British Journal of Pharmacology

Instructions to Authors
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Volumes 102–104
1991

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Papers will be considered for publication on all aspects of pharmacology, including chemotherapy.

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INSTRUCTIONS TO AUTHORS

With effect from 1 January 1992

The *British Journal of Pharmacology* welcomes contributions in all fields of pharmacology for publication as full papers or as high priority Special Reports.

Papers should normally be based on new results obtained experimentally and should constitute a significant contribution to pharmacological knowledge. Papers which reassess pharmacological concepts based on earlier results will also be considered as will purely theoretical papers. Papers dealing only with descriptions of methods are acceptable if new principles are involved.

Contributions that have already been published, or accepted or are under consideration for publication, with essentially the same content will not be considered. This restriction does not apply to results published as abstracts of communications, letters to editors, or as contributions to symposia, provided that the submission adds significantly to the information available in the previously published contribution.

Papers are only accepted if accompanied by a Declaration which must be signed by all Authors. This Declaration concerns the originality of the submitted paper and assigns the copyright of all papers accepted for publication to Macmillan Press Ltd. on behalf of the British Pharmacological Society. See pages 248 and 249 for details.

The Journal will not consider papers which describe experiments on animals which do not fall clearly within the current laws governing animal experimentation in the United Kingdom. Authors must make it clear that the procedures they use were as humane as possible and the doses (initial and subsequent) of anaesthetics and analgesics should be clearly stated; the method of assessing anaesthesia, particularly after the administration of skeletal muscle relaxants (neuro-muscular blocking drugs), must be well defined. The Society has an Ethics Committee which can be consulted by authors through the Secretaries to the Editorial Board.

When investigations on normal human subjects are reported, evidence of approval by a local Ethics Committee must be given. Papers concerned with clinical trials or investigations of the effects of drugs on patients are not appropriate for this Journal.

Authors are strongly urged to keep their manuscripts as short as they reasonably can. An effective way is to reduce the Discussion and the number of figures to a minimum and to avoid repetition of information that has already been published. Authors should remember that a reader may be influenced by literary style and will appreciate simple but accurate prose.

It is important to note that failure to comply with 'Instructions to Authors' may lead to considerable editorial delays.

FULL PAPERS

Manuscripts must be typed on one side of A4 paper. Words at the end of lines should not be divided because they may become incorrectly hyphenated. Handwritten characters or symbols (e.g. Greek letters) should be spelled out in full in the margin. Papers in recent issues of the *British Journal of Pharmacology* should be consulted for the general layout of the paper and also for details. The following subsections are used:

1. Title page
2. Summary
3. Introduction
4. Methods
5. Results
6. Discussion and conclusions
7. Acknowledgements
8. List of references
9. Tables
10. Figures and captions

The type must not be smaller than 12 pitch or 10 point. Each section must be typed in double spacing with margins of not less than 2.5 cm all round and each page should be numbered. **The original and one copy of the typescript should be supplied.**

Title page

The title should normally contain no more than 150 characters and should not consist of a sentence (statement or conclusion) or be interrogative. A short running title containing not more than 50 characters and spaces is also required. The title page should include the names of authors and their appropriate addresses. It should be made clear which address relates to which author. Authors' present addresses differing from those at which the work was carried out should be given as footnotes on the title page and referenced at the appropriate place in the author list by superscript numbers. A footnote may also be used to indicate the author to whom correspondence should be sent. The use of footnotes for any other reason is not allowed. If the address to which proofs should be sent is not that of the first mentioned author, clear instructions should be given in a covering note and not on the title page. The title page should be paginated as page 1 of the paper.

Summary

The summary will be printed at the beginning of the paper. It should not exceed 5% of the length of the paper and should contain a brief account of the problem, the methods, results and the conclusions. It should be arranged in numbered and concise paragraphs. Up to ten **key words** or phrases of two to three words (including names and terms used in the title) should be displayed at the end of the summary. These may be selected from 'Medical Subject Headings' issued by *Index Medicus*. Key words will be used to compile the annual index. The quality of the index will thus be determined by the appropriatness of the key words. Avoid unhelpful or unqualified terms such as 'rat', 'drug' etc.

Introduction

The introduction should give a short and clear account of the background of the problem and the rationale of the investigation. Only previous work that has a direct bearing on the present problem should be cited.

Methods

The methods must be described in sufficient detail to allow the experiment to be interpreted and repeated by the reader. However, detailed repetition of methods which have been adequately described previously should be avoided and references given, although a brief outline is often helpful.

Drugs should be listed in a separate paragraph. Their names should be 'approved names' as published previously in British Approved Names, 1990 (HMSO). If a drug has no 'approved name' its chemical name must be used and the rules set out in the current *Handbook for Chemical Society Authors*

(London, Chemical Society) observed, or its structural formula given. Cumbersome chemical names should be suitably abbreviated for later reference in the paper.

The doses of drugs should be given as unit weight per body weight, e.g. mmol kg^{-1} or mg kg^{-1}; concentrations should be given in terms of molarity, e.g. nM or μM.

Reference should be made to any statistical analyses that have been performed on the results in order, for example, to determine the significance of differences between results obtained under different experimental conditions.

Results

The description of the experimental results should be succinct but, nevertheless, in sufficient detail to allow the experiments to be repeated by others. Typical single experiments may be presented with a clear statement that *n* number of similar experiments had similar results. Where appropriate, however, the mean results with confidence limits or with standard errors of the means and the number of observations should be given. Statistical tests of significance should be performed where appropriate. The results of such tests should be stated as the numerical value of the probability (*P*) that is calculated, with any necessary clarification (e.g. one-tail or two-tail test).

Every effort should be made to avoid unnecessary repetition of data in the text, tables and figures. Conclusions and theoretical considerations should not be elaborated in this section.

Discussion

The purpose of the discussion is to present a brief and pertinent interpretation of the results against the background of existing knowledge. Any assumptions on which conclusions are based must be stated clearly. A mere recapitulation of the results is not acceptable. A review-like treatment, which reduces the impact on the reader, should also be avoided. The main conclusion should be conveyed in a final paragraph.

Acknowledgements

Acknowledgements should be brief but should include reference to sources of support. Sources of drugs not widely available commercially should be acknowledged.

References

In the text, references to other work should take the form: (Bolton & Kitamura, 1983) or, 'Bolton & Kitamura (1983) showed that ...'. If there are more than two authors, the first author's name should be given followed by *et al.* (Bülbring *et al.*, 1981).

References to 'unpublished observations' or 'personal communications' should be mentioned in the text only, and not included in the list of references. Papers which have been **submitted and accepted** for publication, should be included in the list of references with the names of the periodicals and 'in press'. **A photocopy should normally be submitted with the manuscript.** If this is not possible, authors should indicate whether the work cited is an abstract or a full paper. **Papers in preparation or which have been submitted but not yet finally accepted for publication must not be included in the list of references.**

The reference list at the end of the manuscript must be arranged alphabetically according to the surname of the first author. When the surnames of authors are identical, the alphabetical order of their initials takes precedence over the year of publication. The AUTHORS' names are followed by the year of publication in brackets. If more than one paper by the same authors in one year are cited, a, b, c, etc. are placed after the year of publication, both in the text and in the list of references. The title of the article is given in full, followed by the *abbreviated title of the periodical*, volume **number** and first and last page numbers. The abbreviations used for periodicals are those of the most recent edition of the International List of Periodical Title Word Abbreviations. References to articles in books should consist of names of authors, year of publication, title of article followed by the *title of the book*, the editors, volume number, if any, and page numbers, the place of publication and the names of the publishers. For example:

BOLTON, T.B. & KITAMURA, K. (1983). Evidence that ionic channels associated with the muscarinic receptor of smooth muscle may admit calcium. *Br. J. Pharmacol.*, **78**, 405–416.

BRADING, A.F. (1981). Ionic distribution and mechanisms of transmembrane ion movements in smooth muscle. In *Smooth Muscle: An Assessment of Current Knowledge.* ed. Bülbring, E., Brading, A.F., Jones, A.W. & Tomita, T. pp. 65–92. London: Edward Arnold.

Tables

Each table should be given on a separate page, paginated as part of the paper. Tables should be numbered consecutively with arabic numericals and the number should be followed by a brief descriptive caption, occupying not more than two lines, at the head of the table. The proportions of the text area should be borne in mind when designing the layout of tables. For the sake of clarity, tables should not have more than 120 characters to a line, with spaces between columns counted as four characters. The absolute maximum is 180 characters to a line. Each column should have a heading and the units of measurement should be given in parentheses in the heading. Except in special circumstances, tables should be self-explanatory; the necessary descriptions should be at the bottom of the table.

Figures

To avoid unnecessary Figures, particularly those requiring half-tone reproduction, only critical points of the text should be illustrated. If coloured Figures are desired, the Authors should discuss their requirements with the Secretaries, preferably before submission.

Please note that unsatisfactory Figures will be returned to the Author for revision. The Journal reserves the right to reject a manuscript if the Figures are unacceptable.

Submission Requirements

(a) The Authors' names and the Figure number must be indicated lightly *in pencil* on the back of each Figure; if necessary, use an adhesive label to avoid damage to the Figure.

(b) *Each* copy of the manuscript must be accompanied by one set of labelled Figures (i.e. complete with lettering and numbering, arrows, etc.). An original set and one high quality photocopy will suffice.

(c) Another original set of Figures identical in size but *without any letters or numbers* must also be supplied for the use of the Publisher. Arrows and event marks on experimental records may be retained, provided they are larger than 3 mm wide. The Publisher will choose the correct style of typeface of an appropriate size to suit the final size of the Figure on the printed page.

(d) No submitted Figure should exceed 210 × 297 mm (A4).

(e) Each Figure must be accompanied by a legend; each legend should be typed on a *separate* sheet of paper and paginated as part of the manuscript. Legends should explain the Figures in sufficient detail that, whenever possible, they can be understood without reference to the text.

Line Figures

It is best to submit an original drawing (black ink on heavy white paper or faint blue graph paper) which has been prepared to conform with the style and convention of the

Line width (axes)	Line width (graphs)	Symbol size	Figure will reduce to this percentage of the original size
———	———	△□○	100 (No reduction)
———	———	△□○	80
———	———	△□○	70
———	———	△□○	60
———	———	△□○	50
———	———	△□○	40

Journal, because redrawing is expensive. The original drawing should be lettered in pencil and should be larger (up to two times as large) than the intended size in the Journal.

It is important that the printed symbols and lines should retain their clarity. To achieve this the symbols and lines in original drawings should be sharply defined and of an even density and breadth. When graphs are generated by computer, lines must not show noticeable stepping. Heavier (broader) lines should be used for curves than for the axes of graphs. The table above illustrates line widths and symbol sizes to be used together on a figure and the appropriate reductions in the final printed form.

Symbols should be chosen from the following set

○ ● □ ■ △ ▲ ▽ ▼ ◇ ◆ + ×

The preferred order to shading of histogram columns is: open (clear), closed (solid), cross-hatched, heavily stippled and other (if required).

The explanation of the symbols and column headings should be given in the Figure legend and not as a key in the Figure itself.

Where the Figure is a composite of more than one graph, experimental record, etc., particular care is needed to minimise the spaces between each part, without over-crowding the entire Figure.

Figure 1 illustrates a simple properly-drawn graph in its original form (a) and in its reduced form (b) as it would appear in the Journal.

Photographs and photomicrographs

These should be submitted, twice as large as their intended published size, as good quality prints of high contrast especially where traces and records are illustrated. The originals must not contain arrows, lettering or numbering; these must be accurately located on a duplicate print (or photocopy). When submitting half-tone illustrations for publication authors should remember that it is not possible to reproduce Figures to a finer quality than the original photographs/photomicrographs provided. Critical areas should be marked on a second copy or on an overlay, so that the Printer can choose the correct exposure. Maximum trim areas should be marked on a second copy of the photograph/photomicrograph or on a tracing overlay, i.e. authors should show any parts of the photographs that could be excluded from the finished half-tone illustration. **A calibration bar must be provided on the photomicrograph** to ensure that, if the Printer reduces the plate, the scale is reduced in the correct proportion.

Proofs

Two sets of page proofs, will be supplied, one of which should be retained by the authors. The other should be corrected immediately and returned to the Publisher. Corrections should be kept to a minimum.

SPECIAL REPORTS

The purpose of *Special Reports*, which have superseded 'Short Communications', is to provide rapid publication for new and important results which the Editorial Board considers are likely to be of special pharmacological significance. *Special Reports* will have publication priority over all other material and so authors are asked to consider carefully the status of their work before submission.

In order to speed publication there is normally no revision allowed beyond very minor typographical or grammatical corrections. If significant revision is required, the Board may either invite rapid re-submission or, more probably, propose that it be re-written as a Full Paper and be re-submitted for consideration. In order to reduce delays, proofs of *Special Reports* will be sent to authors but **essential corrections must reach the Publisher within 48 hours of receipt.** Authors should ensure that their submitted material conforms exactly to the following requirements.

Special Reports should normally occupy no more than two printed pages of the Journal; two illustrations (Figures or Tables, with legends) are permitted. As a guideline, with type face of 12 pitch and double-line spacing, a page of A4 paper could contain about 400 words. The absolute maximum length of the *Special Report* is 1700 words. For each Figure or Table, please deduct 200 words. The manuscript should comprise a Title page, a Summary consisting of a single short paragraph, followed by key words (maximum of 10), Introduction, Methods, Results, Discussion and References (maximum of 10). In all other respects, the requirements are the same as for Full Papers.

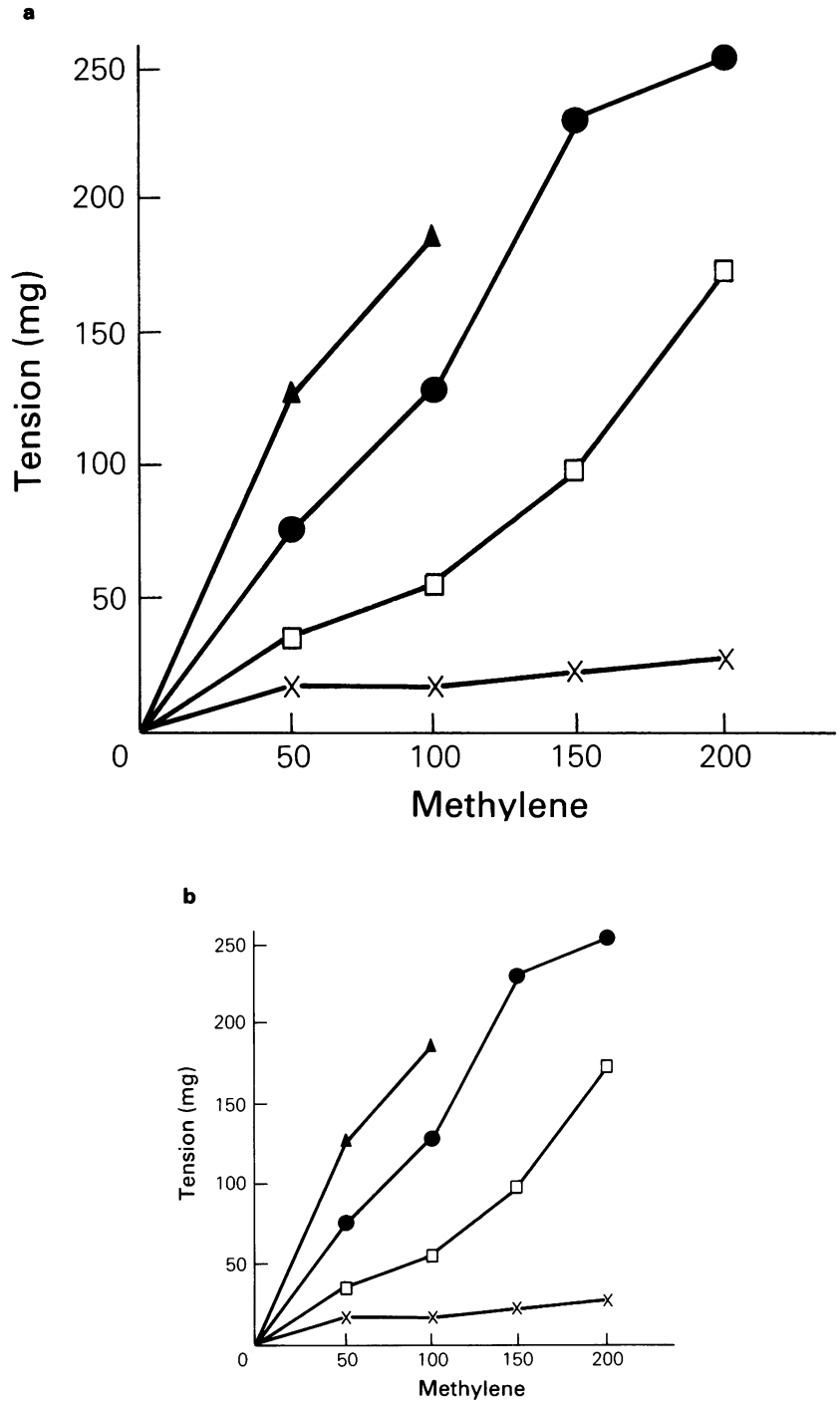

Figure 1. (a) Artwork as drawn. (b) Artwork reduced to 60 per cent of its original size for publication in the Journal.

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Statement

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for publication in the *British Journal of Pharmacology*

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Name .....

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When submitting a manuscript for editorial consideration, Authors should confirm their acceptance of these terms by signing a Declaration to that effect. The recommended wording is given in the example. No paper will be accepted for publication without such a Declaration being signed by each Author (see paragraph 6 above). If the manuscript is not accepted for publication, the assignment will be null and void.

ABBREVIATIONS AND SYMBOLS

Physico-chemical quantities

The *British Journal of Pharmacology* uses the SI symbols for units. The following prefixes for multiples of units should be used:

Multiplier	*Prefix*	*Symbol*
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a
Multiplier	*Prefix*	*Symbol*
10^{3}	kilo	k
10^{6}	mega	M
10^{9}	giga	G
10^{12}	tera	T

Thus, micron = μm; ångstrom = 0.1 nm. Mixed prefixes are not permissible, thus mμg should be ng. The symbols d (10^{-1}) and c (10^{-2}) should be restricted to those occasions on which there is a strongly felt need for them (e.g. cm).

Use of the solidus

The solidus should be avoided as far as possible and the negative index substituted, e.g. $mg\,kg^{-1}$ rather than mg/kg; $pmol\,mm^{-2}\,min^{-1}$ rather than pmol/mm^2/min.

SYMBOLS

Symbols denoting physical quantities are usually printed as italic capitals (indicated by single underline in typescript). A dash over the symbol indicates a mean value; a dot over the symbol indicates a time derivative. Suffixes may be used to indicate 'where' and 'what'. They are printed as inferiors on the line. Multiple suffixes should be avoided if a simpler symbol adequately defined is unambiguous, but if necessary should be separated by commas e.g. P_{A,CO_2} denotes partial pressure of CO_2 alveolar air.

CHEMICAL AND BIOLOGICAL ABBREVIATIONS

Authors should also consult *Nomenclature Guidelines for Authors* contained in this issue of the Journal. The abbreviations listed may be used without definition *except* those for chemicals, drugs and enzymes which must be written in full at first mention in the title, summary and again in the text. At first mention they should be followed by the abbreviation in brackets. Subsequently, the abbreviation alone may be used.

The list of abbreviations for chemical, drug and enzyme names is clearly not comprehensive and includes only a few commonly used examples.

Use abbreviations sparingly as extensive use can make the text hard to follow.

Physico-chemical quantities

Quantity	*Preferred unit*	*Symbol*
Amount (of substance)	mole	mol
Capacitance	farad	F
Concentration	moles per litre	M or $mol\,l^{-1}$
Current	ampere	A
Electrical conductance	siemens	S
Electromotive force	volt	V
Flow (blood or other liquid)	litres per second (or min)	$1\,s^{-1}$ or $1\,min^{-1}$
Flow (air or other gas)	litres per second (or min)	$1\,s^{-1}$ or $1\,min^{-1}$
Force	newton	N
Frequency of regular event	hertz	Hz
Length	metre	m
Mass	gram	g
Power	watt	W
Pressure (or partial pressure)	pascal*	Pa
Radioactivity	becquerel or curie	Bq (60 d.p.m.) or Ci (3.7×10^{10} Bq)
Resistance (electrical)	ohm	Ω
Temperature	degree celsius	°C
Time	second (preferred)	s
	minute	min
	hour	h
Volume (blood or other liquid)	litre	l
Volume (air or other gas)	litre	l
Work	joule	J

* mm of mercury (mmHg) are allowed if conventional, and if mercury manometer is used for calibration.

Chemical and biological abbreviations

acetylcholine	ACh
acetylcholinesterase	AChE
adenosine 3′ : 5′-cyclic monophosphate	cyclic AMP
adenosine 5′-phosphate	AMP
adenosine triphosphatase	ATPase
γ-aminobutyric acid	GABA
analysis of variants	F
adrenaline	Ad
analytical standard of reagent purity	A.R.
anhydrous	anhyd.
approximate(ly)	approx.
approximately equals	≈
aqueous	aq.
arg-vasopressin	AVP
boiling point	b.p.
bovine serum albumin	BSA
cardiovascular system	CVS
catechol-*O*-methyl transferase	COMT
central nervous system	CNS
cerebrospinal fluid	CSF
chi-squared (statistics)	χ^2
clearance	*c*
coenzyme A	CoA
concentrated	conc.
correlation coefficient	*r*
cubic	cu.
degree of freedom (statistics)	d.f.
deoxyribonucleic acid	DNA
deoxyribonuclease	DNase
dextro-(absolute configuration)	D-
dextro-(optical rotation)	(+)-
diameter	diam.
diameter, inside	i.d.
diameter, outside	o.d.
diffusion coefficient	*D*
3,4-dihydroxyphenylalanine	DOPA
3,4-dihydroxyphenylethylamine	dopamine
direct current	d.c.
disintegration per minute	d.p.m.
dissociation constant	K_D
dissociation constant, negative logarithm of	pK
distilled	dist.
dry ice	solid CO_2
edition	edn
editor(s)	ed.
effective concentration	EC_{50}
effective dose, median	ED_{50}
electrocardiogram	ECG
electrocorticogram	ECoG
electroconvulsive therapy	ECT
electroencephalogram	EEG
electromyogram	EMG
electron spin resonance	e.s.r
endothelial-derived relaxing factor	EDRF
epithelial-derived relaxing factor	EpDRF
equilibrium constant	*K*
equivalent (general use)	equiv.
erythrocyte	r.b.c.
erythrocyte sedimentation rate	ESR
ethylenediaminetetracetic acid	EDTA
excitatory postsynaptic potential	e.p.s.p.
experiment	expt
experimental	exptl

fatty acids, nonesterified	NEFA
figure(s) (with reference number)	Figure(s)
figure (diagram)	figure
gas–liquid chromatography	g.l.c.
glomerular filtration rate	GFR
haemoglobin	Hb
half-life	$t_{1/2}$
high-frequency	h.f.
high performance liquid chromatography	h.p.l.c.
human serum albumin	HSA
hydrogen-ion concentration	$[H^+]$
hydrogen-ion activity, negative logarithm of (hydrogen-ion exponent)	pH
6-hydroxydopamine	6-OHDA
5-hydroxyindoleacetic acid	5-HIAA
5-hydroxytryptamine	5-HT
immunoglobulins	IgA, IgD, IgE, IgG, IgM
inhibitor constant	K_i
inhibitory concentration	IC_{50}
inhibitory postsynaptic potential	i.p.s.p.
insoluble	insol.
international unit	iu
intra-arterial	i.a.
intracellular fluid	ICF
intradermal	i.d.
intramuscular	i.m.
intraperitoneal	i.p.
intracerebroventricular	i.c.v.
intravenous	i.v.
isotope (atomic mass) e.g. iodine-131	^{131}I
isotopically substituted compounds e.g.	[^{14}C]-ethanol
laevo-(absolute configuration)	L-
laevo-(optical rotation)	(−)-
lethal dose, median	LD_{50}
leukotriene	LT
logarithm to base e	$\log_e$ or ln
logarithm to base 10	$\log_{10}$
maximum	max.
mean arterial pressure	MAP
mean value of (statistics)	$\bar{x}$
melting point	m.p.
meta	*m*-
Michaelis constant	K_M
minimum	min.
mobility (electrophoresis)	*m*
monoamine oxidase	MAO
noradrenaline	NA
nuclear magnetic resonance	n.m.r.
number	no. or No.
number of observations (statistics)	*n*
ortho	*o*-
packed cell volume	PCV
page/pages	p./pp.
para-	*p*-
paragraph	para. or ¶
parts per million	p.p.m.
per cent	%
platelet activating factor	PAF
posterior	post.
probability (significance level in a statistical test)	*P*
radioimmunoassay	RIA
rectus (configuration by the sequence rule)	**R**
red blood corpuscle	RBC
relative band speed to front (chromatography)	R_F
relative molecular mass	M_r
relative retention time (gas chromatography)	t_r
renal plasma flow	RPF
resistance (respiratory)	*R*
respiratory conductance	Sgaw
revolutions per minute	r.p.m.
ribonucleic acid	RNA
section	§
sedimentation coefficient (ultracentrifugation)	*s*
sinister (configuration by the sequence rule)	**S**
soluble	sol.
solution	soln.
Spearman rank coefficient	r_s
standard deviation: (of observed sample)	s.d.
standard error (of estimate mean value)	s.e.mean
standard error (of sampling)	s.e.
standard temperature and pressure	STP
subcutaneous	s.c.
sum (statistical): of hypothetical population	Σ
of observed sample	S or Σ
temperature	temp.
thin layer chromatography	t.l.c.
time clock—24 h clock used e.g. 18 h 30 min	*t*
time constant	τ
2-amino-2-hydroxymethyl-propan-1,3-diol	Tris
ultraviolet	u.v.
unit	u
vacuum	vac.
valency	e.g. Fe^{2+}; Fe(II) protoporphyrin
volume by volume	v/v
wavelength	λ
weight	wt.
weight by volume	w/v

NOMENCLATURE GUIDELINES FOR AUTHORS

With effect from 1 January 1992

The Nomenclature Working Party (NWP) of the Editorial Board of the *British Journal of Pharmacology* has consulted many acknowledged experts in an effort to clarify and standardize receptor and other nomenclature systems for use by Editors until the recommendations of the IUPHAR Commission on Receptor Nomenclature and Classification are made known.

NWP is unanimous in its view that, with rare exceptions, the Journal should use spellings, names and abbreviations that have been chosen by international bodies or specialist groups specially convened for the purpose.

For receptor nomenclature, with few exceptions, the Journal generally follows the guidelines laid down in the TIPS Receptor Nomenclature Supplement (1992).

1 *Definition of receptors and subtypes*

Receptors and their subtypes are defined in relation to structural information where this is available and on the basis of functional studies. With the latter, they are defined in terms of the relative potencies of agonists and selectivities of antagonists and by the binding of such ligands, without reference to second (or other) messenger systems.

2 *Format of receptor names*

It was agreed that, until the IUPHAR Commission on Receptor Nomenclature and Classification make their recommendations:

(a) Editors will permit with reluctance new nomenclature systems in papers accepted for publication if and only if there are compelling reasons to introduce a new terminology (or modify an accepted one). The criteria upon which the new receptor type or subtype are defined must be given, together with adequate explanations of the relationship between the previous nomenclature (fully referenced) and the proposed one.

N.B. The new nomenclature should not appear in the Title, Short Title or Keywords, unless qualified by the adjective putative (e.g. ... mediated by the putative β_3-adrenoceptor).

(b) Only well-established and universally accepted subtype names (e.g. muscarinic and nicotinic cholinoceptors; α- and β-adrenoceptors) will be acceptable without any reference to the originator of these terms. In cases of controversy concerning further subdivision of the subtype, full referencing must be given.

(c) Receptor subtypes should be designated by means of a subscript numeral or capital letter. Some double subscripts (i.e. numerical plus letter) have been introduced but, where possible, further introductions should be avoided and must be fully referenced.

3 *Types of receptor*

(a) *Acetylcholine receptors* (see Cholinoceptors).

(b) *Adrenoceptors* The principal subtypes are α_1-, α_2-, β_1- and β_2-adrenoceptors. Reference to either 'atypical' β-adrenoceptor or a putative β_3-adrenoceptor would be permitted, provided fully referenced.

(c) *Angiotensin receptors* At present only the AT_1 receptor is recognised. The AT_2 binding site should be fully referenced.

(d) *Bombesin receptors* No subtypes are recognised. Proposed subtypes may be used as discussion points, but a full explanation is required.

(e) *Bradykinin receptors* B_1 and B_2 receptors are recognised. Possible additional types and subtypes of bradykinin receptors should not be designated, except as discussion points and should be fully referenced.

(f) *Calcitonin gene-related peptide (CGRP) receptors* No subtypes are recognised. Proposed subtypes may be used as discussion points, but a full explanation is required.

(g) *Cholecystokinin (CCK) receptors* The principal subtypes are CCK_A and CCK_B receptors, CCK_B receptors being known also as gastrin receptors.

(h) *Cholinoceptors* The two principal subtypes are muscarinic and nicotinic cholinoceptors (the term acetylcholine receptors is acceptable).

Muscarinic cholinoceptors Nomenclature should be confined to only three subtypes, namely M_1, M_2 and M_3 cholinoceptors, where M_2 refers to the cardiac subtype and M_3 includes both smooth muscle and glandular subtypes.

Note that the style m1, m2, etc. refers to nomenclature for a receptor with pharmacology similar to native receptors but which is encoded by a cloned gene/cDNA.

The abbreviation mAChR and variants are not acceptable.

Nicotinic cholinoceptors The principal subtypes currently accepted are muscle-type and neuronal-type receptors. The abbreviation nAChR and variants are not acceptable.

(i) *Dopamine receptors* D_1 and D_2 dopamine receptors are currently recognised. Other subtypes must be very clearly defined and fully referenced. DA_1 and DA_2 should not be used for peripheral dopamine receptors.

(j) *Endothelin receptors* The style to be used is ET_1 and ET_2 and should be fully referenced.

(k) *Excitatory amino acid receptors* At present, no subdivisions of the receptor for N-methyl-D-aspartate (NMDA; see 6(c) below) are permitted except as discussion points.

Four non-NMDA receptors have been established and are named:

(i) AMPA receptors.
(ii) Kainate receptors.
(iii) 2-Amino-4-phosphobutyrate receptors (also sometimes known as ABP or AP4 receptors) to be abbreviated L-AP4 receptors.
(iv) Metabotropic receptors.

(l) *γ-Aminobutyric acid (GABA) receptors* The principal subtypes are $GABA_A$ and $GABA_B$ receptors. Any other is to be used only as a discussion point and to be fully referenced.

(m) *Histamine receptors* The only histamine receptor subtypes that are acceptable without a need for very clear definition and full referencing are H_1-, H_2 and H_3-, although in the last case a definition and references are desirable.

(n) *Receptors for 5-hydroxytryptamine* The name 5-hydroxytryptamine (5-HT) is preferred to serotonin (see 4(b) below). The principal subtypes recognised are $5\text{-HT}_{1A, 1B, 1C, 1D}$, 5-HT_1-like, 5-HT_2, 5-HT_3 and 5-HT_4.

Other types may be debated in the Discussion section but, until there is international agreement on the nomenclature, these subtypes must be referenced.

(o) *Leukotriene receptors* When first mentioned, the style leukotriene (LT) receptor should be used, thereafter LT receptor. Receptors should be designated according to the leukotriene that selectively or preferentially binds to them. All leukotriene receptor types should be fully referenced.

(p) *Neuropeptide Y receptors* No subtypes are recognised. Proposed subtypes may be used as discussion points, but a full explanation is required.

(q) *Opioid receptors* The principal subtypes are μ-, δ- and κ-opioid receptors. Other possible subtypes (e.g. ε) are acceptable only as discussion points and must be referenced.

(r) *Oxytocin receptors* (see Vasopressin and oxytocin receptors).

(s) *Prostanoid receptors* The principal types are DP, EP, FP, IP and TP receptors. These should be introduced as prostanoid XP receptors, thereafter simply as XP receptors (where X denotes the type). If subtypes exist, they would be referred to as XP_n, (e.g. EP_1, EP_2, EP_3) receptors.

(t) *Purinoceptors* The principal subtypes permissible are P_1 and P_2. Subdivisions of P_1 into A_1 and A_2 types and of P_2 into P_{2X} and P_{2Y} types are acceptable. Proposed subtypes may be used as discussion points, but a full explanation is required.

(u) *Tachykinin receptors* Except as discussion points, only the following tachykinin receptor subtypes are acceptable at present: NK_1, NK_2 and NK_3.

(v) *Vasoactive intestinal peptide (VIP) receptors* No subtypes are recognised. Proposed subtypes may be used as discussion points, but a full explanation is required.

(w) *Vasopressin and oxytocin receptors* The principal subtypes are designated V_1, V_2, V_3 and OT receptors; V_3 has sometimes been known as V_{1B} but the original term V_3 is preferred (see 2(c)).

4 *Naming of nerve fibres*

Many nerve fibres are now known to release more than one transmitter, and future work may show that this is in fact the general rule. In that case, the concept of the same transmitter being released either at different developmental stages or under various experimental conditions would no longer hold, and single adjectives that imply this (e.g. cholinergic, noradrenergic) would become inappropriate when applied to nerve fibres, as distinct from transmitter functions. For the present, those nerve fibres that are known to function by releasing more than one identified transmitter may be described accordingly; for example, noradrenergic-purinergic, cholinergic-peptidergic (in alphabetical order, the order implying no priority of function).

N.B. The suffix 'ergic' should continue to be applied only to nerve fibres and to the transmission event, in accordance with Dale's intentions. For example, 'cholinergic' indicates that the nerve fibre, or the transmission, functions under particular conditions through the release of a choline-like substance. The suffix should not be used loosely to mean 'pertaining to'. Hence, for example, the expression 'cholinergic receptor' (rather than cholinoceptor) is an inappropriate use of the term. The term *nitrergic* may be used to describe the transmission event but may not be used to describe nerves.

(a) *Catecholamine releasing nerve fibres* The adjective to be applied to nerve fibres that release dopamine as a transmitter is dopaminergic (not DAergic).

Nerve fibres that are known to function by releasing noradrenaline are to be described as noradrenergic. The term adrenergic should be reserved for either a nerve fibre that functions by releasing a catecholamine, the identity of which is unknown, or one known to release adrenaline.

(b) *Some other adjectives describing nerve fibre function* NANC is an acceptable abbreviation of non-adrenergic, non-cholinergic for peripheral efferent nerve fibres when the identity of the transmitter(s) is unknown other than the fact that neither (nor) adrenaline nor acetylcholine is involved. It should be defined when introduced. NANCergic, e-NANC (or NANC-e) and i-NANC (or NANC-i) are not acceptable terms.

Glutamatergic, not glutaminergic, should be used to describe nerve fibres releasing glutamate. In referring to peptide-releasing nerve fibres, (e.g. those that may release substance P or vasoactive intestinal peptide) the nomenclature to be used is peptidergic (X), e.g. peptidergic (SP), peptidergic (VIP), not SPergic, VIPergic.

The terms 5-hydroxytryptamine (5-HT) and 5-hydroxytryptaminergic (i.e. nerves releasing 5-hydroxytryptamine) are preferred to those of serotonin and serotoninergic. The term 5-HTergic is not acceptable, except to avoid frequent repetition of 5-hydroxytryptaminergic.

Likewise, the terms purinergic (ATP) and purinergic (adenosine) are preferred.

5 *Enzymes*

The IUB Enzyme Commission (EC) number and full name (Enzyme Nomenclature 1984, Academic Press, New York and London) must be quoted when first mentioned in text. Subsequently the accepted trivial name is used. Trivial names may be used in the title.

6 *Other nomenclature requirements*

(a) *Racemates* Authors must state unambiguously in the Methods section of papers which isomers were used, e.g. (+)- or (−)-propranolol, and must bring to the attention of the reader the composite character of drugs that are mixtures of stereoisomers. Furthermore, the implications of the composite nature of such drugs studied for the interpretation of the data measured and the conclusions drawn must be made explicit. Note that the terms d- or l- for dextro- and laevo-rotatory are now obsolete, and the prefixes (+)- or (−)- respectively should be used. Capital D and L refer to the absolute configurations and of course remain acceptable when appropriate.

(b) *Platelet activating factor (acetyl-glyceryl-ether-phosphorylcholine)* The acronym to be used is PAF (not AGEPC, Paf, Paf-acether or other variant). The alkyl chain should be specified for synthetic PAF e.g. C_{16}-PAF.

(c) *Ligands for NMDA receptors* N-methyl-D-aspartate (NMDA) and N-methyl-DL-aspartate (NMDLA) are to be given in full when introduced in the text.

(d) *Purines* This term should not be used as a synonym for purine nucleotides or nucleosides.

(e) *Eicosanoids* The system of nomenclature to be used for eicosanoids is that published in Methods in Enzymology, (1990), **187**, 1–9. This scheme incorporates

recent changes in the style of abbreviation of hydroperoxy-, epoxy- and oxo-unsaturated fatty acids e.g. 12(S)-hydroperoxyeicosatetraenoic acid which was formerly abbreviated as 12(S)-HPETE now becomes 12(S)-HpETE. In manuscripts, the first use of the full chemical name of any eicosanoid should indicate double bond geometry when this is known.

(f) *Peptide nomenclature* The preferred style is capital letters to designate the first letter of the word. Otherwise, upper and lower case letters should be used (e.g. Enk-IR, enkephalin-like immunoreactivity). When numbers are used these should be placed after a hyphen on the same line as the abbreviation, e.g. ET-1.

(g) *Cell lines* Cell type, sources and originating species need to be defined.

(h) *Molecular biology* Abbreviations pertaining to molecular biological techniques need to be defined or presented in such a way that they can be recognised by the non-specialist e.g. the oligonucleotide sequence, TAGC.

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