabricated, falsified, or modified/altered results

WHY RESEARCHERS STUMBLED

Instructors on the Professionalism and Integrity Program assessed underlying causes (often more than one) for researchers' lapses.

Proximate cause	Ultimate cause of researcher lapse	% of participants
Lack of attention	Overextended, not detail-oriented or distracted by personal problems.	 72%
Unsure of rules	An increase in regulations since researcher began career, lack of mentoring or cultural differences.	 56%
Did not prioritize compliance	Failed to recognize seriousness of violations, biased thinking or cultural differences.	 56%
Relationship problems, political tensions	Communicated aggressively or worked with difficult personalities.	 36%
Staff lacked adequate training or integrity	Failed to provide adequate training, did not create culture of compliance in lab or had difficulty hiring individuals.	 28%

