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 Physiology, 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.

(b) 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: 657; 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 (Ci; 1 Ci = 3.7 × 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 rem, but with the corresponding figure in sievers (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. ($\mu$mol/l)' or as 15 under the heading '10$^5$ x concn. (mol/l)', but not as 15 under the heading 'concn. (mol/l x 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.


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


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 $\log (I_0/I)$ is attenuation, 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; $D$, attenuation; $a$, specific absorption coefficient (litre g$^{-1}$ cm$^{-1}$) (alternatively use $A_f^{100}$); $c$, 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

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 r-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-

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:

<table>
<thead>
<tr>
<th>Physical quantity</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>length</td>
<td>metre</td>
<td>m</td>
</tr>
<tr>
<td>mass</td>
<td>kilogram</td>
<td>kg</td>
</tr>
<tr>
<td>time</td>
<td>second</td>
<td>s</td>
</tr>
<tr>
<td>electric current</td>
<td>ampere</td>
<td>A</td>
</tr>
<tr>
<td>thermodynamic temperature</td>
<td>kelvin</td>
<td>K</td>
</tr>
<tr>
<td>luminous intensity</td>
<td>candela</td>
<td>cd</td>
</tr>
<tr>
<td>amounts of substance</td>
<td>mole</td>
<td>mol</td>
</tr>
</tbody>
</table>

The following are examples of derived SI units:

<table>
<thead>
<tr>
<th>Physical quantity</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>energy</td>
<td>joule</td>
<td>J</td>
</tr>
<tr>
<td>force</td>
<td>newton</td>
<td>N</td>
</tr>
<tr>
<td>power</td>
<td>watt</td>
<td>W</td>
</tr>
<tr>
<td>pressure</td>
<td>pascal</td>
<td>Pa</td>
</tr>
<tr>
<td>electric charge</td>
<td>coulomb</td>
<td>C</td>
</tr>
<tr>
<td>electric potential</td>
<td>volt</td>
<td>V</td>
</tr>
<tr>
<td>electric resistance</td>
<td>ohm</td>
<td>Ω</td>
</tr>
<tr>
<td>electric conductance</td>
<td>siemens</td>
<td>S</td>
</tr>
<tr>
<td>electric capacitance</td>
<td>farad</td>
<td>F</td>
</tr>
<tr>
<td>frequency</td>
<td>hertz</td>
<td>Hz</td>
</tr>
<tr>
<td>volume</td>
<td>litre</td>
<td>l</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Multiple</th>
<th>Prefix</th>
<th>Symbol</th>
<th>Multiple</th>
<th>Prefix</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>10$^6$</td>
<td>mega</td>
<td>M</td>
<td>10$^{-3}$</td>
<td>milli</td>
<td>m</td>
</tr>
<tr>
<td>10$^3$</td>
<td>kilo</td>
<td>k</td>
<td>10$^{-6}$</td>
<td>micro</td>
<td>μ</td>
</tr>
<tr>
<td>10$^2$</td>
<td>hecto</td>
<td>h</td>
<td>10$^{-9}$</td>
<td>nano</td>
<td>n</td>
</tr>
<tr>
<td>10$^1$</td>
<td>deka</td>
<td>da</td>
<td>10$^{-12}$</td>
<td>pico</td>
<td>p</td>
</tr>
<tr>
<td>10$^{-1}$</td>
<td>deci</td>
<td>d</td>
<td>10$^{-15}$</td>
<td>femto</td>
<td>f</td>
</tr>
<tr>
<td>10$^{-2}$</td>
<td>centi</td>
<td>c</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*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 μm.

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.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>absorbance</td>
<td>A</td>
</tr>
<tr>
<td>acceleration due to gravity</td>
<td>g</td>
</tr>
<tr>
<td>adenosine 3':5'-cyclic monophosphate (cyclic AMP)</td>
<td>cAMP*</td>
</tr>
<tr>
<td>adenosine 5'-phosphate</td>
<td>AMP*</td>
</tr>
<tr>
<td>adenosine 5'-diphosphate</td>
<td>ADP*</td>
</tr>
<tr>
<td>adenosine triphosphate</td>
<td>ATPase*</td>
</tr>
<tr>
<td>adenosine 5'-triphosphate</td>
<td>ATP*</td>
</tr>
<tr>
<td>adrenocorticotropic hormone</td>
<td>ACTH</td>
</tr>
<tr>
<td>alanine</td>
<td>Ala</td>
</tr>
<tr>
<td>alternating current</td>
<td>a.c.*</td>
</tr>
<tr>
<td>alveolar minute ventilation</td>
<td>VA</td>
</tr>
<tr>
<td>alveolar to arterial oxygen partial pressure difference</td>
<td>(PAO$_2$ - PAO$_3$)</td>
</tr>
<tr>
<td>aminolaevulinic acid</td>
<td>ampicene</td>
</tr>
<tr>
<td>angiotensin</td>
<td>ANG; reference amino acid abbreviations are used as prefix within brackets: e.g. [Sar$^1$, Val$^2$, Ala$^3$]ANG</td>
</tr>
<tr>
<td>ångstrom</td>
<td>Å (1 ångstrom = 10$^{-10}$ nm)</td>
</tr>
<tr>
<td>antidiuretic hormone</td>
<td>ADH (when referring to the physiological secretion)</td>
</tr>
<tr>
<td>arginine</td>
<td>Arg</td>
</tr>
</tbody>
</table>
arteriovenous
asparagine
aspartic acid
atmosphere (unit of pressure)
attenuance
base pair
becquerel
blocking agents
blood pressure
blood urea nitrogen
calculated
body temperature and
blood volume
carbon dioxide output (in
respiratory physiology)
cardiac frequency
cardiac output
centimetre
clearance of x
coenzyme A and its acyl
derivatives
compare
complement components
compliance (respiratory
physiology)
concentrated
concentration
giving half-
maximal response
giving a half-
maximal inhibition
conductance (respiratory
physiology)
correlation coefficient
counts/min, counts/s
cubic centimetres
curie
cycle/s
cysteine
dates
dead-space minute ventilation
dead-space volume
degrees, Celsius or centigrade
deoxy (prefixes)
decoxytocorticosterone
decoxytocorticosterone acetate
dec oxyribonucleic acid
complementary
dec oxyribonuclease
diethylaminoethylcellulose
differential of x with respect
to time
dilute
dimethyl sulfoxide
diphosphoglycerate
direct current
disintegrations/min
disintegrations/s
dissociation constant
acidic
apparent
basic

minus log of doses
dyne
elastance
electrocardiogram
electroencephalogram
emotroductive force
electron paramagnetic (or
spin) resonance
electronvolt

expressed in mmHg

not used; recalculate as urea,
express in mmol/l

BV

BTPS*

BSA*

write in full and give edition
calc. (in Tables only)
not used; recalculate as
kilojoules (1 'Calorie' =
4.184 kJ)

YCO2 = express in ml STP/min

fmax/min expres in 1/min
cm

CoA* and acyl-CoA*

ef.

CI – C9*

C; express in 1 kPa–1

conc.

conc.; may be denoted [], e.g.
plasma [HCO3–]

EC20*

IC50*

Gi; express in 1 s–1 kPa–1

r

c.p.m.*, c.p.s.*

use ml

Cl (1 Ci = 3.7 × 1010 d.p.s.)

Hz

Cys

e.g. 11 August 1970

Vb

T

C

not deoxy

dilute

DMSO*

2,3-DPG

d.c.*

d.p.m.*

d.p.s.*

Km
e.g. K1

Ks

pK

avoid Latin designations such
as b.d. and t.i.d.

dyn

E; express in Pa m–3

ECO*

EEG*

E.m.f.*

EPF*, ESR*

eV (or radiation energies)

ELISA*

not used; recalculate in molar
terms

express as 1012 cells/l

not ethyl alcohol or alcoholic

EDTA*

EGTA*

Na+, K+ etc. for total
exchangeable sodium,
potassium etc.

Expt.; plural, Expts.

Vf

use absorbance

ECF

ECFV

Ex

FPLC*

Fig.; plural, Figs.

Fg

FAD*

FMN*

FSH

FEV 1.0

k (as in A = Ao e–kt)

fV; in breaths/min

FRC

GLC*

T; in mmol min–1 kPa–1

QFR

Glu

Gln

GSH (reduced); GSSG

(oxidized)

Gly

g

Gy

(100 rads)

GH; if human, hGH

G-protein*

Hct; no units

Hb*; express in g/dl

f1/2

Hz

HPIC*

His

h

hCG

hPL

use cortisol
Guidance for Authors

rad (radiation dose; $10^{-5} \text{ J}$ absorbed/g of material)
radioimmunoassay
red blood cell
relative band speed (partition chromatography)
rem
residual volume
resistance (rheological)
respiratory exchange ratio (pulmonary)
respiratory quotient (metabolic)
revolutions
rev./min
ribonucleic acid
messenger
transfer
ribonuclease
röntgen
saline
saturation
second (time)
sievert
solvent systems
sodium dodecyl sulphate
species
specific activity
specific conductance of airways
standard deviation
standard error of the mean
standard temperature and pressure
steroid nomenclature
sulphydryl
sum
Svedberg unit
temperature (absolute)
temperature, thermodynamic
thin-layer chromatography
thyrotrophic hormone
thyrotrophin-releasing hormone
tidal volume
time (symbol)
time of day
torr
tryptophan
tubular maximal reabsorptive capacity for x
tyrosine
ultraviolet
urinary concentration of x
valency
valine
variance ratio
vascular resistance
velocity
venous admixture
viscosity, dynamic
viscosity, kinematic
vital capacity
volt
volume of blood (in cardio-respiratory physiology)
watt
wavelength
weight
white blood cell


use thiol or SH

$\Sigma$
$S$
$T$
$t$
$K$
$\text{ TLC}^*$
$\text{Th}r$
$\text{TRH}$

$V_T$
$t$

c.g. 18.15 hours

not used; use kPa (1 torr = 0.133 kPa)

$\text{Trp}$
$T_{m,s}$

$\text{Tyr}$
$\text{UV}^*$
$c.g. \text{Ca}^{2+}, \text{not Ca}^{++}$

$\text{Val}$
$F$

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

$\nu$; express as m s$^{-1}$

$Q_{aw}$
$\eta$
$v$
$\text{VC}$
$V$

$Q$; use $Q$ for blood flow rate

$W$
$\lambda$
$\omega$

use leucocyte; express counts as $10^9$ cells/l
Aalkjaer, C. 455-465
Aarsen, M. 367-374
Agapitos, E.B. 315-320
Al-Ani, M. 175-180
Alcolado, J.C. 225-235
Alcolado, R. 103-112
Al-Khalidi, A.H. 175-180
Allaway, S.L. 261-268
Anderson, N.H. 237-246
Ando, S.4. 543-550
Andreasen, J. 423-430
Anthony, F. 567-571
Arnold, J.M.O. 559-566
Arthur, M.J.P. 103-112
Asghar, M.S. 529-541
Avanzolini, G. 351-359
Backer, A. 579-585
Baker, R. 37-44
Banide, H. 63-67
Barden, A. 37-44
Barry, P.W. 593-598
Beesley, C.M. 307-313
Beilin, L.J. 37-44
Berg, J.N. 95-101
Bergström, J. 391-396
Bianco, F. 351-359
Bolla, G. 285-289
Boon, N.A. 133-138
Borthwick, A. 291-296
Brooke-Wavell, K. 75-80
Burton, G. 87-93
Busby, M. 481-486
Butler, G.C. 543-550
Calvo, M. 331-333
Camisasca, P. 505-510
Camus, G. 415-422
Carr, S.J. 497-503
Carstens, J. 397-407
Casado, F.J. 247-253
Caslake, M. 237-246
Castañeda, E. 247-253
Cavalcanti, S. 351-359
Charles, C.J. 159-165
Cheung, B. 59-62
Chiari, L. 351-359
Christensen, N.J. 423-430
Collier, D.J. 593-598
Cooper, A. 551-557
Cooper, G.J.S. 467-471
Coote, J.H. 175-180
Coy, D.H. 467-471
Cumin, F. 455-465
Cummins, A.G. 385-389
Dabrosin, C. 493-496
Dale, B.M. 385-389
Davaris, P.S. 315-320
Dave, S. 277-284
Dawodu, J.B. 69-73
De Caterina, R. 45-50
De Vries, P.M.J.M. 367-374
Deby, C. 415-422
Deby-Dupont, G. 415-422
Delgado, J.A. 269-275
Dell'Omo, G. 45-50
Dessauer, C.W. 223
Devlin, A.M. 237-246
Di Bello, V. 45-50
Dipietro, J.A. 345-349
Dirickx-Hannen, B. 379-383
Docherty, K. 321-330
Dominiczak, A.F. 237-246
Dominiczak, M.H. 237-246
Donaldson, G.C. 261-268
Donker, A.J.M. 51-58, 367-374
Dores, J. 147-152
Driscoll, M.D. 559-566
Drücke, T.B. 63-67
Duchateau, J. 415-422
Dwarakanath, A.D. 307-313
Eldrup, E. 423-430
Endo, T. 123-131
Enzmann, G. 351-359
Ercilla, G. 331-333
Esperer, E.A. 315-320
Erlinger, T. 69-73
Evans, P. 567-571
Faller, E.L. 167-174
Fanning, L. 587-592
Farrance, D.P. 277-284
Fearon, K.C.H. 215-221
Felipe, A. 247-253
Feng, C. 95-101
Finnie, I.A. 307-313
Fischer, J.E. 519-525
Fitzpatrick, D. 167-174
Fleischer, L.A. 345-349
Floras, J.S. 13-24, 543-550
Florkowski, C.M. 255-260
Forsberg, A.M. 391-396
Förster, G. 511-517
Fraiture, B. 511-517
Frampton, C.M. 159-165, 255-260
Franklyn, J.A. 181-188
Fraser, R. S. 593-598
Fritsche, K.L. 95-101
Galley, H.F. 361-365
Gammage, M.D. 181-188
Gans, R.O.B. 51-58
Garber, D.W. 473-479
Garcia-Sacristán, A. 269-275
Garrido, E. 331-333
Geisler, P. 335-343
Gemmel, C.G. 69-73
Genovesi, S. 505-510
Gilman, A.G. 223
Golin, R. 505-510
Goutas, N.D. 315-320
Graham, D. 37-44
Grassi, G. 285-289
Green, N.K. 181-188
Grimbly, R.F. 297-305
Grover, P.K. 205-213
Gulledge, T.P. 481-486
Hackney, A.C. 481-486
Haffner, S. 573-578
Hallström, Á. 493-496
Hammar, M. 493-496
Hansen, Ch. 511-517
Haq, I.H. 431-432
Harada-Shiba, M. 197-203
Hardman, A.E. 75-80
Harker, L.A. 559-566
Hasselgren, P.-O. 519-525
Hayasaki, K. 453-454
Heagerty, A.M. 181-188, 551-557
Heine, R.J. 51-58
Hernández, M. 269-275
Hesselink, M.K.C. 189-195
Hezler, W. 481-486
Hironaga, K. 123-131
Hirooka, Y. 123-131
Hochmuth, K. 335-343
Hoeks, A.P. 487-491
Hoffman, E. 481-486
Hoogland, H.J. 487-491
Author Index

Howdle, P.D. 361–365
Hultman, E. 391–396
Hunt, R.H. 167–174
Hunter, E.A.L. 297–305
Husain, A. 69–73
Imai, Y. 453–454
Imaiizumi, T. 123–131
Iredale, J.P. 103–112
Jackson, P.R. 431–432
James, M.A. 139–145
Javierre, C. 331–343
Jensen, K.T. 397–407
Jiang, N.-Y. 467–471
Johnson, R.R. 379–383
Johnson, T.R.B. 345–349
Jones, P.R.M. 75–80
Jones, S. 481–486
Jouhanneau, P. 63–67
Kadowaki, T. 453–454
Kahaly, G. 511–517
Kahr, O. 455–465
Kamath, M. 167–174
Kamijukkoku, S. 453–454
Karhunen, L. 573–578
Kawaguchi, A. 197–203
Keefe, D.M.K. 385–389
Kelly, F.J. 87–93
Kelly, M.P. 455–465
Kittas, C.N. 315–320
Kondo, I. 527–528
Kosaka, Y. 527–528
Kotasek, D. 385–389
Kramer, H.J. 579–585
Kubik, P. 379–383
Lacour, B. 63–67
Lainchbury, J.G. 467–471
Lamy, M. 415–422
Lanfranchi, A. 285–289
Lappalainen, R. 573–578
Lee, W.K. 237–246
Lemperger, P. 335–343
Lenders, J.W.M. 13–24
Leung, R. 59–62
Lewis, L.K. 467–471
Lindholm, B. 391–396
Lindpaintner, K. 45–50
Lombard, M. 375–377
MacDermott, M. 587–592
MacLeod, M.J. 237–246
Maekawa, H. 453–454
Maingay, J.P. 215–221
Mamo, J.C.L. 197–203
Mancia, G. 285–289
Marchiori, G.E. 559–566
Margeli, A.P. 315–320
Marshall, J.M. 153–158
Martin, I. 593–598
Marzabal, P. 247–253
Mason, N.P. 593–598
McIntosh, R.S. 529–541
McMurray, J. 431
Meyer, T.A. 519–525
Meyer-Lehnert, H. 579–585
Michael, C.A. 37–44
Miettinen, H. 573–578
Millege, J.S. 593–598
Miller, M.R. 593–598
Milner, R. 113–122
Mohan, J.S. 153–158
Molsenifar, Z. 81–85
Maelzer, S.E. 423–430
Monaghan, J.C. 409–414
Moore, D. 497–503
Moore, K. 433–443
Morrisson, C. 431
Munro, L.H. 87–93
Namba, T. 123–131
Napoli, V. 45–50
Nash, J. 307–313
Newby, D.E 133–138
Nicholls, M.G. 159–165, 467–471
Nomoto, M. 527–528
Norman, R.I. 497–503
Nys, M. 415–422
O’Dowd, G.M. 307–313
O’Rahilly, S. 3–11
Ogle, C.K. 519–525
Ohanian, V. 181–188
Orringer, E.P. 481–486
Orvig, C. 379–383
Osmon, C. 567–571
Otto, E. 511–517
Oyama, J. 123–131
Packard, C.J. 237–246
Panzetta, G. 351–359
Parker, N. 307–313
Pastor-Anglada, M. 247–253
Payne, J.N. 431–432
Pedersen, E.B. 397–407
Pedrinelli, R. 45–50
Petrucci, R. 45–50
Pfeifer, M. 335–343
Pickin, D.M. 431–432
Pieruzzi, F. 505–510
Pillai, D.N. 409–414
Pincus, S. 345–349
Pollard, A.J. 593–598
Pollard, P.F.A. 593–598
Pollard, R.C. 593–598
Poortmans, J. 415–422
Posner, B.A. 223
Potter, J.F. 139–145
Prieto, D. 269–275
Prins, J.B. 3–11
Radda, G.K. 291–296
Rademaker, M.T. 159–165
Raisbeck, G. 63–67
Ramsay, L.E. 431–432
Reid, H.L. 153–158
Reid, J.L. 237–246
Reneman, R.S. 487–491
Resell, L. 269–275
Rhodes, J.W.M. 307–313
Richards, A.M. 159–165, 255–260, 467–471
Ritchie, J. 37–44
Robb, T.A. 385–389
Robins, K. 175–180
Robinson, D. 261–268
Rodas, G. 331–333
Rongen, G.A. 13–24
Rooyackers, O.E. 189–195
Ross, D.J. 81–85
Ross, J.A. 215–221
Rouhi, R. 511–517
Russell, R.I. 69–73
Ryall, R.L. 205–213
Saenz de Tejada, I. 269–275
Sage, R.E. 385–389
Sakomura, Y. 453–454
Samani, N.J. 455–465
Sandeman, D. 291–296
Sanderson, A.L. 291–296
Savage, M.W. 147–152
Schönhölzer, K.W. 379–383
Schulzer, M. 379–383
Schwarting, K. 579–585
Schwartzling, K. 579–585
Seguro, R. 331–333
Seko, Y. 453–454
Seravalle, G. 285–289
Serjeant, G.R. 153–158
Severi, S. 351–359
Shahbazian, L.M. 95–101
Sherebrin, M.H. 559–566
Sherratt, E.J. 225–235
Shiramoto, M. 123–131
Sikand, K. 497–503
Simonsen, U. 269–275
Sloop, G.D. 473–479
Smith, D. 197–203
Author Index

Smits, P. 13–24
Smulders, R.A. 367–374
Sossi, V. 379–383
Stehouwer, C.D.A. 367–374
Stein, C. 291–296
Stella, A. 505–510
Stokes, G.A. 409–414
Strayhorn, D. 481–486
Sturgess, R.P. 375–377
Suter, M. 379–383
Sutton, R.A.L. 379–383
Suzuki, S. 453–454
Swales, J.D. 139–145
Sybertz, E. 255–260
Takahashi, N. 453–454
Theocharis, S.E. 315–320
Thien, T. 13–24
Thomas, A.W. 225–235
Thomas, M.G. 375–377
Thomas, P.W. 153–158
Thompson, C.H. 291–296
Thornton, J. 361–366
Thurston, H. 139–145
Tiao, G.M. 519–525
Tobie, K. 453–454
Tougas, G. 167–174
Townsend, J. 175–180
Tsai, H.H. 307–313
Turpeinen, A. 573–578
Turri, C. 285–289
Ungerstedt, U. 493–496
Upton, A.R.M. 167–174
Uusitupa, M. 573–578
Vaile, J. 175–180
Van Kamp, G.J. 367–374
Venczel, E. 379–383
Ventura, J.L.I. 331–333
Vetterli, D. 379–383
Voorburg, A. 51–58
Wagemakers, A.J.M. 189–195
Walker, A.B. 147–152
Walker, B.E. 361–365
Walker, V.R. 379–383
Walters, B.N. 37–44
Wang, J.J. 519–525
Warrens, A.N. 25–36
Watt, P.A.C. 139–145
Watteel, G. 167–174
Webb, D.J. 133–138
Webster, N.R. 361–365
Weetman, A.P. 529–541
Wheeler, T. 567–571
Whitehead, S.A. 277–284
Wigmore, S.J. 215–221
Willekes, C. 487–491
Williams, G. 147–152
Withers, D.J. 445–451
Wu, P. 81–85
Yamamoto, A. 197–203
Yamamura, T. 197–203
Yamashiki, M. 527–528
Yandle, T.G. 255–260, 467–471
Yazaki, Y. 453–454
Yeo, W.W. 431–432
Yiou, F. 63–67
Yu, K.C.-W. 197–203
Zanchetti, A. 505–510
Zhang, Q.B. 69–73
Acetylcholine
  endothelium 123–131
  penile small arteries, nitric oxide 269–275
  substance P, N\textsuperscript{G}-monomethyl-L-arginine 133–138
Acute-phase response
cachexia, eicosapentaenoic acid 215–221
Adipocyte
differentiation, apoptosis 3–11*
Adrenomedullin
  hypotension 467–472
  plasma levels, disease 59–62
Acrobic metabolism
  human leucocyte antigen system 331–333
Age
  hypertension, vascular resistance 551–557
  resistance arteries, endothelium-derived relaxing factor 139–145
  sympathetic activity, noradrenaline 285–289
Aldosterone
  brain natriuretic peptide, endopeptidase inhibition 255–260
Altitude sickness
  hypoxia, spirometry 593–598
Aluminium
  intestinal absorption, accelerator mass spectrometry 379–383
  intestinal absorption, silicon 63–67
Amino acids
  breast tissue, microdialysis 493–496
  diet, catecholamines 432–430
  vasodilatation, nitric oxide 367–374
Angiotensin-converting enzyme inhibition
  renin–angiotensin system, heart failure 455–465
Anion-exchange chromatography
   glycosaminoglycan analysis, Graves' disease 511–517
Antibody response
  autoimmune thyroid disease 529–541*
Antioxidants
  blood pressure 361–365
  vitamin E, smoking 87–93
Apoptosis
  adipocyte 3–11*
L-Arginine
  endothelium 123–131
  vasodilatation, nitric oxide 367–374
Arterial pressure
  adrenomedullin 467–472
Arterial pressure pulse
  non-invasive measurement, Fourier analysis 559–566
Arterial wall properties
  menstrual cycle, sex hormones 487–491
Artery structure
  hypertension 551–557
Ascites
  hepatorenal syndrome 433–443*
Atherosclerosis
  blood viscosity, lipoproteins 473–479
  chylomicron remnants, hypercholesterolaemia 197–203
  urinary albumin excretion, hypertension 45–50
Atrial natriuretic peptide
  brain natriuretic peptide, endopeptidase inhibition 255–260
  haemodynamics, natriuresis 159–165
  tubular function, lithium clearance 397–407
Autoimmune thyroid disease
  antibody response 529–541*
Autonomic control
  heart rate variability, spectral analysis 351–359
Autonomic nervous system
  oesophageal stimulation, heart rate variability 167–174
Bile-duct ligation
  renal failure, endothelin 579–585
Blood pressure
  antioxidants 361–365
  artery structure 551–557
  heart rate variability, fractal component 543–550
  urinary albumin excretion, hypertension 45–50
Blood viscosity
  atherosclerosis, lipoproteins 473–479
Body retention
  aluminium 63–67
Bone mineral density
  walking 75–80
Bosentan
  obstructive jaundice, renal failure 579–585
Brachial artery
  arterial pressure pulse, non-invasive measurement 559–566
Brain
  cytokines, endotoxaemia 519–525
Brain natriuretic peptide
  aldosterone, endopeptidase inhibition 255–260
  haemodynamics, natriuresis 159–165
Breast tissue
  menstrual cycle, microdialysis 493–496
Bronchoconstriction
  oxygen saturation, altitude sickness 593–598

Cachexia
  acute-phase response, eicosapentaenoic acid 215–221
Calcium oxalate crystallization
  monosodium urate seeds, uric acid seeds 205–213
Cardiac frequency
  heart failure, fractal component 543–550
Cardiac myocytes
  transfection, hypertrophy 181–188
Cardiac vagal tone
  muscle–heart reflex, isometric contractions 175–180
Cardiovascular pharmacology
  purines 13–24*
Carotenoids
  blood pressure 361–365
Catecholamines
  amino acids, diet 423–430
  natriuresis 409–414
Cell engineering
  insulin replacement, diabetes mellitus 321–330*
Cell proliferation
  cyclic AMP, protein kinase 445–451*
  vitamin D₃, duodenal epithelium 375–377
Cell–matrix interaction
  hepatic stellate cells 103–112*
Central nervous system
  cytokines, endotoxaemia 519–525
Chemoreceptors
  afferent nerve fibres, kidney 505–510
Chemotherapy
  intestinal permeability 385–389
Cholesterol
  coronary heart disease 431–432

Chondroitin sulphate
  Graves’ disease 511–517
Chronic obstructive pulmonary disease
  adrenomedullin 59–62
Chylomicron remnants
  phagocytosis, hypercholesterolaemia 197–203
Cirrhosis
  adrenomedullin 59–62
  renal failure 433–443*
Citrate
  aluminium, intestinal absorption 63–67
Coronary heart disease
  lipids 431–432
Crohn’s disease
  lactoferrin, myeloperoxidase 307–313
Cyclic AMP
  mitogenesis, protein kinase 445–451*
Cyclic GMP
  natriuretic peptides 159–165
Cysteine
  glutathione synthesis, inflammation 297–305
Cytokine cascade
  granulocyte-colony-stimulating factor, hepatic regeneration 315–320
Cytokine production
  T-lymphocytes, hepatitis B vaccination 527–528
Cytokines
  endotoxaemia, central nervous system 519–525

Demyelination
  multiple sclerosis 113–122*
Dermatan sulphate
  Graves’ disease 511–517
Diabetes
  genetics, mitochondrial DNA 225–235*
  insulin gene, gene therapy 321–330*
  diet amino acids, catecholamines 423–430
Dietary fat
  Listeria, mice 95–101
Dietary protein
  glutathione synthesis, inflammation 297–305
Differentiation
  adipocyte 3–11*
Duodenal epithelium
  cell proliferation, vitamin D₃ 375–377

Eating disorder
  obesity, leptin 573–578
Eicosapentaenoic acid
  acute-phase response, cachexia 215–221
Electric stimulation
  muscle contraction, zymosan 189–195
Electrolyte content
membrane potential, skeletal muscle 391–396
Endopeptidase inhibition
aldosterone, brain natriuretic peptide 255–260
Endothelin
bile-duct ligation, renal failure 579–585
neutrophil activation, pre-eclampsia 37–44
Endothelium
L-arginine, N\(^6\)-monomethyl-L-arginine 123–131
Endothelium-derived relaxing factor resistance arteries, age 139–145
Endotoxaemia
inflammatory response, exercise 415–422
interleukin, gene expression 519–525
Energy metabolism
fatiguability, zymosan 189–195
Epitaxy
monosodium urate seeds, uric acid seeds 205–213
Erectile dysfunction
penile small arteries, nitric oxide 269–275
Essential hypertension
adrenomedullin 59–62
Exercise
bone mineral density 75–80
endotoxaemia, inflammatory response 415–422
Extracellular matrix
oligodendrocyte, migration 113–122*

Familial hypocholesterolaemia
sodium transport, membrane microviscosity 237–246
Fanconi syndrome
maleic acid, sodium, potassium-ATPase 247–253
Fatiguability
muscle mitochondria, zymosan 189–195
Fetal development
heart rate variability 345–349
Fetal growth
glucose metabolism, muscle 291–296
Fish oil
*Listeria*, mice 95–101
Fourier analysis
arterial pressure pulse, non-invasive measurement 559–566
Fractal spectra
heart rate variability, heart failure 543–550
Free radicals
vitamin E, smoking 87–93

Gas chromatography–mass spectrometry
vitamin E 87–93

Gender
heart rate variability, fetal development 345–349
Gene expression
interleukin, endotoxaemia 519–525
renin–angiotensin system, heart failure 455–465
Gene therapy
insulin gene, diabetes mellitus 321–330*
Genetics
mitochondrial DNA, diabetes 225–235*
Glucose metabolism
fetal growth, muscle 291–296
Glutathione synthesis
inflammation, dietary protein 297–305
Glycosaminoglycan analysis
high performance liquid chromatography, Graves' disease 511–-517
Granulocyte-colony-stimulating factor
cytokine cascade, hepatic regeneration 315–320
Granulosa cells
steroidogenesis, nitric oxide 277–284
Graves' disease
antibody response 529–541*
glycosaminoglycan analysis, high-performance liquid chromatography 511–517
Gravity
pulmonary perfusion 81–85

Haematology
temperature, seasonal mortality 261–268
Haemodynamics
natriuretic peptides 159–165
Hashimoto's thyroiditis
antibody response 529–541*
Heart failure
adrenomedullin 59–62
heart rate variability, fractal component 543–550
natriuretic peptides 159–165
renin–angiotensin system, gene expression 455–465
Heart rate variability
autonomic nervous system, oesophageal stimulation 167–174
fetal development 345–349
heart failure, fractal component 543–550
Heart rate
isometric contractions 175–180
Heart rate variability
spectral analysis, autonomic control 351–359
spectral analysis, sleep apnoea syndrome 335–343
*Helicobacter pylori* inflammation
interleukin 8, reactive oxygen radicals 69–73
Hepatic regeneration
- granulocyte-colony-stimulating factor, cytokine cascade 315–320

Hepatic stellate cells
- matrix, liver fibrosis 103–112*

Hepatitis B vaccination
- cytokine production 527–528
- hepatorenal syndrome 433–443*

Homogenous sickle cell disease
- ulcer, posture 153–158

Human chorionic gonadotrophin
- pregnancy, vascular endothelial growth factor 567–571

Human leucocyte antigen system
- aerobic metabolism 331–333

Hyaluronic acid
- Graves’ disease 511–517

Hydroxyurea
- physical activity, sickle-cell anaemia 481–486

Hypercholesterolaemia
- chylomicron remnants, phagocytosis 197–203

Hypertension
- antioxidants 361–365
- artery structure 551–557
- sodium–lithium countertransport, membrane microviscosity 497–503
- sympathetic activity, noradrenaline 285–289
- temperature, seasonal mortality 261–268
- urinary albumin excretion, atherosclerosis 45–50

Hypertriglyceridaemia
- sodium transport, membrane microviscosity 237–246

Hypertrophy
- cardiac myocytes, transfection 181–188

Hyperuricosuria
- calcium oxalate crystallization 205–213

Hypocapnia
- altitude sickness, spirometry 593–598

Hypotension
- adrenomedullin 467–472

Hypoxia
- altitude sickness, spirometry 593–598
- myocardial infarction, vascular endothelial growth factor 453–454

Impotence
- penile small arteries, nitric oxide 269–275

Infective diarrhoea
- lactoferrin, myeloperoxidase 307–313

Inflammation
- glutathione synthesis, dietary protein 297–305
- Helicobacter pylori 69–73

Inflammatory bowel disease
- lactoferrin, myeloperoxidase 307–313

Inflammatory response
- endotoxaemia, exercise 415–422

Insulin
- renal sodium and urate excretion 51–58

Insulin gene
- gene therapy, diabetes mellitus 321–330*

Insulin resistance
- fetal growth, muscle 291–296
- renal sodium and urate excretion 51–58
- urinary albumin excretion, hypertension 45–50

Insulin vasodilatation
- resistance arteries, nitric oxide 147–152

Integrin
- oligodendrocyte, migration 113–122*

Interleukin
- acute-phase response, cachexia 215–221
- gene expression, endotoxaemia 519–525
- reactive oxygen radicals, Helicobacter pylori inflammation 69–73

Intestinal absorption
- aluminium, accelerator mass spectrometry 379–383
- aluminium, silicon 63–67

Intestinal permeability
- chemotherapy 385–389

Isometric contractions
- muscle–heart reflex, cardiac vagal tone 175–180

Isometric torque
- muscle weakness, zymosan 189–195

Kidney
- afferent nerve fibres, chemoreceptors 505–510

Lactoferrin
- inflammatory bowel disease, infective diarrhoea 307–313

Laser Doppler flowmetry
- homogenous sickle cell disease 153–158

Leptin
- eating disorder, obesity 573–578

Lipids
- coronary heart disease 431–432

Lipoproteins
- blood viscosity, atherosclerosis 473–479

Listeria
- fish oil, mice 95–101

Lithium clearance
- atrial natriuretic peptide 397–407
- renal sodium and urate excretion 51–58

Liver
- regeneration, granulocyte-colony-stimulating factor 315–320

Liver disease
- renal failure 433–443*
<table>
<thead>
<tr>
<th>Subject</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver fibrosis</td>
<td>hepatic stellate cells, matrix 103-112*</td>
</tr>
<tr>
<td>l-Lysine</td>
<td>vasodilatation, nitric oxide 367-374</td>
</tr>
<tr>
<td>Macrophages</td>
<td>nitric oxide, steroidogenesis 277-284</td>
</tr>
<tr>
<td></td>
<td>Major histocompatibility complex</td>
</tr>
<tr>
<td></td>
<td>T-lymphocytes 25-36*</td>
</tr>
<tr>
<td>Maleic acid</td>
<td>Fanconi syndrome, sodium, potassium-ATPase 247-253</td>
</tr>
<tr>
<td>Mass spectrometry</td>
<td>aluminium, intestinal absorption 379-383</td>
</tr>
<tr>
<td>Mast cell</td>
<td>lactoferrin, inflammatory bowel disease 307-313</td>
</tr>
<tr>
<td>Matrix</td>
<td>hepatic stellate cells, liver fibrosis 103-112*</td>
</tr>
<tr>
<td></td>
<td>Matrix regulation metalloproteinase-1 103-112*</td>
</tr>
<tr>
<td>Mechanoreceptors</td>
<td>afferent nerve fibres, kidney 505-510</td>
</tr>
<tr>
<td>Membrane microviscosity</td>
<td>sodium transport, familial hypocholesterolaemia 237-246</td>
</tr>
<tr>
<td></td>
<td>sodium–lithium countertransport, hypertension 497-503</td>
</tr>
<tr>
<td>Membrane potential</td>
<td>skeletal muscle, electrolyte content 391-396</td>
</tr>
<tr>
<td>Menstrual cycle</td>
<td>amino acids, breast tissue 493-496</td>
</tr>
<tr>
<td></td>
<td>arterial wall properties, sex hormones 487-4991</td>
</tr>
<tr>
<td>Metalloproteinase-1 matrix regulation 103-112*</td>
<td></td>
</tr>
<tr>
<td>Methionine</td>
<td>glutathione synthesis, inflammation 297-305</td>
</tr>
<tr>
<td>Mice</td>
<td>fish oil, <em>Listeria</em> 95-101</td>
</tr>
<tr>
<td>Microdialysis</td>
<td>breast tissue, amino acids 493-496</td>
</tr>
<tr>
<td>Migration</td>
<td>oligodendrocyte, multiple sclerosis 113-122*</td>
</tr>
<tr>
<td>Mitochondria</td>
<td>muscle fatiguability, zymosan 189-195</td>
</tr>
<tr>
<td>Mitochondrial disorders</td>
<td>genetics, diabetes 225-235*</td>
</tr>
<tr>
<td></td>
<td>Mitochondrial DNA genetics, diabetes 225-235*</td>
</tr>
<tr>
<td>Mitogenesis</td>
<td>cyclic AMP, protein kinase 445-451*</td>
</tr>
<tr>
<td></td>
<td>N(^{\text{O}})-Monomethyl-L-arginine acetylcholine, substance P 133-138 endothelium 123-131</td>
</tr>
<tr>
<td>Monosodium urate seeds</td>
<td>calcium oxalate crystallization 205-213</td>
</tr>
<tr>
<td></td>
<td>Mucositis chemotherapy 385-389</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
<td>oligodendrocyte, migration 113-122*</td>
</tr>
<tr>
<td>Muscle</td>
<td>glucose metabolism, fetal growth 291-296</td>
</tr>
<tr>
<td></td>
<td>Muscle contraction fatiguability, zymosan 189-195</td>
</tr>
<tr>
<td></td>
<td>Muscle–heart reflex isometric contractions, cardiac vagal tone 175-180</td>
</tr>
<tr>
<td></td>
<td>Muscle weakness muscle mitochondria, zymosan 189-195</td>
</tr>
<tr>
<td>Myeloperoxidase</td>
<td>inflammatory bowel disease, infective diarrhoea 307-313</td>
</tr>
<tr>
<td>Myoblasts</td>
<td>T-lymphocytes, tolerance 25-36*</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>reperfusion therapy, vascular endothelial growth factor 453-454</td>
</tr>
<tr>
<td>Myotonia</td>
<td>temperature, skeletal muscle 587-592</td>
</tr>
<tr>
<td>Natriuresis</td>
<td>brain natriuretic peptide, endopeptidase inhibition 255-260</td>
</tr>
<tr>
<td></td>
<td>natriuretic peptides 159-165</td>
</tr>
<tr>
<td></td>
<td>prostaglandins, catecholamines 409-414</td>
</tr>
<tr>
<td>Natriuretic peptides</td>
<td>haemodynamics, natriuresis 159-165</td>
</tr>
<tr>
<td>Near infrared spectroscopy</td>
<td>muscle, fetal growth 291-296</td>
</tr>
<tr>
<td>Nephrotoxicity</td>
<td>maleic acid, sodium, potassium-ATPase 247-253</td>
</tr>
<tr>
<td>Neutrophil activation</td>
<td>pre-eclampsia, pregnancy 37-44</td>
</tr>
<tr>
<td>Nitric oxide</td>
<td>endothelium, age 139-145</td>
</tr>
<tr>
<td></td>
<td>insulin vasodilatation, resistance arteries 147-152</td>
</tr>
<tr>
<td></td>
<td>penile small arteries, impotence 269-275</td>
</tr>
<tr>
<td></td>
<td>steroidogenesis, granulosa cells 277-284</td>
</tr>
<tr>
<td></td>
<td>vasodilatation, amino acids 367-374</td>
</tr>
<tr>
<td>Noradrenaline</td>
<td>acetylcholine, substance P 133-138</td>
</tr>
<tr>
<td></td>
<td>aging, hypertension 285-289</td>
</tr>
<tr>
<td>Obesity</td>
<td>adipocytes 3-11*</td>
</tr>
<tr>
<td></td>
<td>eating disorder, leptin 573-578</td>
</tr>
</tbody>
</table>
Obstructive jaundice
renal failure, endothelin 579–585
Oesophageal stimulation
autonomic nervous system, heart rate variability 167–174
Oligodendrocyte
migration, multiple sclerosis 113–122*
Osteoporosis
prevention, walking 75–80
Oxidative stress
vitamin E, smoking 87–93
Oxygen saturation
altitude sickness, bronchoconstriction 593–598

Penile small arteries
nitric oxide, impotence 269–275
Phagocytosis
chylomicron remnants, hypercholesterolaemia 197–203
Physical activity
hydroxyurea, sickle-cell anaemia 481–486
Physical performance
human leucocyte antigen system 331–333
Physical training
sympathetic activity, noradrenaline 285–289
Polymorphism
major histocompatibility complex 25–36*
Portal hypertension
renal failure 433–443*
Posture
homoygous sickle cell disease, ulcer 153–158
Power spectrum analysis
heart rate variability, oesophageal stimulation 167–174
Preadipocyte
differentiation, apoptosis 3–11*
Pre-eclampsia
neutrophil activation, pregnancy 37–44
Pregnancy
neutrophil activation, pre-eclampsia 37–44
vascular endothelial growth factor, progesterone 567–571
Progestrone
vascular endothelial growth factor, pregnancy 567–571
Progestrone synthesis
granulosa cells, nitric oxide 277–284
Prone posture
pulmonary perfusion 81–85
Prostaglandins
endothelium 123–131
natriuresis 409–414
Protein kinase
mitogenesis, cyclic AMP 445–451*
Proto-oncogenes
transfection, hypertrophy 181–188
Pulmonary blood flow
prone posture 81–85
Pulmonary perfusion
prone posture 81–85
Purines
cardiovascular pharmacology 13–24*
Radial artery
arterial pressure pulse, non-invasive measurement 559–566
Radioimmunoassay
adrenomedullin 59–62
Reactive oxygen radicals
interleukin 8, Helicobacter pylori inflammation 69–73
Remyelination
multiple sclerosis 113–122*
Renal afferent nerves
chemoreceptors 505–510
Renal disease
sodium–lithium countertransport, membrane microviscosity 497–503
Renal failure
adrenomedullin 59–62
bile-duct ligation, endothelin 579–585
liver disease 433–443*
Renal sodium excretion
insulin 51–58
Renal urate excretion
insulin 51–58
Renin
brain natriuretic peptide, endopeptidase inhibition 255–260
Renin–angiotensin system
gene expression, heart failure 455–465
Reperfusion therapy
vascular endothelial growth factor, myocardial infarction 453–454
Resistance arteries
endothelium-derived relaxing factor, age 139–145
insulin vasodilatation, nitric oxide 147–152
Sepsis
interleukin, gene expression 519–525
Sex hormones
arterial wall properties, menstrual cycle 487–491
Sickle-cell anaemia
physical activity, hydroxyurea 481–486
Signal transduction mitogenesis, protein kinase 445–451*

Silicon
  aluminium, intestinal absorption 63–67
Single-photon emission computerized tomography pulmonary perfusion, prone posture 81–85
Skeletal muscle
  membrane potential, electrolyte content 391–396
  myotonia, temperature 587–592
Sleep apnoea syndrome
  heart rate variability, spectral analysis 335–343
Smoking
  vitamin E 87–93
Sodium
  excretion, insulin 51–58
  tubular function, atrial natriuretic peptide 397–407
Sodium, potassium-ATPase
  Fanconi syndrome, maleic acid 247–253
Sodium-hydrogen exchange
  familial hypocholesterolaemia, hypertriglyceridaemia 237–246
Sodium-lithium countertransport
  membrane microviscosity, familial hypocholesterolaemia 237–246
  membrane microviscosity, hypertension 497–503
Spectral analysis
  heart rate variability, autonomic control 351–359
  heart rate variability, sleep apnoea syndrome 335–343
Spirometry
  hypoxia, altitude sickness 593–598
Steroidogenesis
  granulosa cells, nitric oxide 277–284
Substance P
  acetylcholine, N\(^\text{G}\)-monomethyl-L-arginine 133–138
Survival
  mice, dietary fat 95–101
Sympathetic activity
  aging, hypertension 285–289
Sympathetic nervous system
  hepatorenal syndrome 433–443*
  purines 13–24*

T-lymphocytes
  cytokine production, hepatitis B vaccination 527–528
  major histocompatibility complex 25–36*

Temperature
  haematology, hypertension 261–268
  myotonia, skeletal muscle 587–592
  seasonal mortality, hypertension 261–268
Thyroid stimulating hormone receptor antibody response, autoimmunity 529–541*
Tissue inhibitor of metalloproteinase-1 matrix regulation 103–112*
Tolerance
  T-lymphocytes, myoblasts 25–36*
Transfection
  cardiac myocytes, hypertrophy 181–188
Transforming growth factor \(\beta\)
  hepatic stellate cells 103–112*
Transplantation
  oligodendrocyte 113–122*
Tubular function
  atrial natriuretic peptide 397–407
Tumour necrosis factor
  glutathione synthesis, dietary protein 297–305

Ulcer
  homozygous sickle cell disease, posture 153–158
Ulcerative colitis
  lactoferrin, myeloperoxidase 307–313
Ultrasound
  bone mineral density 75–80
Urate excretion
  insulin 51–58
Uric acid seeds
  calcium oxalate crystallization 205–213
Urinary albumin excretion
  atherosclerosis, hypertension 45–50
Urinary aluminium excretion 63–67
Urine
  calcium oxalate crystallization 205–213
Urodilatin
  tubular function, lithium clearance 397–407
Urolithiasis
  calcium oxalate crystallization 205–213

Vascular endothelial growth factor
  myocardial infarction, reperfusion therapy 453–454
  pregnancy, progesterone 567–571
Vascular resistance
  hypertension, age 551–557
Vasodilatation
  nitric oxide, amino acids 367–374
Venous occlusion plethysmography
  acetylcholine, substance P 133–138
Subject Index

Ventilation–perfusion
  prone posture  81–85
Ventricular pacing
  natriuretic peptides  159–165
Visceral perception
  autonomic nervous system, heart rate
    variability  167–174
Vitamin C
  blood pressure  361–365
Vitamin D
  blood pressure  361–365
Vitamin D₃
  cell proliferation, duodenal epithelium  375–377
Vitamin E
  smoking  87–93
Walking
  bone mineral density  75–80
Zymosan
  fatiguability, muscle mitochondria  189–195