

## About *Nature Biotechnology*

### AIMS AND SCOPE OF JOURNAL

*Nature Biotechnology* is a monthly journal covering the science and business of biotechnology. It publishes new concepts in technology/methodology of relevance to the biological, biomedical, agricultural and environmental sciences as well as covers the commercial, political, ethical, legal and societal aspects of this research. The first function is fulfilled by the peer-reviewed research section, the second by the expository efforts in the front of the journal. We provide researchers with news about business; we provide the business community with news about research developments.

The core areas in which we are actively seeking research papers include: molecular engineering of nucleic acids and proteins; molecular therapy (therapeutics genes, antisense, siRNAs, aptamers, DNazymes, ribozymes, peptides, proteins); large-scale biology (genomics, functional genomics, proteomics, structural genomics, metabolomics, etc.); computational biology (algorithms and modeling), regenerative medicine (stem cells, tissue engineering, biomaterials); imaging technology; analytical biotechnology (sensors/detectors for analytes/macromolecules), applied immunology (antibody engineering, xenotransplantation, T-cell therapies); food and agricultural biotechnology; and environmental biotechnology. A comprehensive list of areas of interest is shown below.

#### Genetic engineering

- Strategies for controlling gene expression
- Strategies for manipulating gene structure
- Strategies for gene containment

#### Large-scale approaches

- Technologies for analyzing gene function (e.g., arrays, SAGE)
- Technologies for analyzing gene structure/organization (e.g., molecular beacons)
- Chemogenomics or chemical genetics
- Pharmacogenomics/SNPs
- Computational analysis

#### Proteomics

- Technologies for analyzing/identifying protein structure/function (e.g., 2-D gels, mass spectrometry, yeast two-hybrid, SPR, NMR, arrays and chips)
- Structural genomics
- Computational analysis

#### Metabolomics

- Technologies for analyzing/profiling metabolites (chromatography, mass spectrometry)
- Computational analysis

#### Computational biology

- Bioinformatics; algorithms; data deconvolution
- Modeling and systems biology: kinetics-based models and constraints-based models

#### Molecular engineering

- Rational approaches for proteins/antibodies/enzymes/drugs
- Molecular evolution

- Molecular breeding approaches

#### Metabolic engineering

- Genetic manipulation of species of interest to modify or allow the production of a commercially or therapeutically relevant compound
- Computational analysis

#### Novel expression systems

- Mammalian cells
- Insect cells
- Bacteria
- Fungi
- Plant cells

#### Delivery of genes, drugs or cells

- Targeting strategies
- Viral and nonviral vector strategies

#### Imaging

- Reporter molecules
- Imaging approaches/technologies for visualizing whole animals cells or single molecules
- Computational analysis

#### Nucleic acid therapeutics and research tools

- Gene therapy (targeting, expression, integration, immunogenicity)
- Antisense
- RNAi
- DNazymes and ribozymes
- Other (e.g., chimeric oligonucleotides/triple helix)

#### Nanobiotechnology

- Nanomaterials for use in drug delivery or as therapeutics
- Nanomaterials for use in industrial biotechnology
- Nanosensors
- Nanosystems for imaging molecules and cells

#### Vaccines and applied immunology

- Antibody engineering
- T-cell therapies
- Therapies exploiting innate immunity (e.g., complement)
- Antigen delivery vectors and approaches
- Nucleic acid vaccines
- Computational analysis

#### Regenerative medicine

- Stem cells
- Tissue engineering
- Therapeutic cloning (somatic cell nuclear transfer)
- Xenotransplantation
- Biomaterials

#### Biosensors

- Approaches for detecting biological molecules
- Use of biological systems in detecting analytes

#### Assay systems

- Approaches for multiplexing and increasing throughput
- Selection/screening strategies for gene/proteins/drugs

# GUIDE TO AUTHORS

- Microfluidics

## Biomaterials

- Engineering materials for biological application
- Molecular imprinting
- Biomimetics
- Nanotechnology

## Agbiotech and transgenic plants

- Crop improvement (resistance to stress, disease, pests)
- Nutraceuticals
- Forest biotechnology
- Plant vaccines
- Plants as bioreactors
- Gene-containment strategies

## Pharming

- Transgenic animals
- Knockouts
- Reproductive cloning
- Biopharmaceutical and enzyme production
- Transgene targeting and expression strategies

## Environmental

- Bioremediation
- Biomining
- Phytoremediation
- Monitoring

## SAMPLE ISSUE

Free online access to the [January 2009](#) issue.

## EDITORIAL PROCESS

The overview of the journal's [manuscript decision process](#) includes submission, editorial decision on whether the paper should be reviewed, peer review, decisions after review, revision, acceptance in principle, final submission and acceptance, proofs, advance online publication and print publication. Before submitting a paper, authors should consult our [editorial policies](#) as well as [technical tips](#) for using our online submission system.

Please also consult our general guide for [manuscript preparation and submission](#), which includes information on article formats, journal style and figure preparation tips. Note that procedures for initial submission, revision and final submission are slightly different, so please consult the directions before proceeding to the [online submission system](#).

Presubmission inquiries are not a prerequisite for the regular submission process, but are intended as a mechanism for authors to receive rapid feedback on whether a manuscript in preparation is likely to be of interest to the journal. We encourage authors who have already prepared their manuscripts to bypass the presubmission inquiry process and upload their papers as a regular submission to the journal.

Journals in the Nature family no longer take copyright on the primary research articles we publish. Instead we ask authors to sign a [license](#) for us to publish their work. US government employees sign a [different license](#).

## EDITORS AND CONTACT INFORMATION

Like the other Nature titles, *Nature Biotechnology* has no external editorial board. Instead, all editorial decisions are made by a team of full-time professional editors. For information on their scientific and publishing backgrounds/interests, see [About the Editors](#).

A full list of journal staff appears on the [masthead](#).

## RELATIONSHIP TO OTHER NATURE JOURNALS

*Nature Biotechnology* is editorially independent, and its editors make

their own decisions, independent of the other Nature journals. If a paper is rejected from one Nature journal, the authors can use an automated manuscript transfer service to submit the paper to another Nature journal via a link sent to them by the editor handling the manuscript. Authors should note that referees' comments (including any confidential comments to the editor) and identities are transferred to the editor of the second journal along with the manuscript. In that case, the journal editors will take the previous reviews into account when making their decision, although in some cases the editors may choose to take advice from additional or alternative referees. Alternatively, authors may choose to request a fresh review, in which case they should not use the automated transfer link, and the editors will evaluate the paper without reference to the previous review process. More details are available on the [manuscript transfer service](#) and on the [relationships between Nature titles](#).

## EDITORIAL AND PUBLISHING POLICIES

Please see [authors & referees @ npg](#) for detailed information about author and referee services and publication policies at the Nature family of journals. These journals, including *Nature Biotechnology*, share a number of common policies including the following:

- [Author responsibilities](#)
- License agreement and author copyright
- Embargo policy and press releases
- Use of experimental animals and human subjects
- Competing financial interests
- Availability of materials and data
- Digital image integrity and standards
- Security concerns
- Refutations, complaints and corrections
- Duplicate publication
- Confidentiality and pre-publicity
- Plagiarism and fabrication

## IMPACT FACTOR

The 2008 impact factor for *Nature Biotechnology* is 22.3, according to the *ISI Journal Citation Reports*. This places *Nature Biotechnology* first among primary research journals in the field of biotechnology.

The 2008 impact factor represents the number of citations in 2008 to papers published in 2006 and 2007, divided by the total number of papers published in 2006 and 2007. A more detailed explanation of impact factors appears on the [ISI web site](#). For more information on the interpretation and use of impact factors, see the Editorials in the August 2003 issues of *Nature Neuroscience* and *Nature Immunology*.

## EDITORIAL BLOGS

We encourage community participation in all Nature journal blogs. [Nautilus](#) is a blog for authors and aspiring authors of Nature Publishing Group journals. [Peer-to-Peer](#) is a blog for reviewers and is about peer review. Other Nature Publishing Group blogs can be found on the [blog index page](#).

## ABBREVIATION

The correct abbreviation for abstracting and indexing purposes is *Nat. Biotechnol.*

## ISSN AND EISSN

The international standard serial number (ISSN) for *Nature Biotechnology* is 1087-0156, and the electronic international standard serial number (EISSN) is 1546-1696.

**FURTHER EDITORIAL INFORMATION**

Please see the following editorials for more information on various aspects of journal policy:

Beaten out of submission (December 2001)

Business as usual (October 2001)

Democratizing proteomics data (March 2006)

**Content Types****PRIMARY RESEARCH FORMATS**

An **Article** is a substantial novel research study, with a complex story often involving several techniques or approaches. The main text (excluding abstract, Methods, references and figure legends) is 3,000 words. The abstract is typically 150 words, unreferenced. Articles have 6 display items (figures and/or tables). An introduction (without heading) is followed by sections headed Results, Discussion and Methods. The Results and Methods should be divided by topical subheadings; the Discussion does not contain subheadings. If statistical testing was used to analyze the data, the Methods section must contain a subsection on statistical analysis. References are limited to 50.

Articles include received/accepted dates. They may be accompanied by supplementary information. Articles are peer reviewed, and authors must provide a [competing financial interests](#) statement before publication.

A **Letter** reports an important novel research result, but is less substantial than an Article. This format begins with an introductory paragraph (not abstract) of approximately 150 words, summarizing the background, rationale, main results and implications. This paragraph should be referenced, as in Nature style, and should be considered part of main text, so that any subsequent introductory material avoids too much redundancy with the introductory paragraph. The text is limited to 2,000 words, excluding the introductory paragraph, Methods, references and figure legends. References are limited to 30. Letters should have no more than 2–3 display items (figures and/or tables). Letters are not divided by headings, except for the Methods heading. If statistical testing was used to analyze the data, the Methods section must contain a subsection on statistical analysis.

Letters include received/accepted dates. They may be accompanied by supplementary information. Letters are peer reviewed, and authors must provide a [competing financial interests](#) statement before publication.

A **Brief Communication** reports a concise study of high quality and broad interest. This format may not exceed 3 printed pages. Brief Communications begin with a brief unreferenced abstract (3 sentences, no more than 70 words), which will appear on Medline. The title is limited to 10 words (or 90 characters). The main text is typically 1,000–1,500 words, including abstract, references and figure legends, and contains no headings. Brief Communications normally have no more than 2 display items, although this may be flexible at the discretion of the editor, provided the page limit is observed. References are limited to 15. Article titles are omitted from the reference list.

Brief Communications include received/accepted dates. They may be accompanied by supplementary information. Brief Communications are peer reviewed, and authors must provide a [competing financial interests](#) statement before publication.

A **Resource** presents a large data set (such as a comprehensive list of proteins in an organelle or tissue, a genome-wide antibody library, coordinated analysis of cells or reagents by several different laboratories) of broad utility, interest and significance to the community. The main text (excluding abstract, Methods, references and figure legends) is approximately 3,000 words. The abstract is typically 100–150 words, unreferenced. Resources have no more than 6 display items (figures and/

or tables). An introduction (without heading) is followed by sections headed Results, Discussion and Methods. The Results and Methods should be divided by topical subheadings; the Discussion does not contain subheadings. If statistical testing was used to analyze the data, the Methods section must contain a subsection on statistical analysis. References are limited to 50.

Resources include received/accepted dates. They may be accompanied by supplementary information. Resources are peer reviewed, and authors must provide a [competing financial interests](#) statement before publication.

An **Analysis** is a new analysis of existing data (typically large genomic, transcriptomic or proteomic data sets from arrays or other high-throughput platforms) or describe new data obtained in a comparative analysis of technologies that lead to novel and arresting conclusions of importance to a broad audience. The main text (excluding abstract, Methods, references and figure legends) is approximately 3,000. The abstract is typically 100–150 words, unreferenced. Analyses have no more than 6 display items (figures and/or tables). An introduction (without heading) is followed by sections headed Results, Discussion and Methods. The Results and Methods should be divided by topical subheadings; the Discussion does not contain subheadings. If statistical testing was used to analyze the data, the Methods section must contain a subsection on statistical analysis. References are limited to 50.

Analyses include received/accepted dates. They may be accompanied by supplementary information. Analyses are peer reviewed, and authors must provide a [competing financial interests](#) statement before publication.

**OTHER FORMATS**

**Correspondence** is a flexible format that may include anything of interest to the journal's readers, from policy debates to announcements to 'matters arising' from research papers. A Correspondence may describe primary research data, but only in summary form; this format is not intended for full presentation of data. Correspondence should never be more than one printed page, and usually much less. The number of references should not exceed 10 for either the Correspondence or its Reply, and article titles are omitted from the reference list. Titles for correspondence are supplied by the editors.

Authors must submit a [competing financial interests](#) statement, which is printed only if they declare that they have competing interests. In cases where a correspondence is critical of a previous research paper, the authors are normally given the option of publishing a brief reply. Criticism of opinions or other secondary matter does not involve an automatic right of reply.

Refutations are always peer reviewed. Other types of Correspondence may be peer reviewed at the editors' discretion. Authors must provide a [competing financial interests](#) statement before publication.

**News and Views** are by prior arrangement only. They may be linked to articles in *Nature Biotechnology*, or they may focus on papers of exceptional significance that are published elsewhere. Unsolicited contributions will not normally be considered, although prospective authors are welcome to make proposals. News and Views are not peer reviewed.

Authors must submit a [competing financial interests](#) statement, which is printed only if they declare that they have competing interests.

**Book Reviews** are by prior arrangement only, although suggestions are welcome. Book reviews are not peer reviewed.

Authors must submit a [competing financial interests](#), which is printed only if they declare that they have competing interests.

A **Review** is an authoritative, balanced and scholarly survey of recent developments in a research field. The requirement for balance need not prevent authors from proposing a specific viewpoint, but if there

are controversies in the field, the authors must treat them in an even-handed way. Reviews are normally 3,000–4,000 words, and illustrations are strongly encouraged. References are limited to 100, with exceptions possible in special cases. Citations should be selective and, in the case of particularly important studies ( $\leq 10\%$  of all the references), we encourage authors to provide short annotations explaining why these are key contributions. The scope of a Review should be broad enough that it is not dominated by the work of a single laboratory, and particularly not by the authors' own work.

Review authors must provide a [competing financial interests](#) statement before publication. Received/accepted dates are not included. Reviews are always peer reviewed to ensure factual accuracy, appropriate citations and scholarly balance.

**Commentary** is a very flexible format, focusing on the scientific, commercial, ethical, legal, societal or political issues surrounding biotechnology research. Commentary articles should be topical, readable, provocative and introduce new concepts/points of view, providing a personal perspective on a biotechnology-based matter of public or scientific importance. The main criteria are that they should be of immediate interest to a broad readership and should be written in an accessible, non-technical style. Their length is typically 1–4 pages, although some may be longer. Because the content is variable, the format is also flexible. Commentaries do not normally contain primary research data, although they may present 'sociological' data (funding trends, demographics, bibliographic data, etc.). References should be used sparingly (10–25), and article titles are omitted from the reference list.

The related format **Historical Commentary** is a journalistic treatment of the history of a particular discovery or technical development. These pieces may be a personal account by one of the participants or may present strong personal opinions. This format does not necessarily seek scholarly balance, and it should be journalistic and accessible rather than scholarly in style.

Commentary authors must submit a [competing financial interests](#) statement, which is printed only if they declare that they have competing interests. Commentaries may be peer reviewed at the editors' discretion.

**Perspective** is a format for scholarly reviews and discussions of the primary research literature that are too technical for a Commentary but do not meet the criteria for a Review—either because the scope is too narrow, or because the author is advocating a controversial position or a speculative hypothesis or discussing work primarily from one group. Two reviews advocating opposite sides in a research controversy are normally published as Perspectives. The text should not normally exceed 3,000 words. References are limited to 50.

The related format **Historical Perspective** is a more technical account of a particular scientific development. Like other Perspectives, and in contrast to Historical Commentary, Historical Perspectives are scholarly reviews, including citation of key references, aiming to present a balanced account of the historical events, not merely personal opinions or reminiscences.

Perspective authors must provide a [competing financial interests](#) statement before publication. Received/accepted dates are not included. Perspectives are always peer reviewed.

**Analysis** articles are reports that include a new analysis of new or existing data (typically large biological datasets such as genomes, microarrays and proteomics) that lead to a novel, exciting and arresting conclusion. They are peer-reviewed and include a [competing financial interests](#) statement.

A **Feature** encompasses both the technical and commercial aspects of biotechnology. This format is intended not only to complement the emerging scientific developments reported in the research section, but also to provide a forum for regulatory and business topics that would

otherwise not be covered in the journal. Features are generally no more than 3,000 words, should be well illustrated with tables and figures and are written in a journalistic style accessible to a wide range of non-specialist readers. Features not written by freelancers include a [competing financial interests](#) statement. *Nature Biotechnology* welcomes submissions of ideas for future feature topics.

Authors must submit a [competing financial interests](#) statement, which is printed only if they declare that they have competing interests.

A **Patent Article** offers *Nature Biotechnology's* readership an expert insight and analysis of the legal issues that pertain to biotechnology, including patenting, licensing and technology transfer. Written by specialists in the field, patent articles are an informative guide to the legal aspects of biotechnology research and industry. *Nature Biotechnology* welcomes submissions of ideas for future article topics.

Authors must submit a [competing financial interests](#) statement, which is printed only if they declare that they have competing interests.

A **Careers and Recruitment** article provides a view on training, career development or hiring issues and information on the biotechnology job market. *Nature Biotechnology* welcomes submissions of ideas for future article topics.

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A **User's Guide** is a tutorial written by an expert that explains to a researcher how to use online resources to answer questions about biology. It works through an example and familiarizes a reader with databases/web sites/other resources of value in performing *in silico* analysis of biological data. A User's Guide highlights potential pitfalls and limitations that a uninitiated researcher might not be aware of when carrying out different types of analysis. It starts by posing the question of interest, describes the online resources that one would use and then takes the user through the steps needed to answer the question.

Authors must submit a [competing financial interests](#) statement, which is printed only if they declare that they have competing interests.

A **Primer** describes an approach to computational analysis in simple terms for a biological researcher. The article briefly describes the approach in a historical context and in the context of other computational approaches, the principles underlying the analysis and how it can be applied to contemporary problems in biology.

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A **Software Review** compares software packages or freely accessible online resources that address specific analytical questions in biology. The Software Review outlines the application and its importance to biological research and then describes the software packages to be reviewed. It provides a comparison of user friendliness/bugs/compatibility with other software programs under review as well as a comparison of the features in each software package and their utility. It should also summarize the author's overall opinion of the value and utility of different packages. If the software is an upgrade of a previous package, the review should indicate whether it is worth the money. A product information/specification section should be provided for each software package that details cross-compatibility with Macintosh and Windows, minimum system requirements (disk space, RAM) and pricing (Commercial, Academic, Student).

Authors must submit a [competing financial interests](#) statement, which is printed only if they declare that they have competing interests.

## How to Submit

### ONLINE SUBMISSION

We strongly prefer to receive manuscripts via our [online submission system](#). Using this system, authors can upload manuscript files (text, figures

and supplementary information, including video) directly to our office and check on the status of their manuscripts during the review process. In addition, reviewers can access the manuscript (in a highly secure fashion that maintains referee anonymity) over a direct internet link, which speeds the review process. Please consult our technical information on file formats and tips for using the system effectively. Revisions, including manuscripts submitted after a presubmission inquiry, should be uploaded via the link provided in the editor's decision letter. Please do not submit revisions as new manuscripts.

## SUBMISSION POLICIES

Submission to *Nature Biotechnology* is taken to imply that there is no significant overlap between the submitted manuscript and any other papers from the same authors under consideration or in press elsewhere. (Abstracts or unrefereed web preprints do not compromise novelty.) The authors must include copies of all related manuscripts with any overlap in authorship that are under consideration or in press elsewhere. If a related manuscript is submitted elsewhere while the manuscript is under consideration at *Nature Biotechnology*, a copy of the related manuscript should be sent to the editor.

The primary affiliation for each author should be the institution where the majority of their work was done. If an author has subsequently moved, the current address may also be stated.

If the manuscript includes personal communications, please provide a written statement of permission from any person who is quoted. E-mail permission messages are acceptable.

For bioinformatics manuscripts, please send four copies of a CD containing any new algorithms for data analysis along with other resources necessary to use the algorithm, such as the user manual or spreadsheets. The CDs should be mailed to *Nature Biotechnology*, 75 Varick Street, 9th Floor, New York, NY 10013-1917, USA.

For further information on the review process and how editors make decisions, please see the [manuscript decisions](#) page.

A high priority of *Nature Biotechnology* is that all papers be accessible to nonspecialists. Manuscripts are subject to substantial editing to achieve this goal. After acceptance, a copy editor may make further changes so that the text and figures are readable and clear to those outside the field, and so that papers conform to our style. Contributors are sent proofs and are welcome to discuss proposed changes with the editors, but *Nature Biotechnology* reserves the right to make the final decision about matters of style and the size of figures.

The editors also reserve the right to reject a paper even after it has been accepted if it becomes apparent that there are serious problems with the scientific content or with violations of our publishing policies.

Additional editorial policies can be found on the Nature journals [joint policies](#) page. This page includes information on manuscripts reviewed at other Nature journals, competing financial interests declarations, pre-publication publicity, deposition of data as a condition of publication, availability of data and reagents after publication, human and animal subjects, digital image integrity, biosecurity, refutations, complaints and correction of mistakes in the journal, duplicate publication, confidentiality and plagiarism.

## COSTS

There is a charge of \$1,050.00 for the first color figure and \$262.50 for each additional color figure. Extra pages are \$313.13, beginning with the 6th page.

## ADVANCE ONLINE PUBLICATION

*Nature Biotechnology* provides Advance Online Publication (AOP) of

research articles, which benefits authors with an earlier publication date and allows our readers access to accepted papers several weeks before they appear in print. Note that papers published online are definitive and may be altered only through the publication of a print corrigendum or erratum, so authors should make every effort to ensure that the page proofs are correct. All AOP articles are given a unique digital object identifier (DOI) number, which can be used to cite the paper before print publication. For details, please see [about advanced online publication](#).

## COVERS AND OTHER ARTWORK

Authors of accepted papers are encouraged to submit images for consideration as a cover. Cover images are normally linked to a specific paper in that issue, but we may also be able to use other images elsewhere in the journal, such as on the table of contents. Illustrations are selected for their scientific interest and aesthetic appeal. Please send prints or electronic files (rather than slides) in the first instance. Please also include a clear and concise legend explaining the image.

## PREPARING THE MANUSCRIPT

*Nature Biotechnology* is read by scientists from diverse backgrounds. In addition, many are not native English speakers. Authors should therefore give careful thought to how their findings may be communicated clearly. Although a shared basic knowledge of biology may be assumed, please bear in mind that the language and concepts that are standard in one subfield may be unfamiliar to nonspecialists. Thus, technical jargon should be avoided as far as possible and clearly explained where its use is unavoidable. Abbreviations, particularly those that are not standard, should also be kept to a minimum. The background, rationale and main conclusions of the study should be clearly explained. Titles and abstracts in particular should be written in language that will be readily intelligible to any scientist. We strongly recommend that authors ask a colleague with different expertise to review the manuscript before submission, in order to identify concepts and terminology that may present difficulties to nonspecialist readers.

The [content types page](#) describes the types of contributions that may be submitted to the journal, along with their length and figure limits. The journal's format requirements are described below.

Manuscripts reporting new structures should contain a table summarizing structural and refinement statistics. Templates for such tables describing [NMR](#) and [X-ray crystallography](#) data are available here. To facilitate assessment of the quality of the structural data, a stereo image of a portion of the electron density map (for crystallography papers) or of the superimposed lowest energy structures (>10; for NMR papers) should be provided with the submitted manuscript. If the reported structure represents a novel overall fold, a stereo image of the entire structure (as a backbone trace) should also be provided.

Please use American English spelling throughout.

At this time, we are not able to accept manuscripts in Word 2007 format.

Acknowledgments should be brief, and should not include thanks to anonymous referees and editors, or effusive comments. Grant or contribution numbers may be acknowledged. *Nature Biotechnology* requires an Author Contribution statement as described in the [Authorship](#) section of our joint [editorial policies](#).

The Methods section of original research articles will appear online only. Print readers will be directed to the online version of the paper for detailed methods and associated references. Please provide a Methods section with subsections detailing all the methods used in the paper. The Methods section should be no longer than 800 words and should be placed at the very end of the manuscript, after the Acknowledgments, Author Contributions, figure legends and tables, but before the references.

A single list of references should be provided, with any new citations that appear in the Methods section numbered consecutively beginning after the last reference cited in the main text, figure legends and tables. The combined reference number in the main text, figure legends, tables and online Methods should not exceed 50.

References are numbered sequentially as they appear in the text, tables, figure legends and online Methods. Only one publication is given for each number, and footnotes are not used. Only papers that have been published or accepted by a named publication should be in the numbered list; meeting abstracts that are not published and papers in preparation should be mentioned in the text with a list of authors (or initials if any of the authors are co-authors of the present contribution). URLs for web sites should be cited parenthetically in the text, not in the reference list. Grant details and acknowledgments are not permitted as numbered references.

All authors should be included in reference lists unless there are more than five, in which case only the first author should be given, followed by 'et al.'. Authors should be listed last name first, followed by a comma and initials of given names. Titles of cited articles are required for Articles, Letters, Perspectives, Reviews and Features, but not for Commentaries, Brief Communications, News and Views, Patent Articles or Careers & Recruitment articles. Titles of articles should be in Roman text and titles of books in italics; the first word of the title is capitalized, the title written exactly as it appears in the work cited, ending with a period. Journal names are italicized and abbreviated (with periods) according to common usage; refer to Index Medicus for details. Volume numbers appear in bold. For book citations, the publisher and city of publication are required (e.g., John Wiley & Sons, Hoboken, New Jersey, USA, 2003).

Figure legends for Articles begin with a brief title for the whole figure and continue with a short description of each panel and the symbols used, focusing on describing what is shown in the figure and de-emphasizing methodological details. Each legend should total no more than 250 words. Brief Communications have short figure legends (generally less than 100 words), which may include details of methods.

## GENE NOMENCLATURE

Authors should use approved nomenclature for gene symbols, and use symbols rather than italicized full names (Ttn, not titin). Please consult the appropriate nomenclature databases for correct gene names and symbols. Approved human gene symbols are provided by HUGO Gene Nomenclature Committee (HGNC), e-mail: [hgnc@genenames.org](mailto:hgnc@genenames.org); see also <http://www.genenames.org>. Approved mouse symbols are provided by The Jackson Laboratory, e-mail: [nomen@informatics.jax.org](mailto:nomen@informatics.jax.org); see also <http://www.informatics.jax.org/mgihome/nomen>.

For proposed gene names that are not already approved, please submit the gene symbols to the appropriate nomenclature committees as soon as possible, as these must be deposited and approved before publication of an article.

Avoid listing multiple names of genes (or proteins) separated by a slash, as in 'Oct4/Pou5f1', as this is ambiguous (it could mean a ratio, a complex, alternative names or different subunits). Use one name throughout and include the other at first mention: 'Oct4 (also known as Pou5f1)'.

## STATISTICAL GUIDELINES

Every article that contains statistical testing should state the name of the statistical test, the  $n$  for each statistical analysis, the comparisons of interest, a justification for the use of that test (including, for example, a discussion of the normality of the data when the test is appropriate only for normal data), the alpha level for all tests, whether the tests were one-tailed or two-tailed and the actual  $P$  value for each test (not merely

"significant" or " $P < 0.05$ "). It should be clear what statistical test was used to generate every  $P$  value. In the case of Brief Communications, these details should be reported in the text or the figure captions.

Data sets should be summarized with descriptive statistics, which should include the  $n$  for each data set, a clearly labeled measure of center (such as the mean or the median), and a clearly labeled measure of variability (such as standard deviation or range). Ranges are more appropriate than standard deviations or standard errors for small data sets. Graphs should include clearly labeled error bars. Authors must state whether a number that follows the  $\pm$  sign is a standard error (s.e.m.) or a standard deviation (s.d.).

Authors must justify the use of a particular test and explain whether their data conform to the assumptions of the tests. Three errors are particularly common.

- **Multiple comparisons:** When making multiple statistical comparisons on a single data set, authors should explain how they adjusted the alpha level to avoid an inflated Type I error rate, or they should select statistical tests appropriate for multiple groups (such as ANOVA rather than a series of  $t$ -tests).
- **Normal distribution:** Many statistical tests require that the data be approximately normally distributed; when using these tests, authors should explain how they tested their data for normality. If the data do not meet the assumptions of the test, then a non-parametric alternative should be used instead.
- **Small sample size:** When the sample size is small (less than about 10), authors should use tests appropriate to small samples or justify their use of large-sample tests.

There is a [checklist](#) available to help authors minimize the chance of statistical errors.

## PREPARING THE FIGURES

Authors are responsible for obtaining permission to publish any figures or illustrations that are protected by copyright, including figures published elsewhere and pictures taken by professional photographers. The journal cannot publish images downloaded from the internet without appropriate permission.

Figures should be uploaded upon submission via our [online submission system](#), in one of our preferred formats, if possible. Please use the smallest file size that provides sufficient resolution, preferably less than 1 MB, so that referees do not have to download extremely large files. When a paper is accepted, the editors will request high-resolution files suitable for publication.

Unnecessary figures and parts (panels) of figures and tables should be avoided: data presented in small tables or histograms, for instance, can generally be stated briefly in the text instead. Figures should not contain more than one panel unless the parts are logically connected; each panel of a multipart figure should be sized so that the whole figure can be reduced by the same amount and reproduced on the printed page at the smallest size at which essential details are visible. When a manuscript is accepted for publication, we will ask for high-resolution figure files, possibly in a different electronic format. This information will be included in the acceptance letter.

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