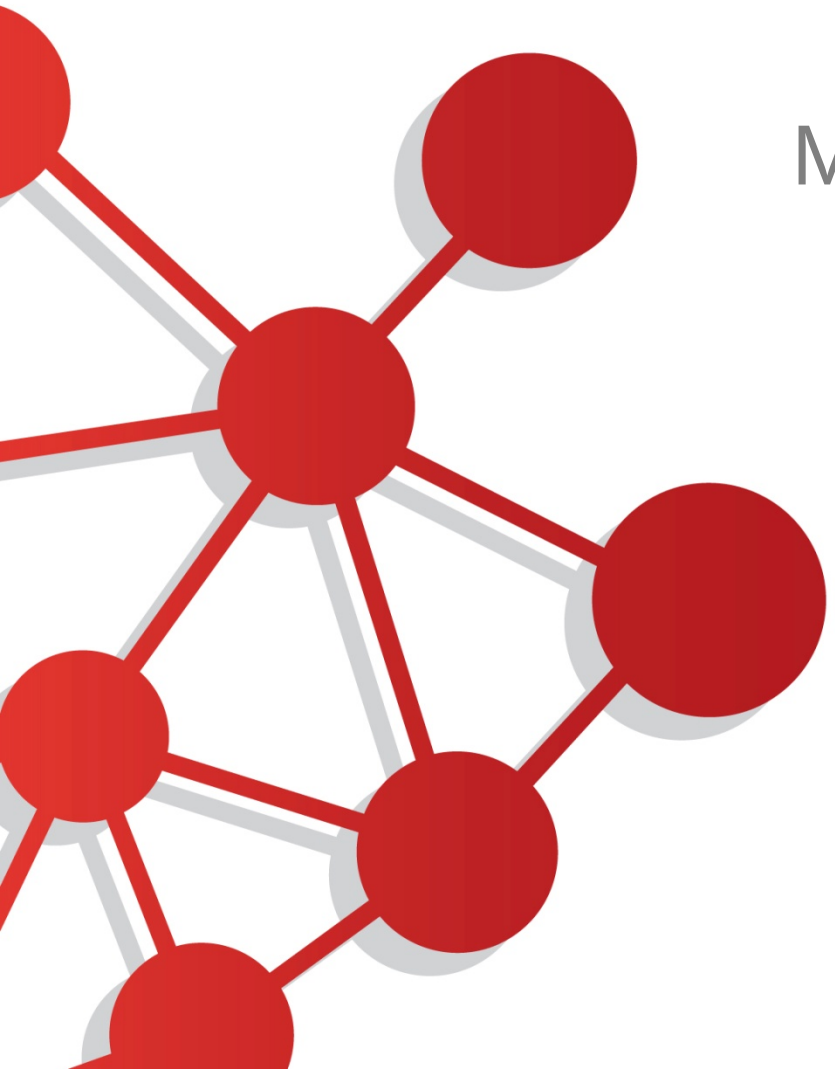
An insider's guide to scientific publishing



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Chief Editor
Nature Neuroscience

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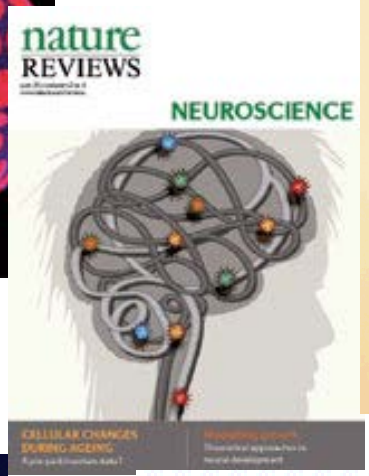
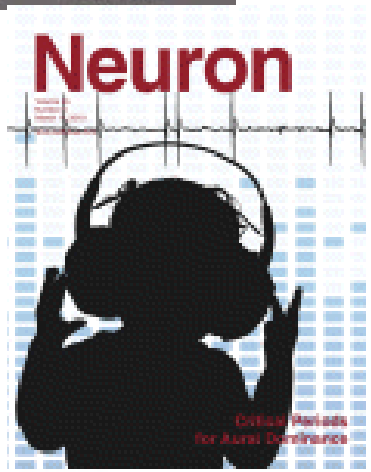
nature publishing group npg

What are we going to talk about today?

- Writing scientific papers
- The editorial process
- Publishing ethics
- What it’s like to be an editor

The world of journals





What makes a great paper?

- Great research
- Great papers tell a story
- Exciting & inspiring

Start with an exciting project

- Why is the topic interesting?
- Does it deal with a big problem or issue in the field?
- Will it change the current thinking in the field?
- Are your techniques cutting-edge?

Creating a great story

- A great story needs great research
- Create a compelling narrative
- For top tier journals you will need to aim for a broad audience

Planning your paper

- What was already known?
- What is the advance provided by your results, what question are you answering?
- How did you answer the question (novel or interesting technique)?
- What do your data show, how do they fit together?
- What's left to be done, what new avenues have opened up?

ABCs of good writing: Accuracy

- Be specific and precise
- Say exactly what you mean and avoid overstatement or understatement

Original

Of the 16.9-fold genome coverage, the majority was from 454 sequencing by synthesis of paired and unpaired reads, with the remaining coverage from Sanger dye primer sequencing of paired reads.

Improved

Of the 16.9-fold genome coverage, 74% was from 454 sequencing by synthesis of paired and unpaired reads. Sanger dye primer sequencing of paired reads was used for the remaining 26% (Supplementary Table 1 and Supplementary Note).

ABCs of good writing: Brevity

- Avoid long, complicated sentences
- Put closely related ideas together

Original

Whereas chimpanzees are widespread across equatorial Africa, bonobos, which have a relatively small and remote habitat, which also meant that they were the last ape species to be described, live only south of the Congo River (Fig. 1a) and are the rarest of all apes in captivity.

Improved

Whereas chimpanzees are widespread across equatorial Africa, bonobos live only south of the Congo River (Fig. 1a). As a result of their relatively small and remote habitat, bonobos were the last ape species to be described and are the rarest of all apes in captivity.

ABCs of good writing: Clarity

- **Active voice:**
  - adds action to the sentence
  - makes sentences shorter

  "We used qPCR to show…"

- **Passive voice:**
  - use when agent is not important
  - sometimes suitable for data and methods section

  "qPCR was used to show…"

General writing tips: sentences

- Be concise, avoid redundancies
- Be precise
- Avoid jargon and acronyms
- Consistent tenses
- Avoid passive voice

General writing tips: paragraphs

- Include a topic sentence in each paragraph
- Stick to one idea per paragraph
- Include transitions between paragraphs/sections
- Use subheadings where allowed

Does poor English matter?

- The content is the most important aspect of the paper– in particular the data and interpretation
- A paper will not be rejected because of poor English grammar or spelling *as long as the main idea is clear and compelling*
- Professional copy editors edit papers to improve the language usage

Scientific Papers: Key parts

- Title
- Abstract
- Introduction
- Results
- Discussion
- Methods
- Figure legends
- References

Title: Draw the reader in

- Focus on the novelty in your work
- Include one key message only
- Be descriptive
- Easily understandable
- Avoid jargon

Titles: some tips

- Avoid overused words and phrases: “On the”, “Study”, “Investigation”, “The Role of..”
- Avoid acronyms unfamiliar to the audience
- Be careful with overly assertive titles (e.g. “[X] causes [Y]”)
- Include keywords
- Be wary of using punctuation in titles, especially question marks

The abstract: your ‘mini paper’

- Set the stage: context and question being addressed
- Tell us what you did: summarize main results
- Explain what the results add to previous knowledge
- Clearly state the implications of your findings

The abstract: an example

Basic introduction to the field, comprehensible to a scientist in any discipline

Detailed background, comprehensible to a scientist in a related discipline

One sentence stating the general problem studied in the paper

One sentence summarizing the main result

Two or three sentences explaining how the main results add to previous knowledge

One or two sentences to put the results into a more general context

(Optional) Two or three sentences to provide a broader perspective, readily comprehensible to a scientist in any discipline

During cell division, mitotic spindles are assembled by microtubule-based motor proteins[1,2]. The bipolar organization of spindles is essential for proper segregation of chromosomes, and requires plus-end-directed homotetrameric motor proteins of the widely conserved kinesin-5 (BimC) family[3]. Hypotheses for bipolar spindle formation include the 'push–pull mitotic muscle' model, in which kinesin-5 and opposing motor proteins act between overlapping microtubules[2,4,5]. However, the precise roles of kinesin-5 during this process are unknown. Here we show that the vertebrate kinesin-5 Eg5 drives the sliding of microtubules depending on their relative orientation. We found in controlled *in vitro* assays that Eg5 has the remarkable capability of simultaneously moving at ~20 nm s^{-1} towards the plus-ends of each of the two microtubules it crosslinks. For anti-parallel microtubules, this results in relative sliding at ~40 nm s^{-1}, comparable to spindle pole separation rates *in vivo*[6]. Furthermore, we found that Eg5 can tether microtubule plus-ends, suggesting an additional microtubule-binding mode for Eg5. Our results demonstrate how members of the kinesin-5 family are likely to function in mitosis, pushing apart interpolar microtubules as well as recruiting microtubules into bundles that are subsequently polarized by relative sliding. We anticipate our assay to be a starting point for more sophisticated *in vitro* models of mitotic spindles. For example, the individual and combined action of multiple mitotic motors could be tested, including minus-end-directed motors opposing Eg5 motility. Furthermore, Eg5 inhibition is a major target of anti-cancer drug development, and a well-defined and quantitative assay for motor function will be relevant for such developments.

The abstract: what to avoid

- Too much detail about the methods (unless it’s a methods paper)
- Obscure abbreviations and acronyms
- References to the figures
- Inclusion of citations is journal-dependent

Tips on keywords

- Should be in both the title and abstract
- Some journals require a list of keywords
- Keywords are medium frequency words in the text (not high frequency words)
- Use words that are not too specific, not too general

The introduction: setting the stage

- Include a hook
- Consider your audience
- Make the question clear
- Move from general to specific
- Be selective, but scholarly, with citations
- Include brief summary of findings and objectives

Results: the heart of the paper

- Order experiments logically, not chronologically
- Avoid interpretation/discussion
- Some background may help flow
- Include enough methods, but not too much
- Diagrams of experimental set-up may be helpful

Discussion: bringing it all together

- Start with summary of results
- Put your results in context
- Include your interpretation
- Discuss discrepancies and identify limitations
- Avoid over-hyping
- Mention future directions
- Don’t bring in new data
- Summarize at the end

Discussion: putting your work in context

- Do your data agree with your predictions and the conclusions of previous studies?
- Were there any surprises?
- What do these contradictions and surprises tell us?
- What does your paper add to the field?

Discussion: common pitfalls

- Referring to a large number of studies for the first time
- Bringing in new data not mentioned in the results
- Simply restating the results
- Not placing the results in the context of existing knowledge

Conclusions

- Be concise yet compelling
- Consider including your own perspective
- Without hype or undue speculation, discuss the impact of your results
- Where could these results lead?
- Does not need to be a separate section

Methods: the how-to manual

- Include enough detail to allow replication
- Don’t rely too much on citations
- Also describe analysis and reagents comprehensively

Figure legends: walk the reader through the data

- Be concise
- Describe what is shown in the figure
- Include enough detail on the methods
- Don’t present conclusions

References

- What to cite:
  - Quotations, opinions, or predictions published by others
  - Direct experimental methods, results, or statistics published by others
  - Graphics published elsewhere
- Be fair, balanced and complete
- Avoid too much self-citation
- Don’t use to curry favor with referees or journal

Supplementary Information

- Experiments that further support your conclusions but are not key to the argument
- Expanded experimental methods
- Extended deductions of mathematical formulae
- Crystallographic and other raw data
- 3D rendering of molecules
- Anything unsuitable for printing (video, audio)

Data deposition

- The volume of raw data can exceed the SI section limit
- We recommend deposition of data such as genome sequences, microarray data or protein structures
- Include the accession number in the manuscript
- The *Nature Methods* blog has links to recommended databases

Paper writing tips: summary

- Maintain a narrative
- Devote each paragraph to one concept or experiment
- Avoid a strictly chronological structure unless this makes sense
- Use the figures as a skeleton
- Utilize supplementary information

Figures

- Present in a logical order
- Key features should be obvious
- One concept each
- Clear and easily understandable
- Clearly labeled error bars where applicable

Figures: universal rules

- Always describe in the figure legends what the error bars represent (S.D, S.E.M)
- State the value of *n* in the figure legend
- Error bars and statistics should be shown only for independently repeated experiments, and never for technical replicates (from the same source)
- If a “representative” experiment is shown, it should not have error bars or P values, because in such an experiment, *n* =1
- If *n* is very small (for example *n* = 3) it is usually best to plot the individual data points

Figure processing

- Minimal processing only
- If unavoidable, processing should conform to community standards and be described
- Authors should retain the original, unprocessed data and metadata

Image processing: universal rules

- No specific feature within an image may be enhanced, obscured, moved, removed, or introduced

- Adjustments of brightness, contrast, or color balance are acceptable if they are applied to the whole image and as long as they do not obscure, eliminate, or misrepresent any information present in the original

- The grouping of images from different parts of the same gel, or from different gels, fields, or exposures must be made explicit

Figures: key points

- Figures should be clear and understandable
- They should appear in a logical order
- They should be minimally processed
- Make sure they are not too cluttered
- Always define your statistical methods
- Be accurate and honest and don’t misrepresent the data

Notes on authorship

- Authorship confers credit and has important academic, social, and financial implications

- Authorship also implies **responsibility and accountability** for published work

Who should be an author?

The ICMJE (International Committee of Medical Journal Editors) recommends these 4 criteria:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
2. Drafting the work or revising it critically for important intellectual content; AND
3. Final approval of the version to be published; AND
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Author contributions

- Some journals publish information about the contributions of each author
- Mandatory at *Nature* since 2009
- Addresses issue of author responsibility
- All important aspects of the study should be covered and related to those who performed them

The role of the corresponding author

- Solely responsible for communicating with the journal and managing communication between co-authors
- Coordinates communication between senior team members on multi-group collaborations
- Ensures that all authors are included in the author list, that its order has been agreed by all authors, and that all authors read the paper before submission
- Is the point of contact for queries from the journal about the published paper
- Is responsible for informing all co-authors of matters arising and ensuring such matters are dealt with promptly

Choosing a journal

1. Audience
2. Scope
3. Publication frequency
4. Quality of papers published
5. Open access/subscription based
6. Technical-assessment-only journals

Other considerations

- Who owns the journal? (e.g. an academic society about which you feel strongly)
- Copy-editing and production services
- Presentation online
- Online search tools and commenting
- Digital meta-information: e.g. linking chemical formulae or crystal structures with databases
- Your likelihood of acceptance!

Nature Publishing Group

- Full time professional editorial staff
- No external editorial board or affiliations
- Highly selective, high impact
- Transfer between journals

Presubmission inquiry

Is my paper a good fit for one of the Nature Journals???

Ask the editors what they think about the paper.

Presubmission inquiry

- Submit an extended abstract and cover letter.
- Spell out exactly what experiments the editor can expect to see.
- Presubs are non-binding; you can still formally submit the paper even if an editor says the paper may not be suitable.

Preparing for submission

- Make sure paper is written for the audience your selected journal
- Make sure to edit
- Ask for comments, especially from those outside your immediate field

Cover letters

- Good place to emphasize importance of your work
  - Give relevant background
  - Briefly describe results
  - Tell us how they advance the field
- Suggest referees (we may or may not use them)
- Exclude referees (we honor these, but please be reasonable)
- Disclose related papers (we may request them)

Cover letters: what not to do

November 26, 2002

Editor
Nature Genetics
345 Park Avenue South, 10th Floor
New York, NY 10010-1707
USA

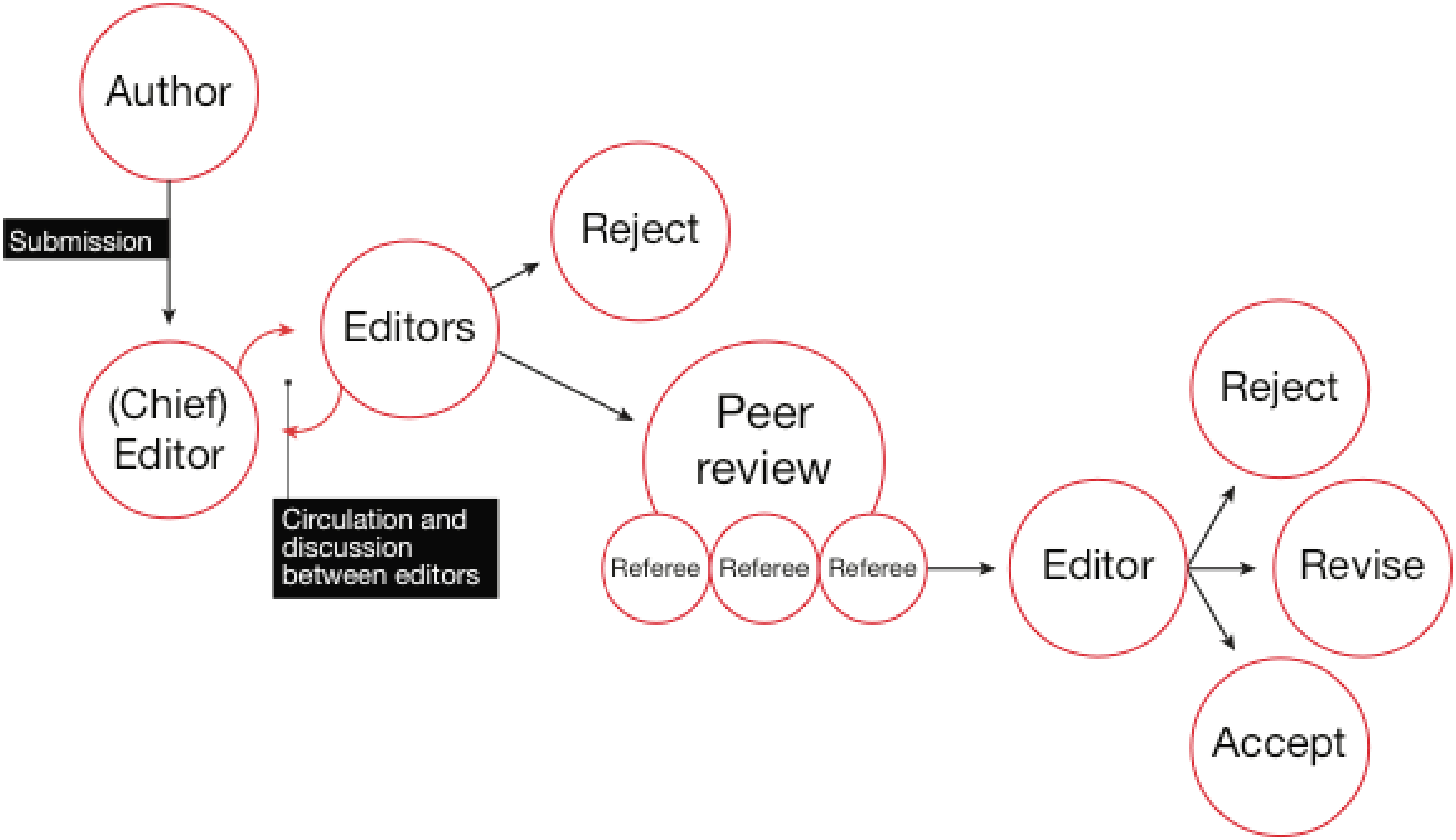
Dear Editor,

It is not clear why a cover letter is required except to fulfill the silly British preoccupation with letterhead and other emblems of status.

Please accept my correspondence.

Sincerely,

The editorial process



What are we looking for?

Mainly:

- Significant step forward for the field
- Broadly interesting for the journal's readership
- Novelty

But also:

- Data provide strong logical support for conclusions
- Mechanistic insight
- Provides new directions for research

And for certain types of papers:

- Important resource value
- Important technical breakthrough

A strong contender for review

- Important novel findings
- Strong, well-controlled data
- Rules out some alternative explanations
- Clear presentation
- Speculation that doesn't 'stretch' the data
- A discussion that puts the paper in perspective

What compromises novelty?

- Research with the same conceptual bottom line…
  - Published elsewhere before your paper was submitted
  - Accepted by the journal before your paper was submitted
  - Published or accepted at the journal while your paper was being revised after rejection

Fundamentals of peer review

- Peer review is the expert quality control mechanism to vet scientific accuracy
- Peer reviewers play a crucial role in the advancement of science
- Peer reviews can help the submission become a better paper
- They are highly valued by journal editors
- Typically ‘blind’ peer review

Why peer review?

- An editor cannot know all the details
- More opinion lessens the danger of bias from the editor/referees
- A first check for technical correctness
- It helps to screen papers for possible relevance

Limitations of peer review

- It is not an exact science
- Never 100% objective
- Can be slow
- Cannot catch fraud
- Can be inconsistent

Why are reviewers anonymous?

- Prevents bland, timid reviews
- Corrects for power imbalance
- Reduces opportunities for favor trading
- Helps scientists stay friends
- Many referees would refuse to review
- Editors, not referees, take the ultimate responsibility for decisions

How do we choose reviewers?

- Technical expertise
- Broad knowledge of field
- Familiar with the journal
- Efficient
- Fair-minded, consistent
- Avoid conflicts of interest
- Avoid exclusions

Editorial decisions

- Decisions can be complicated
- We don’t just count referee votes
- We try to avoid more than two rounds of revision

Referee reports

Even if there are no technical flaws, editors often face contradictory reviewers' recommendations, as reviewers have:

- Diverse technical expertise
- Diverse conceptual backgrounds
- Judged the manuscript on their own terms
- Editors always make their own decisions- referees can be overruled

Reasons for rejection

- Severe technical problems
- Over-interpretation: data don’t support conclusions
- Raises many interesting possibilities, but doesn’t distinguish between them sufficiently to be useful
- Lacking mechanistic insight
- Lacking significant novelty
- Not a large enough step in the field
- Only of interest to specialists in a subfield

Revisions

- Peer review should help you make the paper better
- Address the major issues
- Write a good response to reviewers
  - Structure it well
  - Know when and how to argue
- Remember there is a next time, and there are other journals with different criteria

Appeals

- Post-review rejections based on novelty/importance judgments are hard to overturn
- It makes sense to appeal if there were factual errors or if the paper was rejected for experimental reasons and you can respond with new data

Appeals- what doesn't help?

- "Referees are unfair"
- Guesses at referee identity followed by personal attacks
- Celebrity endorsements
- Cosmetic rewriting of the paper
- Statements about the authors' reputation
- "You published an even worse paper"

Editorial decisions: summary

- Three basic categories of decision: REVISE, REJECT and ACCEPT
- Only resubmit when you have addressed all concerns
- If rejected, determine the reason for the initial rejection and don’t lose heart
- You can appeal a rejection if you think it is unfair

Ethical issues

1. Plagiarism
2. Inappropriate citations
3. Image or data manipulation (fraud)
4. Fabrication and falsification (fraud)

Other examples:

- Authorship issues
- Breaching confidentiality
- Not declaring conflicts of interest

Plagiarism

Definition from World Association of Medical Editors:

Plagiarism is the use of others' published and unpublished ideas or words (or other intellectual property) without attribution or permission, and presenting them as new and original rather than derived from an existing source.

The intent and effect of plagiarism is to mislead the reader as to the contributions of the plagiarizer. This applies whether the ideas or words are taken from abstracts, research grant applications, Institutional Review Board applications, unpublished or published manuscripts in any publication format (print or electronic).

Plagiarism: examples

- Copying text, but providing new data
- Duplicate figures in two separate publications
- Republication of papers already published (in non-English journals)

Remember

- Give credit where credit is due — citations must acknowledge the intellectual contribution of earlier work
- If in doubt, err on the side of too many rather than too few citations

Inappropriate citations

- Omission: overlooking citations
- Citation bias: not citing papers contradicting your claims
- Amplification or misrepresentation: citing a paper wrongfully to support a claim it doesn't
- Cut and paste: copying references from other papers without reading them

Image and data manipulaton

Artificially highlighting elements of interest

What's in a picture? The temptation of image manipulation.
J. Cell Biol. 166, 11 (2004)

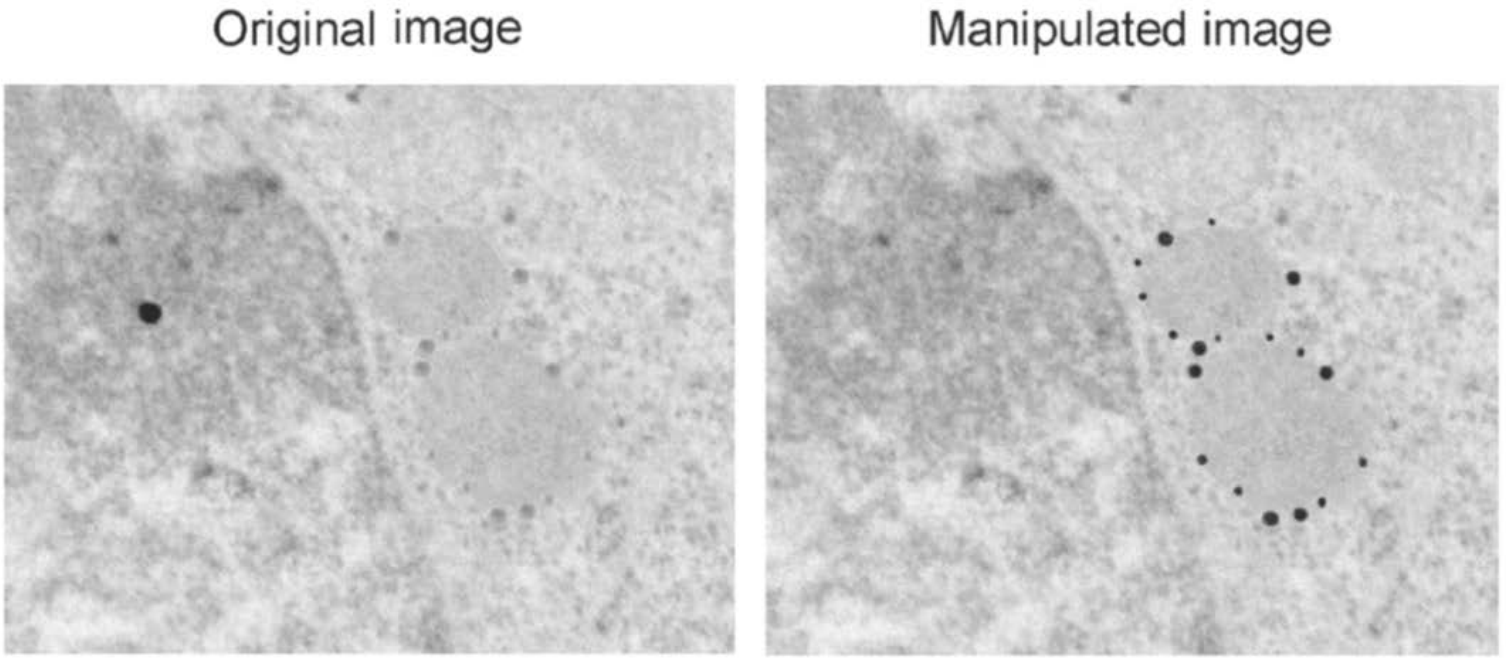
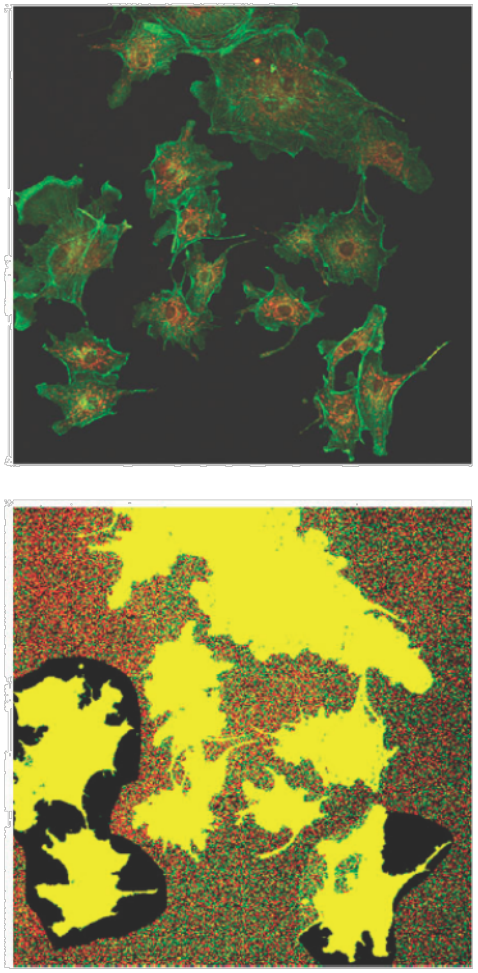


Image and data manipulation

Misrepresenting image data by combining images taken at different time or of different samples



What's in a picture? The temptation of image manipulation.
J. Cell Biol. 166, 11 (2004)

Fabrication and falsification

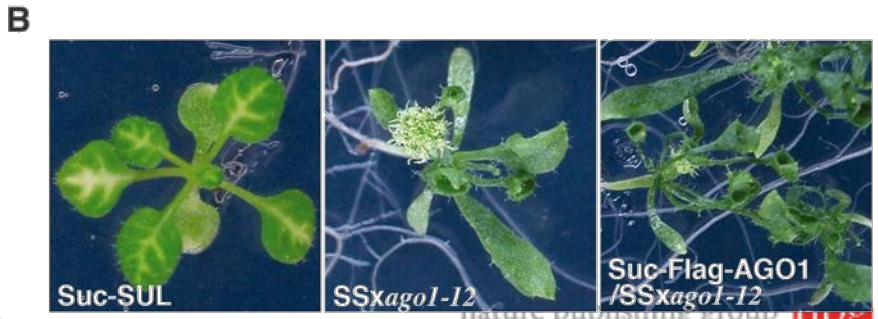
- Same photo, ‘different’ phenotype

Nature Genetics **2007**

Intra- and intercellular RNA interference in Arabidopsis thaliana requires components of the microRNA and heterochromatic silencing pathways

Science May **2010**

Small RNA Duplexes Function as Mobile Silencing Signals Between Plant Cells



Singapore statement

Principles

- Honesty in all aspects of research
- Accountability in the conduct of research
- Professional courtesy and fairness in working with others
- Good stewardship of research on behalf of others

Journal responsibilities

- Journals usually follow up any suspicions
- Journals alert funding institutions and employers
- But journals are neither police nor judges
- Process often stalls if universities do not investigate fully or only slowly
- No clear international regulations exist across disciplines or countries

Retractions

Journal editors should consider **retracting a publication** if:

- There is clear evidence that the findings are unreliable, either as a result of misconduct (e.g. data fabrication) or honest error (e.g. miscalculation or experimental error)
- The findings have previously been published elsewhere without proper cross-referencing, permission or justification (i.e. cases of redundant publication)
- It constitutes plagiarism
- It reports unethical research

Retractions: some statistics

Out of 2047 retracted articles in PubMed:

- 21.3% attributed to error
- 67.4% attributed to misconduct of which the majority were:

Fraud or suspected fraud (43.4%)

Duplicate publication (14.2%)

Plagiarism (9.8%)

Fang F C et al. PNAS 2012;109:17028-17033

Corrections

Journal editors should consider **issuing a correction** if:

- a small portion of an otherwise reliable publication proves to be misleading (especially because of an honest error)
- the author/contributor list is incorrect (i.e. a deserving author has been omitted or somebody who does not meet authorship criteria has been included)

What’s it like to be an editor?

Core job responsibilities

- Read new manuscripts
- Consult with other editors on decisions
- Take manuscripts through external review
- Check accepted manuscripts pre-publication

What else do we do?

- Commission front end content
- Developmental editing
- Write editorials
- Write press releases
- Special projects (supplements, focuses, etc)
- Go to meetings, visit scientists/institutions
- Help organize meetings
- Contribute to social media

Editors are scientists

- Immersion in the latest primary research
- Critical scientific thinking
- Networking with the scientific community
- Exposure to broad number of topics

How we select editors

- Strong research background
- Breadth of scientific interests
- Manuscript test!
- Interest in science communication
- Writing ability (desirable but not essential)
- Good ambassador for journal
- Enthusiastic candidates

Positions at NPG

- **Positions are always advertised (naturejobs.com, sciencejobs.com)**
- **Editorial internship** (6 months in NYC or London office, any area of biology)
- **Manuscript editors**: *Nature* and the Research Journals
- **Specialized editors** for News, Features, News & Views (currently at *Nature, Nature Medicine, Nature Biotechnology*)
- **Review Journal editors**

Other possibilities

- Other journals (Science, Cell Press, PLoS…)
- Copy editing (journals, freelance, books)
- Book editing & acquisitions
- Medical writer
- Science journalism

Questions?

Please feel free to contact me:

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