# GUIDE TO PUBLICATION POLICIES OF THE NATURE JOURNALS

**Last updated on 30 April 2009.**

## Editorial Policies

### NATURE JOURNALS' POLICIES ON PUBLICATION ETHICS

**Nature journals' authorship policy**
**Being an author**
The *Nature* journals do not require all authors of a research paper to sign the letter of submission, nor do they impose an order on the list of authors. Submission to a Nature journal is taken by the journal to mean that all the listed authors have agreed all of the contents. The corresponding (submitting) author is responsible for having ensured that this agreement has been reached, and for managing all communication between the journal and all co-authors, before and after publication. Any changes to the author list after submission, such as a change in the order of the authors, or the deletion or addition of authors, needs to be approved by a signed letter from every author.

**Responsibilities of senior team members on multi-group collaborations** The editors at the Nature journals assume that at least one member of each collaboration, usually the most senior member of each submitting group or team, has accepted responsibility for the contributions to the manuscript from that team. This responsibility includes, but is not limited to: (1) ensuring that original data upon which the submission is based is preserved and retrievable for reanalysis; (2) approving data presentation as representative of the original data; and (3) foreseeing and minimizing obstacles to the sharing of data, materials, algorithms or reagents described in the work.

**Author contributions statements**Authors are required to include a statement of responsibility in the manuscript that specifies the contribution of every author. The level of detail varies; some disciplines produce manuscripts that comprise discrete efforts readily articulated in detail, whereas other fields operate as group efforts at all stages. Examples of published 'author contributions' statements can be seen at this Nautilus post. Nature journals also allow two coauthors to be specified as having contributed equally to the work being described (most often used for co-first authors), but prefer authors to use the 'author contributions' style for reader clarity.

**Corresponding author - prepublication responsibilities**The corresponding (submitting) author is solely responsible for communicating with the journal and with managing communication between coauthors. Before submission, the corresponding author ensures that all authors are included in the author list, its order has been agreed by all authors, and that all authors are aware that the paper was submitted.

After acceptance, the proof is sent to the corresponding author, who circulates it to all coauthors and deals with the journal on their behalf; the journal will not necessarily correct errors after publication if they result from errors that were present on a proof that was not shown to coauthors before publication. The corresponding author is responsible for the accuracy of all content in the proof, in particular that names of coauthors are present and correctly spelled, and that addresses and affiliations are current.

**Corresponding author - responsibilities after publication**The journal regards the corresponding author as the point of contact for queries about the published paper. It is this author's responsibility to inform all coauthors of matters arising and to ensure such matters are dealt with promptly. This author does not have to be the senior author of the paper or the author who actually supplies materials; this author's role is to ensure enquiries are answered promptly on behalf of all the co-authors. The name and e-mail address of this author (on large collaborations there may be two) is published in the paper.

**Correcting the record**Authors of published material have a responsibility to inform the journal promptly if they become aware of any part that requires correcting. Any published correction requires the consent of all coauthors, so time is saved if requests for corrections are accompanied by signed agreement by all authors (in the form of a scanned attachment to an email).

**A confidential process**Nature journal editors treat the submitted manuscript and all communication with authors and referees as confidential. Authors must also treat communication with the journal as confidential: correspondence with the journal, reviewers' reports and other confidential material must not be posted on any website or otherwise publicized without prior permission from the editors, whether or not the submission is eventually published. Our policies about posting preprints and postprints, and about previous communication of the work at conferences or as part of a personal blog or of an academic thesis, are described at the section of this guide about confidentiality policies.

**Referee suggestions**Authors are welcome to suggest suitable independent reviewers when they submit their manuscripts, but these suggestions may not be followed by the journal. Authors may also request the journal to exclude a few (usually not more than two) individuals or laboratories. The journal sympathetically considers such exclusion requests and usually honours them, but the editor's decision on the choice of peer-reviewers is final.

Nature journal editorials on authorship:
*Nature*: Authorship policies (30 April 2009). Clarifying the duties of lead authors, and announcing mandatory 'author contributions' statements. Comments are welcome at Nautilus.

*Nature Cell Biology*: Credit where credit is due (January 2009). Citing the primary literature, and the journal's revised reference limits. Comments are welcome at Nautilus.

*Nature Materials*: Authorship matters (February 2008). Comments are welcome at Nautilus.

*Nature*: Who is accountable? (1 November 2007). Comments on this editorial are welcome at Natuilus blog.

*Nature Neuroscience*: How experts communicate

*Nature Materials*: Authorship without authorization

*Nature Cell Biology*: Contributing transparency

*Nature*: Author contributions

*Nature Medicine*: Ticket scalpers (Comments welcome on the proposal of a '20 paper rule' at Spoonful of Medicine blog)

**Nature journals' policy on duplicate publication**
Material submitted to a Nature journal must be original and not published or submitted for publication elsewhere. This rule applies to material submitted elsewhere while the Nature journal contribution is under consideration.

Authors submitting a contribution to a Nature journal who have related material under consideration or in press elsewhere should upload a clearly marked copy at the time of submission, and draw the editors' attention to it in their cover letter. Authors must disclose any such information while their contributions are under consideration by a Nature journal - for example, if they submit a related manuscript elsewhere that was not written at the time of the original Nature journal submission.

If part of a contribution that an author wishes to submit to a Nature journal has appeared or will appear elsewhere, the author must specify the details in the covering letter accompanying the Nature submission. Consideration by the Nature journal is possible if the main result, conclusion, or implications are not apparent from the other work, or if there are other factors, for example if the other work is published in a language other than English.

The Nature journals are happy to consider submissions containing material that has previously formed part of a PhD or other academic thesis which has been published according to the requirements of the institution awarding the qualification.

The Nature journals allow and encourage prior publication on recognized community preprint servers for review by other scientists in the field before formal submission to a journal. The details of the preprint server concerned and any accession numbers should be included in the cover letter accompanying submission of the manuscript to the Nature journal. This policy does not extend to preprints available to the media or that are otherwise publicised outside the scientific community before or during the submission and consideration process at the Nature journal.

Nature journals allow publication of meeting abstracts before the full contribution is submitted. Such abstracts should be included with the Nature journal submission and referred to in the cover letter accompanying the manuscript. This policy does not extend to meeting abstracts and reports available to the media or which are otherwise publicised outside the scientific community during the submission and consideration process.

The Nature journals are happy to consider submissions containing material that has previously formed, and continues to form, part of an online scientific collaboration such as a wiki or blog, provided that the information has not been publicised outside the scientific community, and is not publicised until the publication date of the work in a Nature journal.

In case of any doubt, authors should seek advice from the editor handling their contribution.

If an author of a submission is re-using a figure or figures published elsewhere, or that is copyrighted, the author must provide documentation that the previous publisher or copyright holder has given permission for the figure to be re-published. The Nature journal editors consider all material in good faith that their journals have full permission to publish every part of the submitted material, including illustrations.

**Editorials in the Nature journals providing details of policies on this topic**:

*Nature Photonics*: Combating plagiarism (May 2009).

*Nature Materials*: The cost of salami slicing

*Nature Medicine*: Truth in numbers

**Plagiarism and fabrication**
**Plagiarism** is when an author attempts to pass off someone else's work as his or her own. Duplicate publication, sometimes called self-plagiarism, occurs when an author reuses substantial parts of his or her own published work without providing the appropriate references. This can range from getting an identical paper published in multiple journals, to 'salami-slicing', where authors add small amounts of new data to a previous paper.

Plagiarism can be said to have clearly occurred when large chunks of text have been cut-and-pasted. Such manuscripts would not be considered for publication in a Nature journal. But minor plagiarism without dishonest intent is relatively frequent, for example, when an author reuses parts of an introduction from an earlier paper. The Nature journal editors judge any case of which they become aware (either by their own knowledge of and reading about the literature, or when alerted by referees) on its own merits.

If a case of plagiarism comes to light after a paper is published in a Nature journal, the journal will conduct a preliminary investigation. If plagiarism is found, the journal will contact the author's institute and funding agencies. A determination of misconduct will lead the Nature journal to run a statement, bidirectionally linked online to and from the original paper, to note the plagiarism and to provide a reference to the plagiarised material. The paper containing the plagiarism will also be obviously marked on each page of the PDF. Depending on the extent of the plagiarism, the paper may also be formally retracted.

Editorial in *Nature Photonics*: Combating plagiarism (May 2009)

Editorial in *Nature Immunology*: Borrowing words, or claiming them? (**10**, 225; 2009). Comments from readers are invited at this Nautilus blog post.

Editorial in *Nature*: Clamp down on copycats

**Fraud and replication**.

See Editorial in *Nature*: Solutions, not scapegoats (**453**, 957; 19 June 2008).

There is a related Commentary by S. Titus *et al*. in the same issue of *Nature* (**453**, 980-982; 2008; subscription or site license required) and free-to-access online discussion of these issues at Nature Network: Repairing Research Integrity.

See Editorial in *Nature*: Share your lab notes

(A related News Feature in *Nature*, for which a subscription or site licence is required, is Electronic notebooks: a new leaf.)

See the *Nature* special report: Taking on the cheats

**Image integrity**. The Nature journals' policy and guidelines on digital images and their manipulation.

**Due credit for others' work**
**Discussion of unpublished work**

Manuscripts are sent out for review on the condition that any unpublished data cited within are properly credited and the appropriate permission has been sought. Where licenced data are cited, authors must include at submission a written assurance that they are complying with originators' data-licencing agreements.

Referees are encouraged to be alert to the use of appropriated unpublished data from databases or from any other source, and to inform the editor of any concern they may have.

This policy, which applies to all Nature journals, is explained in *Nature* in the editorial:

Handling (mis) appropriated data

**Discussion of published work**

When discussing the published work of others, authors must properly describe the contribution of the earlier work. Both intellectual contributions and technical developments must be acknowledged as such and appropriately cited.

**Nature journals' competing financial interests policy**
In the interests of transparency and to help readers to form their own judgements of potential bias, Nature journals require the authors of most articles to declare any competing financial interests in relation to the work described, by sending the author a form to complete and sign before publication of the article. A sample of the form sent to authors by the journal office is available.

In cases where the authors declare a competing financial interest, a short statement to that effect is published as part of the printed article, with a more detailed version available online. If no such statement is present in the article, the authors have declared to the editors of the journal that they do not have any competing financial interests

**Definition**
For the purposes of this statement, competing interests are defined as those of a financial nature that, through their potential influence on behaviour or content or from perception of such potential influences, could undermine the objectivity, integrity or perceived value of a publication.

They can include any of the following:

**Funding:** Research support (including salaries, equipment, supplies, reimbursement for attending symposia, and other expenses) by organizations that may gain or lose financially through this publication.

**Employment:** Recent (while engaged in the research project), present or anticipated employment by any organization that may gain or lose financially through this publication.

**Personal financial interests:** Stocks or shares in companies that may gain or lose financially through publication; consultation fees or other forms of remuneration from organizations that may gain or lose financially; patents or patent applications whose value may be affected by publication.

It is difficult to specify a threshold at which a financial interest becomes significant, but note that many US universities require faculty members to disclose interests exceeding $10,000 or 5% equity in a company (see, for example, B. Lo *et al*. *New Engl. J. Med.* **343**, 1616-1620; 2000). Any such figure is necessarily arbitrary, so we offer as one possible practical alternative guideline: 'Any undeclared competing financial interests that could embarrass you were they to become publicly known after your work was published.'

We do not consider diversified mutual funds or investment trusts to constitute a competing financial interest.

**Application to authors**
Unless/until the article is published, authors' declarations will be considered confidential, and will not be disclosed to peer-reviewers.

The published article indicates the authors' response using the following standard wording:

- The authors declare competing financial interests: details accompany the full-text HTML version of the paper at (url of journal website).

The online declaration should include an itemized list of the competing financial interests.

For publications with more than one author, the corresponding author (the person responsible for communication with the journal) should provide a declaration on behalf of all authors.

We recognize that some authors may be bound by confidentiality agreements. In such cases the editors will investigate further and may at their discretion invite the authors to state in the online version, in place of itemized disclosure:'The authors declare that they are bound by confidentiality agreements that prevent them from disclosing their financial interests in this work.'

We do not require authors to state the monetary value of their financial interests.

**Application to referees**
The Nature journals invite peer-reviewers to exclude themselves in cases where there is a significant conflict of interest, financial or otherwise. However, just as financial interests need not invalidate the conclusions of an article, nor do they automatically disqualify an individual from evaluating it. We ask peer-reviewers to inform the editors of any related interests, including financial interests as defined above, that might be perceived as relevant. Editors will consider these statements when weighing reviewers' recommendations.

**Application to editors**
All Nature journal editorial staff are required to declare to their employer (Nature Publishing Group) any interests - financial or otherwise - that might influence, or be perceived to influence, their editorial practices. Failure to do so is a disciplinary offence.

**Application to publishing policy**
The Nature journals thrive on their independence. Their strict policy is that editorial independence, decisions and content should not be compromised by commercial or financial interests, or by any specific arrangements with advertising clients or sponsors. Our policy is to disclose such arrangements where there is any risk of a perception of compromise. A list of all sponsors associated with Nature Publishing Group is available.

**Reasons for policy**
Before the adoption of the policy described above, the policy of the Nature journals was that no declarations of competing interests were required from authors, and that potential referees should disqualify themselves from refereeing if they felt they had such a conflict. The current policy, introduced in 2001, is not based on any assumption that commercial interests of researchers are likely to lead to a lack of research integrity. Rather, it is based on a recognition of potential problems for three principal reasons.

First, there is suggestive evidence in the literature that publication practices in biomedical research have been influenced by the commercial interests of authors. Examples for original research and secondary literature (for example, review articles) are given here. This evidence is consistent with the truism that, although, in principle, science may be objective and its findings independent of other interests, scientists can be imperfect and subjective. There are circumstances where selection of evidence, interpretation of results or emphasis of presentation might be inadvertently or even deliberately biased by a researcher's other interests.

Second, there is a more general concern among researchers and others about the possible undermining of the integrity of scientific research by increasing commercial links and consequent influences. We believe that the best way to maintain readers' trust in the integrity of the research and other material we publish is through a policy of transparency. If financial interests are disclosed, readers will be able to make an informed judgment about their significance or lack of significance. We believe this will be to the benefit of readers and authors alike.

Third, many institutions have introduced policies on competing interests that require authors to include descriptions of financial and other interests in publications. We are happy to support them.

We do not expect to police this policy ourselves: we believe that primary responsibility for ensuring that researchers' conduct is appropriate lies with their employers, rather than with journal editors. However, where we believe trust in the published work has been significantly compromised by an author's actions, we will seek to redress the matter by an appropriate combination of sanctions and communication to readers and employers, which may include imposed corrections. Such corrections are linked to the original publication so that those accessing the work online see the correction.

We welcome comments and suggestions about this policy.

Dr Philip Campbell Editor, *Nature* Editor-in-Chief, Nature publications

**Nature journals' editorials providing further details about this policy**:

*Nature*: Declaration of financial interests

*Nature Neuroscience*: A new policy on financial disclosure

*Nature Immunology*: Competing financial interests

*Nature Neuroscience*: Financial disclosure for review authors

*Nature Cell Biology*: Nothing to declare

*Nature Medicine*: Dealing with disclosure

*Nature Methods*: Nothing to declare?

*Nature Chemical Biology*: Keeping it real

*Nature Medicine*: The doors of perception (February 2008), on the distinction between actual and perceived competing interests. Comments from readers are welcome at Nautilus.

**Confidentiality**
Nature journals keep confidential all details about a submitted manscript and do not comment to any outside organization about manucripts under consideration by the journals while they are under consideration or if they are rejected. The journal editors may comment publicly on published material, but their comments are restricted to the content itself and their evaluation of it.

After a manuscript is submitted, correspondence with the Nature journal, referees' reports and other confidential material, whether or not the submission is eventually published, must not be posted on any website or otherwise publicised without prior permission from the editors. The editors themselves are not allowed to discuss manuscripts with third parties or to reveal information about correspondence and other interactions with authors and referees.

Referees of mansucripts submitted to Nature journals undertake in advance to maintain confidentiality of manuscripts and any associated supplementary data.

**Pre-publicity**
Nature journal authors must not discuss contributions with the media (including other scientific journals) until the publication date; advertising the contents of any contribution to the media may lead to rejection. The only exception is in the week before publication, during which contributions may be discussed with the media if authors and their representatives (institutions, funders) clearly indicate to journalists that their contents must not be publicized until the journal's press embargo has elapsed. Authors will be informed of embargo dates and timings after acceptance for publication of their articles.

Presentation and discussion of material submitted to a Nature journal at scientific meetings is encouraged, but authors must indicate that their work is subject to press embargo and decline to discuss it with members of the media. Authors are free to publish abstracts in conference proceedings and to distribute preprints of submitted or 'in press' papers to professional colleagues, but not to the media.

Occasionally, journalists and editors hear about work at talks given at scientific meetings and mention this work in meeting reports or editorials in their journals. In these cases, a Nature journal will assess the extent to which authors have solicited this interest or cooperated with journalists. If, in the judgement of the editors, the journal's embargo policy has been broken, the submitted paper may be rejected, even if it is technically 'in press'.

Contributions being prepared for or submitted to a Nature journal can be posted on recognized preprint servers (such as ArXiv or Nature Precedings), and on collaborative websites such as wikis or the author's blog. The website and URL must be identified to the editor in the cover letter accompanying submission of the paper, and the content of the paper must not be advertised to the media by virtue of being on the website or preprint server. Material in a contribution submitted to a Nature journal may also have been published as part of a PhD or other academic thesis.

**Taxonomic descriptions**. Authors of papers that contain taxonomy (that is, the formal nomenclature and description of a newly discovered species) should be aware that it is possible for third parties to exploit the prior publication of nomenclature at any time between online posting of a preprint and the print publication date in a journal, by publishing the name in print and asserting priority according to the rules of the Code of Zoological Nomenclature. Nature Publishing Group takes no responsibility for such assertions of priority in the case of manuscripts it publishes if the content of those manuscripts have previously appeared in the public domain as online preprints or other form of online posting.

**Our policy** on the posting of particular versions of the manuscript is as follows:1. You are welcome to post pre-submission versions or the original submitted version of the manuscript on a personal blog, a collaborative wiki or a preprint server at any time (but not subsequent pre-accept versions that evolve due to the editorial process).2. The accepted version of the manuscript, following the review process, may only be posted 6 months after the paper is published in a Nature journal. A publication reference and URL to the published version on the journal website must be provided on the first page of the postprint.3. The published version - copyedited and in Nature journal format - may not be posted on any website or preprint server.

Posting of articles on authors', institutions' and funders' websites after publication is explained in NPG's license to publish policy.

**Editorials providing information about pre-publicity policy**:

*Nature*: Preprints and *Nature*

*Nature: Nature* respects preprint servers

**BIOETHICS**

**Human and other animal experiments**
For primary research manuscripts in the Nature journals (Articles, Letters, Brief Communications, Technical Reports) reporting experiments on live vertebrates and/or higher invertebrates, the corresponding author must confirm that all experiments were performed in accordance with relevant guidelines and regulations. The manuscript must include in the Supplementary Information

(methods) section (or, if brief, within of the print/online article at an appropriate place), a statement identifying the institutional and/or licensing committee approving the experiments, including any relevant details.

For experiments involving human subjects, authors must identify the committee approving the experiments, and include with their submission a statement confirming that informed consent was obtained from all subjects.

Nature journal editorials providing more details about these policies:

*Nature Methods*: Of guinea pigs and men

*Nature Genetics*: Animal research and the search for understanding

*Nature*: Standards for papers on cloning

*Nature*: An open debate

**Nature journals' policy on biosecurity**
Nature journal editors may seek advice about submitted papers not only from technical reviewers but also on any aspect of a paper that raises concerns. These may include, for example, ethical issues or issues of data or materials access. Very occasionally, concerns may also relate to the implications to society of publishing a paper, including threats to security. In such circumstances, advice will usually be sought simultaneously with the technical peer-review process. As in all publishing decisions, the ultimate decision whether to publish is the responsibility of the editor of the Nature journal concerned.

The threat posed by bioweapons raises the unusual need to assess the balance of risk and benefit in publication. Editors are not necessarily well qualified to make such judgements unassisted, and so we reserve the right to take expert advice in cases where we believe that concerns may arise. We recognize the widespread view that openness in science helps to alert society to potential threats and to defend against them, and we anticipate that only very rarely (if at all) will the risks be perceived as outweighing the benefits of publishing a paper that has otherwise been deemed appropriate for a Nature journal. Nevertheless, we think it appropriate to consider such risks and to have a formal policy for dealing with them if need arises.

The editorial staff of Nature journals maintains a network of advisers on biosecurity issues. All concerns on that score, including the commissioning of external advice, will be shared within an editorial monitoring group consisting of the Editor-in-Chief of Nature publications, the Executive Editor of the Nature research journals, the Chief Biological Sciences Editor of Nature, and the chief editor of the journal concerned.

Once a decision has been reached, authors will be informed if biosecurity advice has informed that decision. Please see the joint statement by journal editors.

**Nature journal editorials providing more details on biosecurity policies and publishing issues**:

*Nature Medicine*: Freedom of information

*Nature*: Statement on the consideration of biodefence and biosecurity

*Nature Immunology*: Dealing with potential dangers

*Nature Methods*: The challenge of responsible methods

*Nature Immunology*: Biosecurity with 'bio-sense'

*Nature*: Rules of engagement

*Nature*: Risks and benefits of dual-use research

*Nature:* Network of concern

*Nature*: Towards better biosecurity

**AVAILABILITY OF DATA & MATERIALS**

**Availability of data and materials**
An inherent principle of publication is that others should be able to replicate and build upon the authors' published claims. Therefore, a condition of publication in a Nature journal is that **authors are required to make materials, data and associated protocols promptly available to readers without preconditions**. Any restrictions on the availability of materials or information must be

disclosed to the editors at the time of submission. Any restrictions must **also** be disclosed in the submitted manuscript, including details of how readers can obtain materials and information. If materials are to be distributed by a for-profit company, this should be stated in the paper.

**Supporting data** must be made available to editors and peer-reviewers at the time of submission for the purposes of evaluating the manuscript. **Peer-reviewers** may be asked to comment on the terms of access to materials, methods and/or data sets; Nature journals reserve the right to **refuse publication** in cases where authors do not provide adequate assurances that they can comply with the journal's requirements for sharing materials.

**After publication**, readers who encounter refusal by the authors to comply with these policies should contact the chief editor of the journal (or the chief biology/chief physical sciences editors in the case of *Nature*). In cases where editors are unable to resolve a complaint, the journal may refer the matter to the authors' funding institution and/or publish a formal statement of correction, attached online to the publication, stating that readers have been unable to obtain necessary materials to replicate the findings.

**Details** about how to share some specific materials, data and methods can be found in the sections below. The preferred way to share large data sets is via public repositories. Some of these repositories offer authors the option to host data associated with a manuscript confidentially, and provide anonymous access to peer-reviewers before public release. These repositories coordinate public release of the data with the journal's publication date (advance online publication (AOP) or, if the manuscript is not published AOP, print/online publication). This option should be used when possible, but it is the **authors' responsibility** to communicate with the repository to ensure that public release is made promptly on the journal's AOP (or print/online) publication date. Any supporting data sets for which there is no public repository must be made available as Supplementary Information files that will be freely accessible on nature.com upon publication. In cases where it is technically impossible for such files to be provided to the journal, the authors must make the data available to editors and peer-reviewers at submission, and directly upon request to any reader on and after the publication date, the author providing a URL or other unique identifier in the manuscript.

**Nature journal editorials providing more detail for these policies**:

*Nature Cell Biology*: Policy update (sharing materials) March 2005.

*Nature Chemical Biology*: Molecular cross-fertilization February 2006.

*Nature Cell Biology*: Sharing science May 2006.

*Nature*: Illuminating the black box 16 July 2006.

*Nature Cell Biology*: Nothing to hide (data not shown) June 2006.

*Nature Genetics*: Access to materials October 2004.

*Nature*: Methods in full (15 February 2007, comments on this methods format are welcome at Nautilus, the author blog).

*Nature Methods*: Social software (March 2007, comments on this *Nature Methods* policy are welcome at Methagora, the *Nature Methods* blog).

*Nature Chemical Biology*: A new look for chemical information (June 2007, comments are welcome at Nautilus, the author blog).

*Nature Neuroscience*: Got data? (August 2007, comments welcome at this Nautilus post).

*Nature Genetics*: Compete, collaborate, compel (August 2007, comments welcome at this Nautilus post).

*Nature Methods*: Methods section remake (May 2009, comments welcome at Methagora, the *Nature Methods* blog).

**Sharing biological materials**
A condition of publication in a Nature journal is that authors are required to make materials, data and associated protocols promptly available to others without preconditions.

For materials such as mutant strains and cell lines, the Nature journals require authors to use established public repositories whenever possible (for example, Jackson Laboratory, Mutant Mouse Regional Resource Centers, American Type Culture Collection (Americas), American Type Culture Collection (Asia/Europe), UK Stem Cell Bank), and provide accession numbers in the manuscript.

**Flow cytometry**Every manuscript that contains flow cytometry experiments should identify in the Methods section all antibody reagents by clone identifier, vendor and fluorochrome. Authors should identify the instrument and software used to collect and analyse experimental data. Axes labels for plots or graphs depicting flow cytometry data should state the marker (for example, CD4) and the axes scales (log or linear) should be clearly visible. Authors should provide numerical analysis for the number of cells analysed and the absolute numbers or percentages (with statistics stated in either the text, legend or in a supplementary table) of the relevant cell population(s) within post-sort fractions. Hints for good general practice in the description of flow cytometry experiments can be found in this *Nature Immunology* article and at the MIFlowCyt Standards section of SourceForge.

For papers describing a new cell population or for which a given sorted cell population is critical to the main message imparted by the new work, authors should describe in a supplementary figure or two the full gating strategy used for the experiments described in the manuscript. A figure depicting the 'gates' used to identify sorted subsets is useful and should be provided to the referees on request. These data would include preliminary forward and side scatter gates of the starting cell population, indicating where boundaries between 'positive' and 'negative' staining cell populations are defined. For preliminary sorts that use 'cocktails' of antibodies to exclude certain cell populations, for example, lineage-minus (Lin-), the antibodies and fluorochromes that are contained in the 'cocktail' need to be specified for the 'dump' channel.

**Sharing data sets**
A condition of publication in a Nature journal is that authors are required to make materials, data and associated protocols promptly available to others without preconditions.

Data sets must be made freely available to readers from the date of publication, and must be provided to editors and peer-reviewers at submission, for the purposes of evaluating the manuscript.

For the following types of data set, submission to a community-endorsed, public repository is mandatory. Accession numbers must be provided in the paper. Examples of appropriate public repositories are listed below.

**DNA and protein sequences**
Protein sequences: Uniprot

DNA and RNA sequences: Genbank/EMBL/DDBJ,
Protein DataBank, UniProt.

DNA sequencing data (traces for capillary electrophoresis and short reads for next-generation sequencing): NCBI trace and short-read archive, EBI Ensembl trace sever

This policy includes even short stretches of novel sequence information such as **epitopes, functional domains, genetic markers, or haplotypes**. Short novel sequences must include surrounding sequence information to provide context.

The sequences of all **RNAi, antisense and morpholino probes** must be included in the paper or deposited in a public database, with the accession number quoted. When an unpublished library is included in the paper, at minimum the sequences of the probes central to the conclusions of the paper must be presented.

**Macromolecular structures**
Authors of papers describing structures of biological macromolecules must provide atomic coordinates and related experimental data (structure factor amplitudes/intensities for crystal structures, or restraints for NMR structures) upon request of editors for the purposes of evaluating the manuscript, if they are not already freely accessible in a publicly available and recognized database (for example, Protein DataBank, Uniprot, Nucleic Acids Database or Biological Magnetic Resonance Databank).

Where there is no public repository and if the data sets are too large to submit to the journal online, authors should either consult the journal editorial office for advice or provide five separate copies of these data to the editors in an appropriate format (for example, CD or DVD) for the purposes of peer-review.

Accessibility must be designated 'for immediate release on publication'. For papers published in *Nature*, a weekly publication with a twice-weekly AOP publication schedule, the author must authorize Protein DataBank (PDB) release on the Wednesday of (or before) online or print publication. (The journal office informs authors of the publication date as soon as articles are scheduled, and also informs the PDB directly.) For papers published in the monthly Nature journals, the 'for immediate release on publication' designation is adequate.

**Microarray data**
MIAME-compliant microarray data: deposit in GEO or ArrayExpress upon submission to the journal.

Data must be MIAME-compliant, as described at the MGED web site specifying microarray standards.

**Crystallographic data for small molecules**
Manuscripts reporting new three-dimensional structures of small molecules from crystallographic analysis should include a .cif file and a structural figure with probability ellipsoids for publication as Supplementary Information. These files must have been checked using the IUCR's CheckCIF routine, and a PDF copy of the output must be included at submission, together with a justification for any alerts reported. Crystallographic data for small molecules should be submitted to the Cambridge Structural Database and the deposition number referenced appropriately in the manuscript. Full access must be provided on publication.

**Other datasets**
In addition to the above-mentioned mandatory requirements for data submission to community-endorsed public databases, Nature journals strongly recommend deposition of other types of data sets into appropriate public repositories that are at an earlier stage of development. Examples of such repositories that facilitate sharing large data sets and offer the option of anonymous referee access to

data before publication include:

For proteomics data: PRIDE

For protein interaction data: IMEx consortium of databases including DIP, IntAct and MINT

For chemical compound screening and assay data: PubChem

Other databases recommended by Nature journals include IntAct, PeptideAtlas, Tranche, and the Global Proteome Machine Organization.

**Nature journal editorials providing more detail for these policies**:

*Nature*: New policy for structural data (9 July 1998)

*Nature*: Rules of genome access (23 March 1990)

*Nature*: Microarray standards at last (26 September 2002)

*Nature Cell Biology*: Microarray data standards (November 2002, the third editorial on this web page)

*Nature Immunology*: Microarray policy (February 2003)

*Nature Genetics*: How to discuss ancestry and ethnicity (June 2004)

*Nature Genetics*: Criteria for association (November 2005)

*Nature Medicine*: Structural Integrity (February 2005)

*Nature*: Crystal Clear (30 June 2005)

*Nature Cell Biology*: Whither RNAi? (June 2003)

*Nature Biotechnology*: Democratizing proteomics data (Feedback and comments on this March 2007 Nature Biotechnology policy are welcome at Nautilus, the author blog.) Also Time for leadership, providing an update (August 2007) to the proposals in the previous editorial (comments from authors and other scientists in the field are welcome at this Nautilus post).

*Nature Structural & Molecular Biology*: Name that gene! (August 2007, Comments welcome on Nautilus.)

*Nature*: Shared genomes, describing the Nature journals' Creative Commons licence for genome sequences (6 December 2007.) Comments welcome on Nautilus.

*Nature Methods*: Thou shalt share your data (March 2008). Please visit Methagora, the *Nature Methods* blog, to comment on this Editorial and its recommendations.

**PEER REVIEW POLICY**

**General information**
The following types of contribution to Nature journals are peer-reviewed: Articles, Letters, Brief Communications, Communications Arising, Technical Reports, Analysis, Reviews, Perspectives, Progress articles and Insight articles. All forms of published correction may also be peer-reviewed at the discretion of the editors.

Other contributed articles are not usually peer-reviewed. Nevertheless, articles published in these sections, particularly if they present technical information, may be peer-reviewed at the discretion of the editors.

For any general questions and comments about the peer-review process, the journal or its editorial policies that are not addressed here, we encourage reviewers to contact us using the feedback links in the box at the top right of each page in the authors & referees' website.

Questions about a specific manuscript should be directed to the editor who is handling the manuscript.

The peer-review policies of the Nature Reviews journals can be found on their websites.

**Online manuscript review**

We ask peer-reviewers to submit their reports via our secure online system by following the link provided in the editor's email. There is an online help guide to assist in using this system, and a helpdesk email account for any technical problems.

**Criteria for publication**

Nature journals receive many more submissions than they can publish. Therefore, we ask peer-reviewers to keep in mind that every paper that is accepted means that another good paper must be rejected. To be published in a Nature journal, a paper should meet four general criteria:

- Provides strong evidence for its conclusions.
- Novel (we do not consider meeting report abstracts and preprints on community servers to compromise novelty).
- Of extreme importance to scientists in the specific field.
- Ideally, interesting to researchers in other related disciplines.

In general, to be acceptable, a paper should represent an advance in understanding likely to influence thinking in the field. There should be a discernible reason why the work deserves the visibility of publication in a Nature journal rather than the best of the specialist journals.

**The review process**

All submitted manuscripts are read by the editorial staff. To save time for authors and peer-reviewers, only those papers that seem most likely to meet our editorial criteria are sent for formal review. Those papers judged by the editors to be of insufficient general interest or otherwise inappropriate are rejected promptly without external review (although these decisions may be based on informal advice from specialists in the field).

Manuscripts judged to be of potential interest to our readership are sent for formal review, typically to two or three reviewers, but sometimes more if special advice is needed (for example on statistics or a particular technique). The editors then make a decision based on the reviewers' advice, from among several possibilities:

- **Accept**, with or without editorial revisions
- Invite the authors to **revise their manuscript** to address specific concerns before a final decision is reached
- Reject, but indicate to the authors that **further work might justify a resubmission**
- **Reject outright**, typically on grounds of specialist interest, lack of novelty, insufficient conceptual advance or major technical and/or interpretational problems

Reviewers are welcome to recommend a particular course of action, but they should bear in mind that the other reviewers of a particular paper may have different technical expertise and/or views, and the editors may have to make a decision based on conflicting advice. The most useful reports, therefore, provide the editors with the information on which a decision should be based. Setting out the arguments for and against publication is often more helpful to the editors than a direct recommendation one way or the other.

Editorial decisions are not a matter of counting votes or numerical rank assessments, and we do not always follow the majority recommendation. We try to evaluate the strength of the arguments raised by each reviewer and by the authors, and we may also consider other information not available to either party. Our primary responsibilities are to our readers and to the scientific community at large, and in deciding how best to serve them, we must weigh the claims of each paper against the many others also under consideration.

We may return to reviewers for further advice, particularly in cases where they disagree with each other, or where the authors believe they have been misunderstood on points of fact. We therefore ask that reviewers should be willing to provide follow-up advice as requested. We are very aware, however, that reviewers are usually reluctant to be drawn into prolonged disputes, so we try to keep consultation to the minimum we judge necessary to provide a fair hearing for the authors.

When reviewers agree to assess a paper, we consider this a commitment to review subsequent revisions. However, editors will not send a resubmitted paper back to the reviewers if it seems that the authors have not made a serious attempt to address the criticisms.

We take reviewers' criticisms seriously; in particular, we are very reluctant to disregard technical criticisms. In cases where one reviewer alone opposes publication, we may consult the other reviewers as to whether s/he is applying an unduly critical standard. We occasionally bring in additional reviewers to resolve disputes, but we prefer to avoid doing so unless there is a specific issue, for example a specialist technical point, on which we feel a need for further advice.

**Selecting peer-reviewers**

Reviewer selection is critical to the publication process, and we base our choice on many factors, including expertise, reputation, specific recommendations and our own previous experience of a reviewer's characteristics. For instance, we avoid using people who are slow, careless, or do not provide reasoning for their views, whether harsh or lenient.

We check with potential reviewers before sending them manuscripts to review. Reviewers should bear in mind that these messages contain confidential information, which should be treated as such.

**Access to the literature**

If a reviewer does not have access to any published paper that is necessary for evaluation of a submitted manuscript, the journal will supply the reviewer with a copy. Under these circumstances, the reviewer should send the publication reference of the paper required to the editor who sent them the paper to review. The editor will obtain the paper, paying any necessary fees, and send it to the reviewer.

**Writing the review**

The primary purpose of the review is to provide the editors with the information needed to reach a decision. The review should also instruct the authors on how they can strengthen their paper to the point where it may be acceptable. As far as possible, a negative review should explain to the authors the weaknesses of their manuscript, so that rejected authors can understand the basis for the decision and see in broad terms what needs to be done to improve the manuscript for publication elsewhere. This is secondary to the other functions, however, and referees should not feel obliged to provide detailed, constructive advice to authors of papers that do not meet the criteria for the journal (as outlined in the letter from the editor when asking for the review). If the reviewer believes that a manuscript would not be suitable for publication, his/her report to the author should be as brief as is consistent with enabling the author to understand the reason for the decision.

Confidential comments to the editor are welcome, but it is helpful if the main points are stated in the comments for transmission to the authors. The ideal review should answer the following questions:

- Who will be interested in reading the paper, and why?
- What are the main claims of the paper and how significant are they?
- Is the paper likely to be one of the five most significant papers published in the discipline this year?
- How does the paper stand out from others in its field?
- Are the claims novel? If not, which published papers compromise novelty?
- Are the claims convincing? If not, what further evidence is needed?
- Are there other experiments or work that would strengthen the paper further?
- How much would further work improve it, and how difficult would this be? Would it take a long time?
- Are the claims appropriately discussed in the context of previous literature?
- If the manuscript is unacceptable, is the study sufficiently promising to encourage the authors to resubmit?
- If the manuscript is unacceptable but promising, what specific work is needed to make it acceptable?

**Other questions to consider**

We appreciate that reviewers are busy, and we are very grateful if they can answer the questions in the section above. However, if time is available, it is extremely helpful to the editors if reviewers can advise on some of the following points:

- Is the manuscript clearly written?
- If not, how could it be made more clear or accessible to nonspecialists?
- Would readers outside the discipline benefit from a schematic of the main result to accompany publication?
- Could the manuscript be shortened? (Because of pressure on space in our printed pages we aim to publish manuscripts as short as is consistent with a persuasive message.)
- Should the authors be asked to provide supplementary methods or data to accompany the paper online? (Such data might include source code for modelling studies, detailed experimental protocols or mathematical derivations.)
- Have the authors done themselves justice without overselling their claims?
- Have they been fair in their treatment of previous literature?
- Have they provided sufficient methodological detail that the experiments could be reproduced?
- Is the statistical analysis of the data sound, and does it conform to the journal's guidelines?
- Are the reagents generally available?
- Are there any special ethical concerns arising from the use of human or other animal subjects?

**Timing**

Nature journals are committed to rapid editorial decisions and publication, and we believe that an efficient editorial process is a valuable service both to our authors and to the scientific community as a whole. We therefore ask reviewers to respond promptly within the number of days agreed. If reviewers anticipate a longer delay than previously expected, we ask them to let us know so that we can keep the authors informed and, where necessary, find alternatives.

**Anonymity**
We do not release reviewers' identities to authors or to other reviewers, except when reviewers specifically ask to be identified. Unless they feel strongly, however, we prefer that reviewers should remain anonymous throughout the review process and beyond. Before revealing their identities, reviewers should consider the possibility that they may be asked to comment on the criticisms of other reviewers and on further revisions of the manuscript; identified reviewers may find it more difficult to be objective in such circumstances.

We ask reviewers not to identify themselves to authors without the editor's knowledge. If they wish to reveal their identities while the manuscript is under consideration, this should be done via the editor, or if this is not practicable, we ask authors to inform the editor as soon as possible after the reviewer has revealed his or her identity to the author.

We deplore any attempt by authors to confront reviewers or determine their identities. Our own policy is to neither confirm nor deny any speculation about reviewers' identities, and we encourage reviewers to adopt a similar policy.

**Editing referees' reports**
As a matter of policy, we do not suppress reviewers' reports; any comments that were intended for the authors are transmitted, regardless of what we may think of the content. On rare occasions, we may edit a report to remove offensive language or comments that reveal confidential information about other matters. We ask reviewers to avoid statements that may cause needless offence; conversely, we strongly encourage reviewers to state plainly their opinion of a paper. Authors should recognize that criticisms are not necessarily unfair simply because they are expressed in robust language.

**The peer-review system**
It is editors' experience that the peer-review process is an essential part of the publication process, which improves the manuscripts our journals publish. Not only does peer review provide an independent assessment of the importance and technical accuracy of the results described, but the feedback from referees conveyed to authors with the editors' advice frequently results in manuscripts being refined so that their structure and logic is more readily apparent to readers.

Nature journals are appreciative of its peer-reviewers, of whom there are many tens of thousands. It is only by collaboration with our reviewers that editors can ensure that the manuscripts we publish are among the most important in their disciplines of scientific research. We appreciate the time that reviewers devote to assessing the manuscripts we send them, which helps ensure that Nature journals publish only material of the very highest quality. In particular, many submitted manuscripts contain large volumes of additional (supplementary) data and other material, which take time to evaluate. We thank our reviewers for their continued commitment to our publication process.

Much has been written, in Nature journals and elsewhere, on the peer-review system as a whole. Alternative systems have been proposed in outline: for example, signed peer-review, blind peer-review and open peer review. The system has been exhaustively studied, reported on, and assessed -- both positively and negatively.

Nature journals' position on the value of the peer-review system is represented in the following extract from an editorial in *Nature Immunology*.

**Reviewing peer review**
The goals of peer review are both lofty and mundane. It is the responsibility of journals to administer an effective review system. Peer review is designed to select technically valid research of significant interest. Referees are expected to identify flaws, suggest improvements and assess novelty. If the manuscript is deemed important enough to be published in a high visibility journal, referees ensure that it is internally consistent, thereby ferreting out spurious conclusions or clumsy frauds.

One problem with manuscript selection is the inherent tension between referees and authors. Referees wish for only the most solid science to be published, yet when they 'switch hats' to that of author, they desire quick publication of their novel ideas and approaches. Authors of papers that blow against the prevailing winds bear a far greater burden of proof than normally expected in publishing their challenge to the current paradigm. Veering too far in one direction or the other leads to complaints either that peer review isn't stringent enough, or that it is stifling the freshest research. It is the job of the editors to try to avoid both extremes.

Journal editors do not expect peer review to ferret out cleverly concealed, deliberate deceptions. A peer reviewer can only evaluate what the authors chose to include in the manuscript. This contrasts with the expectation in the popular press that peer review is a process by which fraudulent data is detected before publication (although that sometimes happens).

We are continually impressed with peer review's positive impact on almost every paper we publish. Even papers that are misunderstood by reviewers are usually rewritten and improved before resubmission. Mistakes are made, but peer review, through conscientious effort on the part of referees, helps to protect the literature, promote good science and select the best. Until a truly viable alternative is provided, we wouldn't have it any other way.

The full text of this editorial is available through *Nature Immunology*.

In 2006, *Nature* published a comprehensive web focus on the peer review system. All articles in this focus are open for readers' comments via a link at the end of each article and at Peer to Peer, the blog for peer-reviewers and about peer review.

Nature Network runs an 'ask the editor' group, free to join, in which scientists can ask the editors questions about peer review.

**Peer-review publication policies**
All contributions submitted to Nature journals that are selected for peer-review are sent to at least one, but usually two or more, independent reviewers, selected by the editors. Authors are welcome to suggest suitable independent reviewers and may also request that the journal excludes one or two individuals or laboratories. The journal sympathetically considers such requests and usually honours them, but the editor's decision on the choice of referees is final.

As a condition of agreeing to assess the manuscript, all reviewers undertake to keep submitted manuscripts and associated data confidential, and not to redistribute them without permission from the journal. If a reviewer seeks advice from colleagues while assessing a manuscript, he or she ensures that confidentiality is maintained and that the names of any such colleagues are provided to the journal with the final report. By this and by other means, Nature journals endeavour to keep the content of all submissions confidential until the publication date other than in the specific case of its embargoed press release available to registered journalists. Although we go to every effort to ensure reviewers honour their promise to ensure confidentiality, we are not responsible for the conduct of reviewers.

Reviewers should be aware that it is our policy to keep their names confidential, and that we do our utmost to ensure this confidentiality. Under normal circumstances, blind peer-review is protected from legislation. We cannot, however, guarantee to maintain this confidentiality in the face of a successful legal action to disclose identity in the event of a reviewer having written personally derogatory comments about the authors in his or her reports. For this reason as well as for reasons of standard professional courtesy, we request reviewers to refrain from personally negative comments about the authors of submitted manuscripts. Frank comments about the scientific content of the manuscripts, however, are strongly encouraged by the editors.

**Nature journal editorials providing more detail for these policies**:

*Nature Neuroscience*: Pros and cons of open peer-review

*Nature Methods*: A method for peer review, a peer review for methods

*Nature Neuroscience*: Making the most of peer-review

*Nature Immunology*: Reviewing peer-review

*Nature Cell Biology*: Editorial procedures reviewed

*Nature Cell Biology*: Reviewing peer-review

*Nature Chemical Biology*: Reviewing all options

*Nature*: Peer review on trial

*Nature Immunology*: Under review

*Nature*: Peer review and fraud

*Nature Cell Biology*: Opening up peer review

*Nature Immunology*: Reviewing appeals

*Nature Medicine*: Why review?

*Nature*: Replicator review, 22 Nov 2007. Peer-review for strong claims. Comments welcome at Peer to Peer.

*Nature*: Mind games, 22 Nov 2007. How not to mix opinion and science. Comments welcome at Peer to Peer.

*Nature*: Working double-blind, 7 February 2008. Should there be author anonymity in peer review? Comments welcome at Peer to Peer.

*Nature Cell Biology*: What to publish?, March 2008. The journal's peer review process, and planned enhancements. Comments welcome at Peer to Peer.

*Nature Cell Biology*: Good review, April 2008. Rewards for peer-reviewing, and what constitutes a good report. Comments welcome at Peer to Peer.

*Nature Chemical Biology*: Decoding decisions, December 2008. The journal's peer-review process explained. Comments welcome at Peer to Peer.

*Nature Neuroscience*: Striving for excellence, January 2009. Seeking to optimize the peer-review system. Comments welcome at Peer to Peer.

**Ethics and security**
Nature journal editors may seek advice about submitted papers not only from technical reviewers but also on any aspect of a paper that raises concerns. These may include, for example, ethical issues or issues of data or materials access. Very occasionally, concerns may also relate to the implications to society of publishing a paper, including threats to security. In such circumstances, advice will usually be sought simultaneously with the technical peer-review process. As in all publishing decisions, the ultimate decision whether to publish is the responsibility of the editor of the journal concerned.

**EMBARGO**

**Communication with the media**
Material submitted to Nature journals must not be discussed with the media, except in the case of accepted contributions, which can be discussed with the media no more than a week before the publication date under our embargo conditions. We reserve the right to halt the consideration or publication of a paper if this condition is broken.

Each Nature journal produces and distributes to a registered list a press release summarizing the content of the next issue's publication. Journalists are encouraged to read the full version of any papers they wish to cover, and are given the names of corresponding authors, together with phone and fax numbers and e-mail addresses. They receive access to the full text of papers about a week before publication on a password-protected website, together with other relevant material (for example, an accompanying News and Views article, and any extra illustrations provided by the authors). The content of the press release and papers is embargoed until the time and date clearly stated on the press release.

Papers that are deemed especially newsworthy are highlighted by a brief summary on the press release for that journal, written by the editors and the press office. Authors may therefore receive calls or emails from the media during this time; we encourage them to cooperate with journalists so that media coverage of their work is accurate and balanced. Authors whose papers are scheduled for publication may also arrange their own publicity (for instance through their institutional press offices), but they must strictly adhere to our press embargo and are advised to coordinate their own publicity with our press office.

The Nature journals believe that their embargo serves scientists, authors, journalists and the public. Our policy is to release information about our content in a way that provides fair and equal access to the media, allowing it to provide informed comment based on the complete and final version of the paper that is to be published. Authors and their institutions' press offices are able then to interact with the media ahead of publication, and benefit from the subsequent coverage.

The benefits of peer review as a means of giving journalists confidence in new work published in journals are self-evident. Premature release to the media denies journalists that confidence. It also removes journalists' ability to obtain informed reactions about the work from independent researchers in the field.

For all these reasons, Nature journals have refused to publish papers prematurely released to the press. Journalists who break our embargoes have been removed from the press-release circulation list, and we shall continue to use this sanction when appropriate.

See editorial in *Nature Methods*:

*Deja vu*? (what constitutes prepublication and how to avoid it).

**Communication between scientists**
Nature journals do not wish to hinder communication between scientists. For that reason, different embargo guidelines apply to work that has been discussed at a conference or displayed on a preprint server and picked up by the media as a result. (Neither conference presentations nor posting on recognized preprint servers constitute prior publication.)

Our guidelines for authors and potential authors in such circumstances are clear-cut in principle: communicate with other researchers as much as you wish, whether on a recognised community preprint server, on *Nature Precedings*, by discussion at scientific meetings (publication of abstracts in conference proceedings is allowed), in an academic thesis, or by online collaborative sites such as wikis; but do not encourage premature publication by discussion with the press (beyond a formal presentation, if at a conference).

This advice may jar with those (including most researchers and all journalists) who see the freedom of information as a good thing, but it embodies a longer-term view: that publication in a peer-reviewed journal is the appropriate culmination of any piece of original research, and an essential prerequisite for public discussion.

If further clarification is required, please contact the Nature press office by e-mail.

**CORRECTIONS**

**Correction and retraction policy**
We recognize our responsibility to correct errors that we have previously published. Our policy is to consider refutations (readers' criticisms) of primary research papers, and to publish them (in concise form) if and only if the author provides compelling evidence that a major claim of the original paper was incorrect. Refutations are peer-reviewed, and where possible they are sent to the same referees who reviewed the original paper. A copy is usually also sent to the corresponding author of the original paper for signed comments. Refutations are typically published in the Communications Arising section of *Nature* (which is online-only) or the Correspondence section of other Nature journals, sometimes with a brief response from the original authors. Some submitted refutations are eventually published as retractions by the paper's authors. In both cases, the published refutation or retraction is linked online to the original paper, and the published paper is linked online to the refutation or retraction.

Complaints, disagreements over interpretation and other matters arising should be addressed to the editor of the journal concerned. Because debates over interpretation are often inconclusive, we do not automatically consider criticisms of review articles or other secondary material, and in the event that we decide to publish such a criticism we do not necessarily consult the original authors. Editorial decisions in such cases are based on considerations of reader interest, novelty of arguments, integrity of the publication record and fairness to the parties involved. Publication may take various forms at the discretion of the editor. The Nature Reviews journals consider correspondence relating to all review-type articles but not to Research Highlights.

Corrections are published for significant errors in non-peer-reviewed content of the Nature journals at the discretion of the editors. Readers who have identified such an error should send an email to the general email address of the journal, clearly stating the publication reference, title, author and section (eg News, Essay) of the article, and briefly explaining the error.

The Nature journals operate the following policy for making corrections to the print and online versions of their peer-reviewed content.

**Publishable amendments** requested by the authors of the publication are represented by a formal printed and online notice in the journal because they affect the publication record and/or the scientific accuracy of published information. Where these amendments concern peer-reviewed material, they fall into one of four categories: erratum, corrigendum, retraction or addendum, described here.

**Erratum**. Notification of **an important error made by the journal** that affects the publication record or the scientific integrity of the paper, or the reputation of the authors, or of the journal.

**Corrigendum**. Notification of **an important error made by the author(s)** that affects the publication record or the scientific integrity of the paper, or the reputation of the authors or the journal. All authors must sign corrigenda submitted for publication. In cases where coauthors disagree, the editors will take advice from independent peer-reviewers and impose the appropriate amendment, noting the dissenting author(s) in the text of the published version.

**Retraction**. Notification of **invalid results**. All coauthors must sign a retraction specifying the error and stating briefly how the conclusions are affected, and submit it for publication. In cases where coauthors disagree, the editors will seek advice from independent peer-reviewers and impose the type of amendment that seems most appropriate, noting the dissenting author(s) in the text of the published version.

**Addendum**. Notification of a **peer-reviewed addition of information to a paper**, usually in response to readers' request for clarification. Addenda are published only rarely and only when the editors decide that the addendum is crucial to the reader's understanding of a significant part of the published contribution.

**Editorial decision-making**
Decisions about types of correction are made by the editors of the journal that published the paper, sometimes with peer-reviewers' advice. This process involves consultation with the authors of the paper, but the editor makes the final decision about the category in which the amendment is published. Each Nature journal states the details of its procedure in the guide to authors on its own website, but all operate a broadly similar process.

When an amendment is published, it is linked bi-directionally to and from the article being corrected. For *Nature*, if the correction is significant, for example if a new figure is published, a PDF version of the correction is appended to the last page of the original article PDF so that the original article PDF will remain a facsimile of the printed page and readers downloading the PDF will receive the original article plus amendment. For the monthly *Nature* journals, a corrected PDF is posted online that includes on its final page a description of the original error and when it was corrected.

Authors sometimes request a correction to their published contribution that does not affect the contribution in a significant way or impair the reader's understanding of the contribution (a spelling mistake or grammatical error, for example). *Nature* journals do not publish such corrections, in print or online. The online and print versions of the article are both part of the published record and hence their original published version is preserved. *Nature* journals do, however, correct the online version of a contribution if the wording in the html version does not make sense when compared with the PDF version ('see left' for a figure that is an appropriate phrase for the PDF but not for the html version, for example). In these cases, the fact that a correction has been made is stated in a footnote so that readers are aware that the originally published text has been amended.

**Corrections to AOP articles**
The policy of the *Nature* journals is that corrections are rarely made to Advance Online Publication (AOP) articles before they appear in the print version of the journal.

If a very significant error is discovered after publication of an AOP article but before the print version has gone to press, the editors will decide whether to amend the AOP article. If a correction is made to the online version, a footnote is added to state that: first, there was an error in the AOP version of the article; second, the error has since been corrected in the HTML and PDF versions; and third, that the article will appear correctly in a forthcoming print issue. When the article is printed, it will carry a publication date in the following style: Published online: 9 January 2007; corrected 10 January 2007 (details online); doi:10.1038/nature709.

**Detailed description of correction types**
**Errata** concern the amendment of mistakes introduced by the journal in editing or production, including errors of omission such as failure to make factual proof corrections requested by authors within the deadline provided by the journal and within journal policy. Errata are generally not published for simple, obvious typographical errors, but are published when an apparently simple error is significant (for example a greek mu for an 'm' in a unit, or a typographical error in the corresponding author's name).

If there is an error in the lettering on a figure, the usual procedure is to publish a sentence of rectification. A significant error in the figure itself is corrected by publication of a new corrected figure as an erratum. The figure is republished only if the editor considers it necessary for a reader to understand it.

**Corrigenda** are judged on their relevance to readers and their importance for the published record. Corrigenda are published after discussion among the editors (typically including the editors who handled the published contribution), often with the help of peer-reviewers. All coauthors must sign an agreed wording.

Corrigenda submitted by the original authors are published if the scientific accuracy or reproducibility of the original paper is compromised; occasionally, on investigation by the editors, these may be published as retractions. In cases where some coauthors decline to sign a corrigendum or retraction, the editors reserve the right to publish it with the dissenting author(s) identified. Nature journals publish corrigenda if there is an error in the published author list, but not for overlooked acknowledgements.

Readers wishing to draw the journal's attention to a significant published error should submit a Communications Arising (in the case of *Nature*) or, in the case of the other Nature journals, submit as a Correspondence. This procedure is a mechanism for investigating readers' comments and does not imply that the comment will be published. In cases where a significant error is confirmed after taking the advice of peer-reviewers, such comments will be published in one of the categories of amendment described here.

**Addenda** are judged on the significance of the addition to the interpretation of the original publication. Addenda do not contradict the original publication, but if the authors inadvertently omitted significant information available to them at the time, this material will be published as an addendum after peer-review and after discussion among the editors.

**Retractions** are judged according to whether the main conclusion of the paper no longer holds or is seriously undermined as a result of subsequent information coming to light of which the authors were not aware at the time of publication. In the case of experimental papers, this can include further experiments by the authors or by others that do not confirm the main experimental conclusion of the original publication. Readers wishing to draw the editors' attention to published work requiring retraction should first contact the authors of the original paper and then write to the journal, including copies of the correspondence with the authors (whether or not the correspondence has been answered). The editors will seek advice from reviewers if they judge that the information is likely to draw into question the main conclusions of the published paper.

**Nature journal editorials about correction policy**:

*Nature Medicine*: The long road to retraction

*Nature Cell Biology*: Policy matters/policies that matter

*Nature Neuroscience*: Setting the record straight

**Reprints**
As soon as a *Nature* journal has agreed to publish a correction to a published paper, the author can contact the reprint department by email, including the full publication reference in the message. Reprints can be altered to provide the corrected version if notification is received in time.

**Supplementary information**
In the Nature journals, authors' corrections to supplementary information (SI) are made only in exceptional circumstances (for example major errors that compromise the conclusion of the study). Published corrections to SI are usually accompanied by a printed Corrigendum note. Authors cannot update SI because new data have become available or interpretations have changed, as the SI is a peer-reviewed and integral part of the paper, and hence part of the published record.

SI cannot be amended between acceptance and publication unless a change made for technical reasons by the journal in order to publish the material on the website has introduced a significant error.