CLINICAL SCIENCE

Guidance for Authors 1997

CONTENTS

1. POLICY OF THE JOURNAL

1.1. Scope

Clinical Science publishes papers in the field of clinical investigation, provided they are of a suitable standard and contribute to the advancement of knowledge in this field. The term 'clinical investigation' is used in its broadest sense to include studies in animals and the whole range of biochemical, physiological, immunological and other approaches that may have relevance to disease in man. Studies which are confined to normal subjects, or animals, or are purely methodological in nature may be acceptable. The material presented should permit conclusions to be drawn and should not be only of a preliminary nature. The journal publishes four types of manuscript, namely invited Editorial Reviews, Full Papers, Rapid Communications and Correspondence. In addition, *Clinical Science* publishes abstracts of the proceedings of the Medical Research Society (as Supplements) and also the Bayer Lecture.

1.2. Availability on the World Wide Web (WWW) ◀

In 1997, headers of all articles will become available on the journal's home page on the WWW (http://cs.portlandpress.co.uk).

1.3. The editorial process

Membership of the Editorial Board covers as wide a range of interests as possible.

A submitted paper is considered by an appropriate editor together with (usually) two Referees from outside the membership of the Board. The Editor returns it with a recommendation to the Editor in Chief or Regional Editor, who then writes formally to the authors. The ultimate responsibility of acceptance for publication lies with the Editor in Chief.

Authors may suggest potential referees for their papers in the submission letter. The journal is under no obligation to follow such suggestions, but, if it does so, only **one** of the referees will be chosen from the authors' nominations, as the other referee will be selected independently.

1.4. Ethics of investigations

(a) Human subjects. Authors must state in the text of their paper that the research has been carried out in accordance with the Declaration of Helsinki (1989) of the World Medical Association, and has been approved by the Ethics Committee of the institution in which the work was performed. Consent **must** be obtained from each patient or subject after full explanation of the purpose, nature

and risk of all procedures used, and the fact that such consent has been given should be recorded in the paper.

(b) Animals. Care must always be taken to ensure that experimental animals do not suffer unnecessarily. Authors must state in the text the anaesthetic procedures used in full, and all precautions they took to ensure that the animals did not suffer unduly during and after the experimental procedure. Authors must confirm that the work was undertaken as required by the appropriate national legislation governing the use of animals, or, in the absence of such legislation, that the experimental procedures were carried out in accordance with the United States NIH guidelines [Guide for the care and use of laboratory animals, DHEW Publication no. (NIH) 85–23, Bethesda, MD: Office of Science and Health Reports, DRR/NIH, 1985].

The Editorial Board will not accept papers where the ethical aspects are, in the Board's opinion, open to doubt.

1.5. Originality of papers

Submission of a paper to *Clinical Science* implies that it has been approved by all the named authors, that all persons entitled to authorship have been so named, that it reports unpublished work that is not under consideration for publication elsewhere, that proper reference is made to the preceding literature, and that if the paper is accepted for publication the authors will transfer to the Biochemical Society the copyright of the paper, which will then not be published elsewhere in the same form, in any language, without the consent of the Society. Authors will be required to sign an undertaking to these effects. The restriction on previous publication does not usually apply to previous publication of oral communications in brief abstract form. In such cases authors should enclose three ▶ copies of the abstracts of previous publications. However, the restriction does apply to papers on the WWW. Requests for consent for reproduction of material published in *Clinical Science* should be addressed to the Managing Editor.

2. SUBMISSION OF MANUSCRIPTS: GENERAL INFORMATION AND FORMAT

2.1. General

Papers submitted for publication (together with correspondence about papers, proofs and requests for permission to reproduce material) should be sent to: The Managing Editor, *Clinical Science*, 59 Portland Place, London W1N 3AJ, U.K. [telephone: (UK) 0171-637 5873, (from overseas) +44 171-637 5873; fax: (UK) 0171-323 1136, (from overseas) +44 171-323 1136; e-mail: edit@portlandpress.co.uk]. The covering letter should include the author's telephone and fax numbers and e-mail address (if available).

Please note: authors in the Pacific Rim countries should submit their papers to Professor S. B. Harrap, Regional Editor, University of Melbourne, Department of Physi- ▶ ology, Parkville, Victoria 3052, Australia (telephone +61 3 9344 5836; fax +61 3 9349 4519).

The submission should contain four copies (of which three may be photocopies, except for half-tone figures) of the typescript, Tables, Figures, etc. The authors should retain one copy of the paper. The Editorial Board does not accept responsibility for damage or loss of papers submitted, although great care is taken to ensure safety and confidentiality of the typescript during the editorial process.

Papers should be presented so that they are intelligible to the non-specialist reader of the journal. This is particularly important in highly specialized fields and a very brief résumé of the current state of knowledge is usually helpful. Certain types of material, e.g. mathematical formulations requiring more than trivial derivations, should be given in a separate Appendix.

Where the reader is referred to previous works by the same author(s) for important details relevant to the present work, three copies or reprints of the publication (including papers on the WWW) should be sent with the ◀ typescript. This is of particular importance in relation to methodology.

The dates of receipt and acceptance of the paper will be published. If the paper has to be returned to the authors for revision and is not resubmitted within 1 month, the ◀ date of receipt will be revised accordingly and the revised paper may be treated as a new submission. It is emphasized that badly presented or unduly long papers will be returned for revision and delays in publication will be inevitable. Similar delays will be incurred if the typescript is not prepared strictly in accordance with the instructions detailed below.

Typescripts of rejected work will not be returned to authors unless a specific request for the return has been made at the time of submission.

2.2. Use of authors' diskettes

Authors should submit diskettes of **revised** papers to the editorial office. If the revised paper is acceptable every effort will be made to use the diskette during typesetting, but this cannot be guaranteed. Authors must ensure that files have been updated to incorporate all revisions, and hence that the version on the diskette matches the revised hard copy. We use WordPerfect for Windows, but we are able to read most 5.25″ and 3.5″ diskettes whether they have been created on an IBM PC or Macintosh computer. Our conversion software can translate a wide variety of commercially available word-processing packages and saving files in ASCII or DOS format is not necessary. The diskettes should be accompanied by a covering letter specifying manuscript number, operating system and software program.

(a) *Text.* Files should be formatted double-spaced with no hyphenation and automatic wordwrap (no hard returns within paragraphs). Please type your text consistently, e.g. take care to distinguish between '1'(one) and 'l' (lower case L), and '0' (zero) and 'O' (capital O), etc.

(b) *Tables.* Tables should be typed as text. The use of graphics programs and 'table editors' should be avoided.

(c) *Figures.* No artwork should be incorporated into the text files. Figures are normally handled conventionally, but

artwork may be provided on disk either in TIFF or EPS format and saved as a separate file. We can also accept CorelDraw files. Hard copy of illustrations must also be supplied (see p. v).

(d) *Mathematics*. In-line equations should be typed as text. The use of graphics programs and 'equation editors' should be avoided. Displayed equations (unless prepared by the 'MathType Equation Editor') are re-keyed by our printer.

2.3. Full Papers

These may be of any length that is justified by their content. Authors should, however, note that because of pressure for space in the journal no paper, whatever its scientific merits, will be accepted if it exceeds the minimum length required for precision in describing the experiments and clarity in interpreting them. As a guide, most papers published in the journal are of between six and eight printed pages. A concise well-written paper tends to be published more rapidly. Extensive Tables of data can be deposited with the Royal Society of Medicine (see 2.7). *Guidance for Authors* is usually published in the January issue of the journal, and is revised periodically.

The authors should refer to a current issue of *Clinical Science* to make themselves familiar with the general layout. Typescripts should be, in general, arranged as follows:

(a) *Title page*. Title: this should be as informative as possible, since titles of papers are being increasingly used in indexing and coding for information storage and retrieval. The title should indicate the species in which the observations reported have been made. It should not contain any abbreviations. The numbering of parts in a series of papers is not permitted.

List of authors' names (degrees and appointments are not required).

Laboratory or Institute of origin.

Key words: for indexing the subject of the paper; they should, if possible, be selected from the current issues of 'Medical Subject Headings' (MeSH) produced by the *Index Medicus*.

Short title: for use as a running heading in the printed text; it should not exceed forty-five characters and spaces and should not contain any abbreviations.

Author for correspondence: the name and address of the author to whom queries and requests for reprints should be sent.

(b) *Summary*. This should be a brief statement arranged **in numbered paragraphs** of what was done, what was found and what was concluded, and should rarely exceed 250 words. Abbreviations should be avoided as far as possible and must be defined. Statistical and methodological details including exact doses should also be avoided unless they are essential to the understanding of the Summary.

(c) *Introduction*. This should be comprehensible to the general reader and should contain a clear statement of the reason for doing the work, but should not include either the findings or the conclusions.

(d) *Methods*. The aim should be to give sufficient information in the text or by reference to permit the work to be repeated without the need to communicate with the author.

(e) *Results*. This section should not include material appropriate to the Discussion section.

(f) *Discussion*. This should not contain results and should be pertinent to the data presented.

(g) *Acknowledgments*. These should be as brief as possible.

(h) *References*. See p. v for the correct format.

(i) *Figures and Tables*. See p. v.

2.4. Rapid Communications

The passage of these papers through the editorial process will be expedited and contributors are encouraged to take advantage of this facility when data are novel and exciting, when rapid publication is of importance and when material can be presented concisely. Authors **must** include in their letter of submission a brief statement explaining the novelty of their work. Rapid Communications should describe completed work and should not be merely a preliminary communication.

Rapid Communications should be similar in format to full papers, except that they must occupy not more than four printed pages. This is about 3000 words, with appropriate deductions (at the rate of 1000 words/page) for Figures and Tables.

To achieve rapid publication, authors of accepted Rapid Communications will not be sent proofs. Rejection of a paper submitted as a Rapid Communication does not preclude its re-submission as a full paper for publication in *Clinical Science*, in which event the paper would be reviewed and reports provided with the editorial decision in the normal way.

2.5. Correspondence

Letters containing original observations or critical assessments of material published in *Clinical Science*, including Editorial Reviews, will be considered for the Correspondence section of the journal. Letters should be no longer than 750 words, with one Figure or Table and up to six references, or 1000 words maximum without a Figure or Table. Letters relating to material previously published in *Clinical Science* should be submitted within 6 months of the appearance of the article concerned. They will be sent to the authors for comment and both the letter and any reply by the author will be published together. Further correspondence arising therefrom will also be considered for publication. Consideration will also be given to publication of letters on ethical matters.

2.6. Editorial Reviews

These are normally commissioned. However, unsolicited reviews will be considered. Prospective authors should first submit a synopsis of their proposed review rather than the full typescript.

2.7. Arrangements for large amounts of information

It is impracticable to publish very large sets of individual values or very large numbers of diagrams, and under

these circumstances a summary of the information only should be included in the paper. The information from which the summary was derived should be submitted with the typescript and, if the latter is accepted, the Editors may ask for a copy of the full information and diagrams to be deposited with the Librarian, the Royal Society of Medicine, 1 Wimpole Street, London W1M 8AE, U.K., who will issue copies on request. Experience has shown that such requests are frequently received.

2.8. Proof corrections

These are expensive and corrections of other than printers' errors may have to be charged to the author.

2.9. Offprints

Twenty-five offprints are supplied free and additional copies may be obtained at terms, based upon the cost of production, that will be given with the proofs. All offprints should be ordered when the proofs are returned (except for Rapid Communications, where they should be ordered when the subedited typescript is returned).

2.10. Availability on MEDLINE and from Adonis

Summaries of papers in *Clinical Science* are available on the MEDLINE system run by the National Library of Medicine, National Institutes of Health, Bethesda, MD, U.S.A.

Full text with illustrations of individual papers can be obtained from Adonis Document Delivery Service, PO Box 839, 1000 AV Amsterdam, The Netherlands.

3. MISCELLANEOUS NOTES

3.1. Abbreviations

Abbreviations should be avoided; if used they must be defined at the first mention; new abbreviations should be coined only for unwieldy names which occur frequently. Abbreviations. except those indicated by an asterisk in the list on p. vii, should not appear in the title and short title nor, if possible, in the Summary. Numbers, not initials, should be used for patients and subjects.

3.2. Anatomical nomenclature

This should follow the recommendations of the International Anatomical Nomenclature Committee (Nomina Anatomica. 3rd ed. Amsterdam: Excerpta Medica Foundation, 1966).

3.3. Animals, plants and micro-organisms

The full binomial specific names should be given at first mention for all experimental animals other than common laboratory animals. The strain and, if possible, the source of laboratory animals should be stated. Thereafter in the text, single letter abbreviations may be given for the genus; if two genera with the same initial letter are studied, abbreviations such as *Staph.* and *Strep.* should be used.

3.4. Biochemical nomenclature

As far as possible authors should follow the recommendations of the Nomenclature Committee of IUBMB and IUPAC–IUBMB Joint Commission on Biochemical Nomenclature (see Biochemical nomenclature and related documents, 2nd ed., London: Portland Press, 1992; for corrections see Eur J Biochem 1993; **213**: 1–3).

3.5. Buffers and salts

The acidic and basic components should be given, together with the pH. Alternatively, a reference to the composition of the buffer should be given. Further details are provided in Biochem J 1996; **313**: 1–15.

When describing solutions containing organic anions and their parent acids, the salt designator (e.g. lactate, urate, oxalate) should be used in preference to the name of the acid (lactic, uric, oxalic) unless it is certain that virtually all of the acid is in the undissociated form.

The composition of incubation media should be described, or a reference to the composition should be given.

3.6. Computer modelling

Papers concerned primarily with computer modelling techniques are acceptable provided that use of such techniques leads to a clear choice between two or more alternative hypotheses, or to the formulation of a new hypothesis amenable to experimental challenge or verification, or provides some new insight into the behaviour of a particular physiological system. Extensive technical details of hardware and software should not be given.

3.7. Doses

Doses of drugs should be expressed in mass terms, e.g. milligrams (mg) or grams (g), and also in (parentheses) in molar terms, e.g. mmol, mol, where this appears to be relevant. Molecular masses of many drugs may be found in The Merck Index. 11th ed. Rahway, NJ, U.S.A.: Merck and Co. Inc., 1989.

3.8. Enzymes

Nomenclature should follow that given in Enzyme Nomenclature (San Diego: Academic Press, 1992); for corrections and additions see Eur J Biochem 1994; **223**: 1–5 and Eur J Biochem 1995; **232**: 1–6. The Enzyme Commission (EC) number should be quoted at the first mention. Where an enzyme has a commonly used informal name, this may be employed after the first formal identification. A unit of enzyme activity can be expressed as that amount of material which will catalyse transformation of 1 μmol of the substrate/s under defined conditions, including temperature and pH. This gives the unit of the amount of enzyme named the katal (symbol kat). Alternatively, or when the natural substrate has not been fully defined, activity should be expressed in terms of units of activity relative to that of a recognized reference prepara-

tion, assayed under identical conditions. Activities of enzymes should normally be expressed as units/ml or units/mg of protein.

3.9. Evaluation of measurement procedures

When a new measuring procedure has been used, or when an established procedure has been applied in a novel fashion, an estimate of the precision of the procedure should be given. This should, as far as possible, indicate what sources of variation have been included in this estimate, e.g. variation of immediate replication, variation within different times of day, or from day to day, etc.

If the precision of measurement varies in proportion to the magnitude of the values obtained, it can best be expressed as the coefficient of variation; otherwise it should be expressed by an estimate of the (constant) standard error of a single observation, or by estimates of several points within the range of observed values.

When recovery experiments are described the approximate ratio of the amount added to the amount already present and the stage of the procedure at which the addition was made should be stated.

For methods or assays crucial to the understanding of the paper, information should normally be provided on the validity, accuracy and precision of those methods.

3.10. Figures and Tables

Their number should be kept to a minimum. Their appropriate position in the paper should be indicated in the margin of the text. References to Figures and Tables should be in arabic numerals, e.g. Fig. 3, and they should be numbered in order of appearance. In general, the same data should not be presented in both a Figure and a Table.

Figures should be supplied in a form that can be reproduced directly by the printer, together with photocopies. All Figures should have their number and the authors' names written in pencil on the back; the top of the Figure ▶ should be indicated with a pencilled arrow. Figures are not routinely relettered. Authors should ensure that nomenclature, abbreviations, etc. used in lettering of Figures correspond to those used in the text. Separate panels within Figures should be clearly marked (a), (b), (c), etc. so that they can be referred to easily in the legend and text. Acceptable symbols for experimental points are ●, ▲, ■, ○, △, □. The symbols × or + should be avoided. Symbols should not be generated by using tints or a graphics program. The same symbols must not be used for two curves where the points might be confused. For scatter diagrams, solid symbols are preferred. When a particular variable appears in more than one Figure, the same symbol should be used for it throughout, if possible.

Curves should not be drawn beyond the experimental points, nor should axes extend appreciably beyond the data. Only essential information that cannot readily be included in the legend should be written within the Figure.

▶ The use of tints should be avoided; however, if tints are necessary, please ensure that a dot fill of 100 lines per inch or lower is used. Columns in histograms should be differentiated by the use of simple hatching etc.

Figures for half-tone reproduction should be submitted as glossy prints. **Four copies (not photocopies) of each print should be provided.** All lettering should be placed ◀ directly on to the Figure, not on a clear film overlay. Where the magnification is to be indicated (e.g. on electron micrographs), this should be done by adding a bar representing a stated length.

Colour figures are accepted when, in the opinion of the Editorial Board, they are essential to illustrate a particular scientific point. Authors will normally be required to pay the full cost of colour separation and printing (at 1997 prices, approximately £1000 for the first Figure and £200 for each subsequent Figure).

Tables should be typed separately from the text. They should have an underlined title followed by any legend. Parameters being measured, with units if appropriate, should be clearly indicated in the column headings.

Captions for the Figures, and titles and legends for the Tables, should make them **readily understandable** without reference to the text. Adequate statistical information, including that on regression lines, should be included in Figure captions where appropriate.

Care is needed when using powers in Figure and Table headings to avoid numbers with too many digits (see 3.17).

3.11. Footnotes

These should be avoided as far as possible but where they are used in Tables they should be identified by the symbols *†‡§‖¶, in that order.

3.12. 'Homology'

The term 'homologous' has a precise meaning in biology of 'having a common evolutionary origin', but it has often been used in work on protein and nucleic acid sequences to mean simply 'similar'. A group of experts has urged that the interests of clarity are best served by restricting use to the more precise definition (Reeck GR, et al. Cell 1987; **40**: 667; Lewin R. Science 1987; **237**: 1570). *Clinical Science* agrees with these arguments and aims to preserve the distinction between 'homologous' and 'similar' in its pages.

3.13. Isotope measurements

Where possible radioactivity should be expressed in absolute terms; the SI unit for radioactivity is the becquerel (Bq), defined as 1 disintegration/s, but the Curie (C_i; 1 $C_i = 3.7 \times 10^{10}$ Bq) may also be used. Alternatively, radioactivity may be expressed as disintegrations (or counts) per unit of time, e.g. disintegrations/s (d.p.s.) or counts/min (c.p.m.).

3.14. Radionuclide applications in man

If new or modified radionuclide applications in man are described, an estimate of the maximal possible radiation dose to the body and critical organs should be given.

For the time being this can continue to be expressed in rems, but with the corresponding figure in sieverts (Sv) given in parentheses after it.

3.15. Methods

In describing certain techniques, namely centrifugation (when the conditions are critical), chromatography and electrophoresis, authors should follow the recommendations published by the Biochemical Society (currently, Biochem J 1997; **321**: 1–16).

3.16. Nomenclature of disease

This should follow the International Classification of Disease (9th revision. Geneva: World Health Organization, 1979) as far as possible.

3.17. Powers in Tables and Figures

Care is needed where powers are used in Table headings and in Figures to avoid numbers with an inconvenient number of digits. For example: (i) an entry '2' under the heading 10^3 k means that the value of k is 0.002; an entry '2' under the heading 10^{-3} k means that the value of k is 2000. (ii) A concentration 0.00015 mol/l may be expressed as 0.15 under the heading 'concn. (mmol/l)' or as 150 under heading 'concn. (μmol/l)' or as 15 under the heading '$10^5 \times$ concn. (mol/l)', but not as 15 under the heading 'concn. (mol/l $\times 10^{-5}$)'.

3.18. References

The 'Vancouver' system is used: references in the text are numbered consecutively in the order in which they are first mentioned, the numerals being given in brackets, e.g. [22]. References cited in Figure legends or Tables only should be numbered in a sequence determined by the position of the first mention in the text of the Figure or Table. References should be listed in numerical order and the names of all authors of a paper should be given (except where there are seven or more when only the first three should be listed and et al. added), with the full title of the paper and the source details in full including the first and last page numbers, e.g.

2. Mathur R, Mortimore IL, Jan MA, Douglas NJ. Effect of breathing pressure and posture on palatoglossal and genioglossal tone. Clin Sci 1995; **89**: 441–5.

When the quotation is from a book, the following format should be used, giving the relevant pages or chapter number:

20. Cornish-Bowden A. Fundamentals of enzyme kinetics. London: Portland Press Ltd, 1995.
21. Hainsworth R, Drinkhill MJ. Regulation of blood volume. In: Jordan D, Marshall JM, eds. Cardiovascular regulation. London: Portland Press Ltd, 1995: 77–91.

References to 'personal communications' and unpublished work' should appear in the text only and not in the list of references. The name and initials of the source of information should be given. In the case of quotations from personal communications the authors **must** provide documentary evidence that permission for quotation has been obtained. When the reference is to material that has been accepted for publication but has not yet been published, this should be indicated in the list of references by 'In press' together with the name of the relevant journal and, if possible, the expected date of publication. If such a citation is of major relevance to the manuscript submitted for publication authors are advised that the editorial process might be expedited by the inclusion of a copy of such work.

3.19. Solutions

Concentration of solutions should be described where possible in molar terms (mol/l and subunits thereof), stating the molecular particle weight if necessary. Values should not be expressed in terms of normality or equivalents. Mass concentration should be expressed as g/l or subunits thereof, for example mg/l or μg/l. For solutions of salts, molar concentration is always preferred to avoid ambiguity as to whether anhydrous or hydrated compounds are used. Concentrations of aqueous solutions should be given as mol/l or mol/kg (g/l or g/kg if not expressed in molar terms) rather than % (w/v) or % (w/w). It should always be made clear whether concentrations of compounds in a reaction mixture are final concentrations or the concentrations in solutions added.

3.20. Spectrophotometric data

The general name for the quantity log (I_o/I) is attenuance, and it reduces to absorbance when there is negligible scattering or reflection. The more general term 'attenuance' should be used when scattering is considerable, e.g. when the quantity is measured to estimate the cell density of a culture. Otherwise the term absorbance should be used; neither should be called extinction or optical density. Symbols used are: A, absorbance; D, attenuance; a, specific absorption coefficient (litre g^{-1} cm^{-1}) (alternatively use $A^{1\%}_{1cm}$); ε, molar absorption coefficient (the absorbance of a molar solution in a 1 cm light-path) (litre mol^{-1} cm^{-1}, *not* cm^2 mol^{-1}).

3.21. Spelling

Clinical Science uses as standards for spelling the Concise or Shorter Oxford Dictionary of Current English (Oxford: Clarendon Press) and Butterworth's Medical Dictionary (London: Buttterworths).

3.22. Statistics

Papers are frequently returned for revision (and their publication consequently delayed) because the authors use inappropriate statistical methods. Two common errors are the use of means, standard deviations and standard errors in the description and interpretation of grossly non-normally distributed data and the application of t-tests for the significance of difference between means in similar circumstances, or when the variances of the two groups are non-homogeneous. In some circumstances it may be more appropriate to provide a 'scattergram' than a statistical summary. Authors are recommended to consult the statistical guidelines presented by Altman et al. in 'Statis-

tical guidelines for contributors to medical journals' Br Med J 1983; **286**: 1489–93.

The type of statistical test used should be stated in the Methods section. A reference should be given for the less commonly encountered statistical tests. The format for expressing mean values and standard deviations or standard errors of the mean is, for example: mean cardiac output 10.4 litres/min (SD 1.2; $n = 11$). Degrees of freedom should be indicated where appropriate. Levels of significance are expressed in the form $P < 0.01$.

3.23. Trade names

The name and address of the supplier of special apparatus and of biochemicals should be given. Registered trademarks should be identified by the symbol ® where they appear in the text. In the case of drugs, approved names should always be given with trade names and manufacturers in parentheses.

4. UNITS: THE SI SYSTEM

The recommended Système International (SI) units (see Quantities, units and symbols in physical chemistry. Oxford: Blackwell Scientific Publications Ltd, 1988) are used by *Clinical Science*. **All papers submitted should use these units** except for blood pressure values, which should be expressed in mmHg, and gas partial pressures, where values at the author's discretion may be given in mmHg (with kPa in parentheses) or as kPa (with mmHg in parentheses). Airways pressure should be expressed in kPa. Where molecular mass is known, the amount of a chemical or drug should be expressed in mol or in an appropriate subunit, e.g. mmol. Energy should be expressed in joules (J).

The basic SI units and their symbols are as follows:

Physical quantity	*Name*	*Symbol*
length	metre	m
mass	kilogram	kg
time	second	s
electric current	ampere	A
thermodynamic temperature	kelvin	K
luminous intensity	candela	cd
amounts of substance	mole	mol

The following are examples of derived SI units:

Physical quantity	*Name*	*Symbol*	*Definition*
energy	joule	J	$kg\ m^2\ s^{-2}$
force	newton	N	$kg\ m\ s^{-2} = J\ m^{-1}$
power	watt	W	$kg\ m^2\ s^{-3} = J\ s^{-1}$
pressure	pascal	Pa	$kg\ m^{-1}\ s^{-2} = N\ m^{-2}$
electric charge	coulomb	C	A s
electric potential difference	volt	V	$kg\ m^2\ s^{-2}\ A^{-1} = J\ A^{-1}\ s^{-1}$
electric resistance	ohm	Ω	$kg\ m^2\ s^{-3}\ A^{-2} = V\ A^{-1}$
electric conductance	siemens	S	$kg^{-1}\ m^{-2}\ s^3\ A^2 = \Omega^{-1}$
electric capacitance	farad	F	$A^2\ s^3\ kg^{-1}\ m^{-2} = A\ s\ V^{-1}$
frequency	hertz	Hz	s^{-1}
volume	litre	l	$10^{-3}\ m^3$

The word 'litre' has been accepted as a special name for cubic decimetre (1 litre = 1 dm^3).

Both the basic and derived SI units, including the symbols of derived units that have special names, may be preceded by prefixes to indicate multiples and submultiples. The prefixes should be as follows:

Multiple	*Prefix*	*Symbol*	*Multiple*	*Prefix*	*Symbol*
10^6	mega	M	10^{-3}	milli	m
10^3	kilo	k	10^{-6}	micro	μ
10^2	hecto	h*	10^{-9}	nano	n
10	deka	da	10^{-12}	pico	p
10^{-1}	deci	d*	10^{-15}	femto	f
10^{-2}	centi	c*			

*To be avoided where possible (except for cm).

Compound prefixes should not be used, e.g. 10^{-9} m should be represented by 1 nm, not 1 mμm.

Notes

(i) Full stops are not used after symbols.

(ii) Minutes (min), hours (h), days and years will continue to be used in addition to the SI unit of time [the second(s)].

(iii) The solidus may be used in a unit as long as it does not have to be employed more than once, e.g. mmol/l is acceptable, but ml/min/kg is not, and should be replaced by ml $min^{-1}\ kg^{-1}$.

5. ABBREVIATIONS, CONVENTIONS, DEFINITIONS, SYMBOLS AND SPECIAL COMMENTS

Standard symbols and abbreviations that can be used without definition are indicated by an asterisk; this list also shows selected abbreviations in the form of groups of capital letters (e.g. ALA, ECF, MCHC) which when used must be defined in the text as indicated on p. iv. The standard abbreviations for amino acids are only for use in Figures and Tables or for peptide sequences.

absorbance	*A*
acceleration due to gravity	*g*
adenosine 3′:5′-cyclic monophosphate (cyclic AMP)	cAMP*
adenosine 5′-phosphate	AMP*
adenosine 5′-diphosphate	ADP*
adenosine triphosphatase	ATPase*
adenosine 5′-triphosphate	ATP*
adrenoceptor (*see also* blocking agents)	
adrenocorticotropic hormone	ACTH
alanine	Ala
alternating current	a.c.*
alveolar minute ventilation	$\dot{V}_A$
alveolar to arterial oxygen partial pressure difference	$(P_{AO_2} - P_{aO_2})$
aminolaevulinic acid	ALA
ampere	A
angiotensin	ANG; reference amino acid abbreviations are used as prefix within brackets: e.g. [Sar^1, Val^5, Ala^8]ANG
ångstrom	Å (1 ångstrom = 10^{-1} nm)
antidiuretic hormone	ADH (when referring to the physiological secretion)
arginine	Arg

arteriovenous	a–v: *permitted* in Figures and Tables
asparagine	Asn
aspartic acid	Asp
atmosphere (unit of pressure)	*not used*; express in kPa (1 atmosphere = 101.325 kPa)
attenuance	D
base pair	bp*
becquerel	Bq (1 d.p.s.)
blocking agents	e.g. β-adrenoceptor antagonists preferred
blood pressure	express in mmHg
blood urea nitrogen	*not used*; recalculate as urea, express in mmol/l
blood volume	BV
body temperature and pressure, saturated	BTPS*
bovine serum albumin	BSA*
British Pharmacopoeia	write in full and give edition
calculated	calc. (in Tables only)
'Calorie' (= 1000 cal)	*not used*; recalculate as kilojoules (1 'Calorie' = 4.184 kJ)
carbon dioxide output (in respiratory physiology)	$\dot{V}_{CO_2}$; express in ml STP/min
cardiac frequency	f_c in beats/min
cardiac output	express in l/min
centimetre	cm
clearance of x	C_x
coenzyme A and its acyl derivatives	CoA* and acyl-CoA*
compare	cf.
complement components	C1–C9*
compliance (respiratory physiology)	C; express in 1 kPa^{-1}
concentrated	conc.
concentration	concn.; may be denoted [ ], e.g. plasma $[HCO_3^-]$
concentration giving half-maximal response	EC_{50}*
concentration giving half-maximal inhibition	IC_{50}*
conductance (respiratory physiology)	G; express in 1 s^{-1} kPa^{-1}
correlation coefficient	r
counts/min, counts/s	c.p.m.*, c.p.s.*
cubic centimetres	*use* ml
curie	Ci (1 Ci = 3.7×10^{10} d.p.s.)
cycle/s	Hz
cysteine	Cys
dates	e.g. 11 August 1970
dead-space minute ventilation	$\dot{V}_D$
dead-space volume	V_D
degrees, Celsius or centigrade	°C
deoxy (prefix)	*not* desoxy
deoxycorticosterone	DOC
deoxycorticosterone acetate	DOCA
deoxyribonucleic acid	DNA*
complementary	cDNA*
deoxyribonuclease	DNase*
diethylaminoethylcellulose	DEAE-cellulose*
differential of x with respect to time	$\dot{x}$(= dx/dt)
1,25-dihydroxycholecalciferol	1,25-$(OH)_2D_3$
dilute	dil.
dimethyl sulphoxide	DMSO*
2,3-diphosphocglycerate	2,3-DPG
direct current	d.c.*
disintegrations/min	d.p.m.*
disintegrations/s	d.p.s.*
dissociation constant	
acidic	K_a
apparent	e.g. K'_a
basic	K_b
minus log of	pK
doses	avoid Latin designations such as b.d. and t.i.d.
dyne	dyn
elastance	E; express in Pa m^{-3}
electrocardiogram	ECG*
electroencephalogram	EEG*
electromotive force	e.m.f.*
electron paramagnetic (or spin) resonance	EPR*, ESR*
electronvolt	eV (or radiation energies)
enzyme-linked immunosorbent assay	ELISA*
equation	eqn.
equivalents (amount of a chemical)	*not used*; recalculate in molar terms
erythrocyte count	express as 10^{12} cells/l
ethanol, ethanolic	*not* ethyl alcohol or alcoholic
ethylenediaminetetra-acetate	EDTA*
'ethyleneglycolbis(aminoethyl-ether)tetra-acetate'	EGTA*
exchangeable	Na_e, K_e etc. for total exchangeable sodium, potassium etc.
Experiment (with reference numeral)	Expt.; plural, Expts.
expired minute ventilation	$\dot{V}_E$
extinction	*use* absorbance
extracellular fluid	ECF
extracellular fluid volume	ECFV
extraction ratio of x (renal)	E_x
fast protein liquid chromatography	FPLC*
Figure (with reference numeral)	Fig.; plural, Figs.
filtered load of x (renal)	F_x
flavin-adenine dinucleotide	FAD*
flavin mononucleotide	FMN*
follicle-stimulating hormone	FSH
forced expiratory volume in 1.0 s	$FEV_{1.0}$
fractional concentration in dry gas	F
fractional disappearance rate	k (as in $A = A_0e^{-kt}$)
frequency of respiration	f_R; in breaths/min
functional residual capacity	FRC
gas–liquid chromatography	GLC*
gas transfer factor	T; in mmol min^{-1} kPa^{-1}
glomerular filtration rate	GFR
glutamic acid	Glu
glutamine	Gln
glutathione	GSH (reduced); GSSG (oxidized)
glycine	Gly
gram	g
gravitational field, unit of (9.81 m s^{-1})	g
gray	Gy (100 rads)
growth hormone	GH; if human, hGH
guanine-nucleotide-binding regulatory protein	G-protein*
haematocrit	Hct; no units
haemoglobin	Hb*; express in g/dl
half-life	$t_{1/2}$
hertz (s^{-1})	Hz
high-pressure (or high-performance) liquid chromatography	HPLC*
histidine	His
hour	h
human chorionic gonadotropin	hCG
human placental lactogen	hPL
hydrocortisone	*use* cortisol

hydrogen ion activity	aH; express in nmol/l
minus log of	pH
25-hydroxycholecalciferol	25-(OH)D_3
4-(2-hydroxyethyl)-l-piperazine-ethanesulphonic acid	Hepes*
hydroxyproline	Hyp
immunoglobulins	IgA, IgD, IgE, IgG, IgM*
infrared	IR*
injection routes:	use abbreviations only in Figures
intra-arterial	i.a.
intramuscular	i.m.
intraperitoneal	i.p.
intravenous	i.v.
subcutaneous	s.c.
international unit	i.u. (definition and reference should be given for uncommon or ambiguous applications, e.g. enzymes)
intracellular fluid	ICF
intracellular fluid volume	ICFV
ionic strength	*I*
isoleucine	Ile
isotonic	*specify composition of fluid*, e.g. 150 mmol/l NaCl
isotopically labelled compounds	e.g. [U-^{14}C]glucose, [l-^{14}C]glucose, sodium [l-^{14}C]acetate; *use* ^{131}I-labelled albumin, *not* [^{131}I]albumin
	for simple molecules: $^{14}CO_2$, ^3H_2O
joule	J
katal	kat
kilobases	kb*
kilogram	kg
lactate dehydrogenase	LDH
leucine	Leu
leucocyte count	express as 10^9 cells/l
lipoproteins (serum)	
high density	HDL
low density	LDL
very low density	VLDL
litre	l (write in full if confusion with the numeral 1 is possible)
logarithm (base 10)	log
logarithm (base e)	ln
luteinizing hormone	LH
lysine	Lys
mass spectrometry	MS*
maximum	max.
mean corpuscular haemoglobin	MCH; express in pg
mean corpuscular haemoglobin concentration	MCHC; express in g/dl
mean corpuscular volume	MCV; express in fl ($1\ \mu m^3 = 1$ fl)
melting point	m.p.
meta-	*m-*
methanol, methanolic	*not* methyl alcohol
methionine	Met
metre	m
Michaelis constant	K_m
micromole	μmol
micron (10^{-6} m)	μm; *not* μ
milliequivalent	*not used*; give amount in mmol
millilitre	ml
millimetre of mercury	mmHg; for blood pressure and, at authors' discretion, for gas partial pressures: see p. vi (1 mmHg = 0.133 kPa)
millimolar (concentration)	mmol/l; not mM
millimole	mmol
minimum	min.
minute (60 s)	min
molal	mol/kg
molar (concentration)	mol/l; *not* M
molar absorption coefficient	ε (the absorbance of a molar solution in a 1 cm light-path)
mole	mol
molecular mass	express in Da or kDa
molecular mass (relative)	M_r (no units)
4-morpholine propanesulphonic acid	Mops*
nicotinamide–adenine dinucleotide	NAD if oxidation state not indicated*
	NAD^+ if oxidized*
	NADH if reduced*
nicotinamide–adenine dinucleotide phosphate	NADP if oxidation state not indicated*
	$NADP^+$ if oxidized*
	NADPH if reduced*
normal	should not be used to denote the concentration or osmolarity of a solution
normal temperature and pressure	*use* standard temperature and pressure (STP*)
nuclear magnetic resonance	NMR*
number (in enumerations)	no. (in Tables only)
observed	obs. (in Tables only)
ohm	Ω
ornithine	Orn
ortho-	*o-*
orthophosphate (inorganic)	P_i
osmolarity	express in osmol (or mosmol)/l
oxygen uptake per minute (in respiratory physiology)	$\dot{V}O_2$; express in ml STP/min
packed cell volume	PCV; express in %
page, pages	p., pp.
para-	*p-*
para-aminohippurate	PAH
partial pressure	*P*; express in either kPa or mmHg (see p. vii)
e.g. alveolar, of O_2	P_{AO_2}
arterial, of CO_2	P_{aCO_2}
capillary, of O_2	P_{capO_2}
end-tidal, of CO_2	P_{ETCO_2}
mixed venous, of CO_2	P_{vCO_2}
pascal	Pa
per	/
per cent	%
petroleum ether	*not used*; *use* light petroleum and give boiling range
phenylalanine	Phe
phenylmethanesulphonyl fluoride	PMSF*
phosphate-buffered saline	PBS*
plasma renin activity	express as pmol of angiotensin I h^{-1} ml^{-1}
plasma volume	PV
poise	1 poise = 10^{-1} N s m^{-2}
polyacrylamide-gel electrophoresis	PAGE*
potential difference	p.d.
power output	W (1 kpm/min = 0.1635 W)
precipitate	ppt.
pressure	*P*; express in kPa (except for blood pressures and gas partial pressures: see p. vii); 1 kPa = 7.5 mmHg
probability of an event being due to chance alone	*P*
proline	Pro
pulmonary capillary blood flow	$\dot{Q}c$
pyrophosphate (inorganic)	PP_i*

rad (radiation dose; 10^{-5} J absorbed/g of material)	not abbreviated (100 rads = 1 Gy)
radioimmunoassay	RIA*
red blood cell	*use* erythrocyte; express counts as 10^{12} cells/l
relative band speed (partition chromatography)	R_F
rem	100 ergs/s × quality factor
renin	*see* plasma renin activity
residual volume	RV
resistance (rheological)	R; express in kPa l^{-1} s
respiratory exchange ratio (pulmonary)	R
respiratory quotient (metabolic)	RQ
revolutions	rev.
rev./min	*not* r.p.m.; *use g* if possible (see p. viii)
ribonucleic acid	RNA*
messenger	mRNA*
transfer	tRNA*
ribonuclease	RNase*
röntgen	R
saline	define at first mention [e.g. NaCl solution (154 mmol/l)]
saturation	S, e.g. Sa_{O_2} for arterial oxygen saturation (see partial pressure for other analogous abbreviations)
second (time)	s
serine	Ser
sievert	Sv (1 J/kg × quality factor)
solvent systems	e.g. butanol/acetic acid/water (4:1:1, by vol.), butanol/acetic acid (4:1, v/v)
sodium dodecyl sulphate	SDS*
species	sp., plural spp.
specific activity	sp. act. Confusion must be avoided between e.g. specific radioactivity and the specific activity of an enzyme
specific conductance of airways	sGaw; express in s^{-1} kPa^{-1}
standard deviation	SD*
standard error of the mean	SEM*
standard temperature and pressure	STP
steroid nomenclature	see Eur J Biochem 1989; **186**: 429–58 and Eur J Biochem 1993; **213**: 1–3
sulphydryl	*use* thiol or SH
sum	Σ
Svedberg unit	S
temperature (absolute)	T
(empirical)	t
temperature, thermodynamic	K
thin-layer chromatography	TLC*
threonine	Thr
thyrotrophic hormone	TSH
thyrotrophin-releasing hormone	TRH
tidal volume	V_T
time (symbol)	t
time of day	e.g. 18.15 hours
torr	not used; *use* kPa (1 torr = 0.133 kPa)
tryptophan	Trp
tubular maximal reabsorptive capacity for x	$T_{m,x}$
tyrosine	Tyr
ultraviolet	UV*
urinary concentration of x	U_x
valency	e.g. Ca^{2+}, *not* Ca^{++}
valine	Val
variance ratio	F
vascular resistance	express in kPa l^{-1} s (with value in dyn s cm^{-5} in parentheses); primary values of differential vascular pressure (mmHg) and flow (l/min) should always also be given in Tables or text as appropriate
velocity	v; express as m s^{-1}
venous admixture	Q_{va}
viscosity, dynamic	η
viscosity, kinematic	ν
vital capacity	VC
volt	V
volume of blood (in cardio-respiratory physiology)	Q; *use* $\dot{Q}$ for blood flow rate
watt	W
wavelength	λ
weight	wt.
white blood cell	*use* leucocyte; express counts as 10^9 cells/l

Volume 92

AUTHOR INDEX

Volume 92

SUBJECT INDEX

First and last page numbers of papers to which entries refer are given. Page numbers marked with an asterisk refer to Reviews.