

# **British Journal of Pharmacology**

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**Volumes 99–101**

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# INSTRUCTIONS TO AUTHORS

With effect from 1 January 1991

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.

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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 appropriateness 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<sup>-1</sup> or mg kg<sup>-1</sup>; concentrations should be given in terms of molarity, e.g. nM or  $\mu$ M.

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.

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## 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.

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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.

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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.

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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.

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## 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
—	—	Δ□○	100 (No reduction)
—	—	Δ□○	80
—	—	Δ□○	70
—	—	Δ□○	60
—	—	Δ□○	50
—	—	Δ□○	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

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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.

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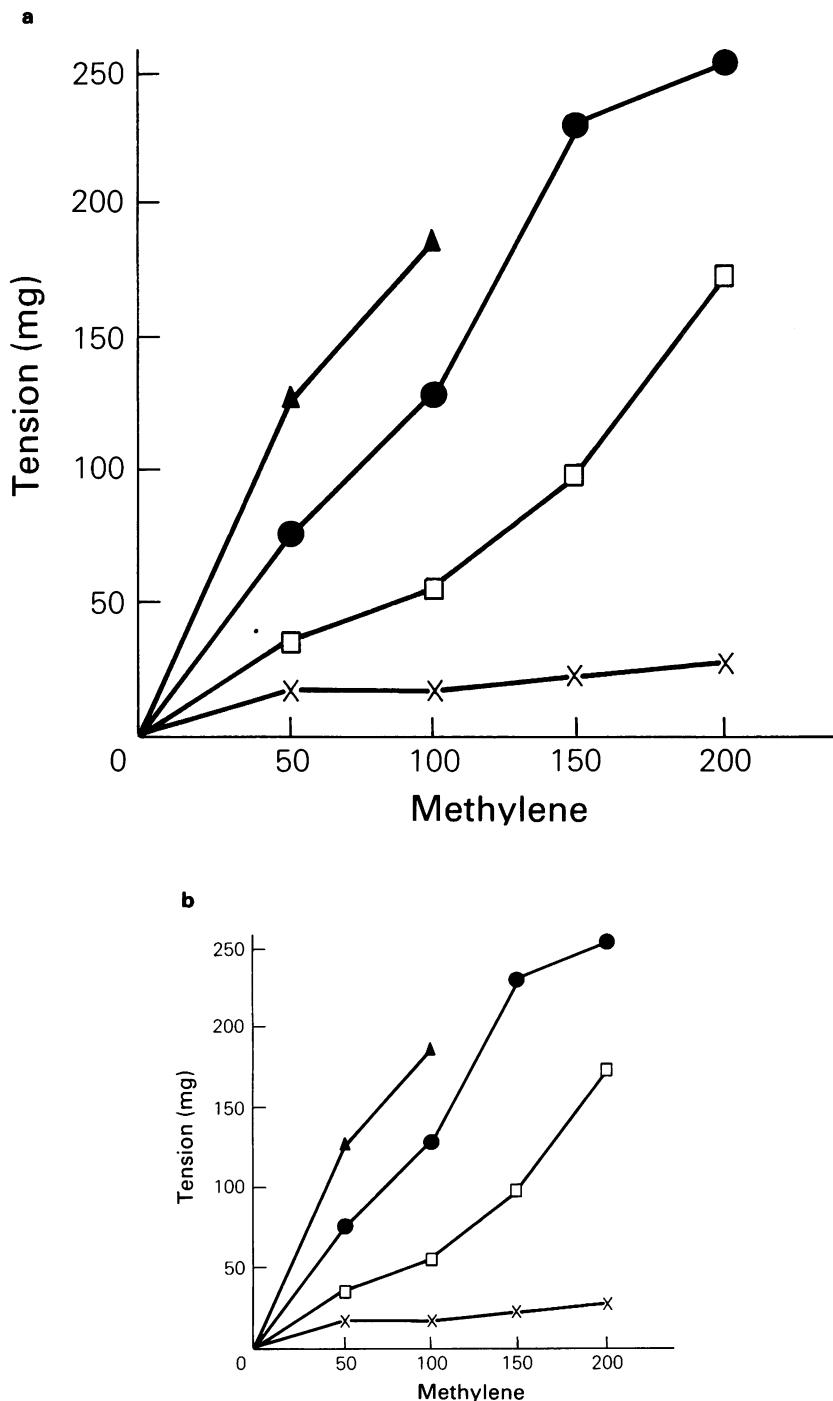


Figure 1. (a) Artwork as drawn. (b) Artwork reduced to 60 per cent of its original size for publication in the Journal.

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**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	$\mu$
$10^{-9}$	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 =  $\mu$ m; ångstrom = 0.1 nm. Mixed prefixes are not permissible, thus  $m\mu$ g 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<sup>-1</sup> rather than mg/kg; pmol mm<sup>-2</sup> min<sup>-1</sup> rather than pmol/mm<sup>2</sup>/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<sub>2</sub> 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 <sup>-1</sup>
Current	ampere	A
Electrical conductance	siemens	S
Electromotive force	volt	V
Flow (blood or other liquid)	litres per second (or min)	1 s <sup>-1</sup> or 1 min <sup>-1</sup>
Flow (air or other gas)	litres per second (or min)	1 s <sup>-1</sup> or 1 min <sup>-1</sup>
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 <sup>10</sup> Bq)
Resistance (electrical)	ohm	Ω
Temperature	degree celsius	°C
Time	second (preferred) minute hour	s min 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	dextro-(absolute configuration)	D-
acetylcholinesterase	AChE	dextro-(optical rotation)	(+)-
adenosine 3' : 5'-cyclic monophosphate	cyclic AMP	diameter	diam.
adenosine 5'-phosphate	AMP	diameter, inside	i.d.
adenosine triphosphatase	ATPase	diameter, outside	o.d.
γ-aminobutyric acid	GABA	diffusion coefficient	D
analysis of variants	F	3,4-dihydroxyphenylalanine	DOPA
adrenaline	Ad	3,4-dihydroxyphenylethylamine	dopamine
analytical standard of reagent	A.R.	direct current	d.c.
purity		disintegration per minute	d.p.m.
anhydrous	anhyd.	dissociation constant	K <sub>D</sub>
approximate(ly)	approx.	dissociation constant, negative	pK
approximately equals	≈	logarithm of	
aqueous	aq.	distilled	dist.
arg-vasopressin	AVP	dry ice	solid CO <sub>2</sub>
boiling point	b.p.	edition	edn
bovine serum albumin	BSA	editor(s)	ed.
cardiovascular system	CVS	effective concentration	EC <sub>50</sub>
catechol-O-methyl transferase	COMT	effective dose, median	ED <sub>50</sub>
central nervous system	CNS	electrocardiogram	ECG
cerebrospinal fluid	CSF	electrocorticogram	ECoG
chi-squared (statistics)	χ <sup>2</sup>	electroconvulsive therapy	ECT
clearance	c	electroencephalogram	EEG
coenzyme A	CoA	electromyogram	EMG
concentrated	conc.	electron spin resonance	e.s.r
correlation coefficient	r	endothelial-derived relaxing factor	EDRF
cubic	cu.	epithelial-derived relaxing factor	EpDRF
degree of freedom (statistics)	d.f.	equilibrium constant	K
deoxyribonucleic acid	DNA	equivalent (general use)	equiv.
deoxyribonuclease	DNase	erythrocyte	r.b.c.
		erythrocyte sedimentation rate	ESR
		ethylenediaminetetraacetic acid	EDTA
		excitatory postsynaptic potential	e.p.s.p.
		experiment	expt
		experimental	exptl

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

# NOMENCLATURE GUIDELINES FOR AUTHORS

With effect from 1 January 1991

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 had been chosen by international bodies or specialist groups specially convened for the purpose.

## 1 Definition of receptors and subtypes

In functional studies, pharmacological receptors are to be defined in terms of the relative potencies of agonists and selectivities of antagonists, also 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 is 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 Key-words, unless qualified by the adjective putative, where appropriate (e.g. ... mediated by the putative  $\beta_3$ -adrenoceptor).

(b) Only well-established and universally accepted subtype names (e.g. muscarinic and nicotinic cholinoreceptors;  $\alpha$ - and  $\beta$ -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. numeral plus letter) have been introduced but, where possible, further introductions should be avoided and must be fully referenced.

\* Note on abbreviations: the preferred style is *capital letters* to designate (a) the first letter of the word (e.g. V, Vasopressin); (b) the first letter of each main syllable or additional word (e.g. NK, neurokinin; GABA,  $\gamma$ -aminobutyric acid; NMDA, N-methyl-D-aspartate). Otherwise, upper and lower case letters should be used (e.g. Enk-IR, enkephalin-like immunoreactivity).

## 3 Types of receptor

(a) *Acetylcholine receptors* (see Cholinoreceptors).  
 (b) *Adrenoceptors* At present, the only adrenoceptor subtypes that should be accepted without a need for very clear definition and full referencing are  $\alpha_1$ -,  $\alpha_2$ -,  $\beta_1$ - and  $\beta_2$ -adrenoceptors. Reference to either 'atypical' adrenoceptor or the putative  $\beta_3$ -adrenoceptor would be permitted, provided fully referenced.

(c) *Bradykinin receptors* For consistency of style with NK receptors, these should be designated BK<sub>1</sub>, BK<sub>2</sub>. For the present, possible additional types and subtypes of BK receptors should not be designated, except as discussion points.

(d) *Cholecystokinin (CCK) receptors* The principal subtypes are CCK<sub>A</sub> and CCK<sub>B</sub> receptors, CCK<sub>B</sub> receptors being also known as gastrin receptors.

(e) *Cholinoreceptors* The two principal subtypes are muscarinic and nicotinic cholinoreceptors (the term acetylcholine receptors is acceptable).

*Muscarinic cholinoreceptors* Until further evidence is forthcoming, the nomenclature should be confined to only three subtypes, namely M<sub>1</sub>, M<sub>2</sub> and M<sub>3</sub> cholinoreceptors, where M<sub>2</sub> refers to the cardiac subtype and M<sub>3</sub> includes both smooth muscle and glandular subtypes. When the term is used repetitively, muscarinic receptor would be acceptable.

Note that the style m1, m2, etc. refers to nomenclature for molecular structure based on cDNA/genomic cloning.

The abbreviation mAChR and variants are not acceptable.

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

(f) *Dopamine receptors* Only D<sub>1</sub> and D<sub>2</sub> dopamine receptors are currently recognised. For the present, the possible D<sub>3</sub> subtype must be very clearly defined and fully referenced. There is no need to use DA<sub>1</sub> and DA<sub>2</sub> for peripheral dopamine receptors.

(g) *Excitatory amino acid receptors* At present, no subdivisions of the receptor for N-methyl-D-aspartate (NMDA; see 5 (c) below) are permitted except as discussion points.

Three non-NMDA receptors have been established and are named: (i) Quisqualate- and AMPA-preferring non-NMDA receptors that control cationic channels, to be abbreviated AMPA receptors. (ii) Kainate-preferring non-NMDA receptors, to be abbreviated Kai receptors. (iii) 2-Amino-4-phosphobutyrate receptors (also sometimes known as ABP or AP<sub>4</sub> receptors) to be abbreviated L-AP<sub>4</sub> receptors.

Acceptance of the occurrence of another receptor, described as regulating phosphatidyl inositol pathways, is considered to be premature. The term 'metabotropic receptor' is therefore to be used only as a discussion point.

Otherwise, where appropriate, the term glutamate receptors should be used.

(h)  *$\gamma$ -Aminobutyric acid (GABA) receptors* The principal subtypes are GABA<sub>A</sub> and GABA<sub>B</sub> receptors. Any other is to be used only as discussion point.

(i) *Histamine receptors* At present, the only histamine receptor subtypes that are acceptable without a need for very clear definition and full referencing are H<sub>1</sub>-, H<sub>2</sub> and H<sub>3</sub>- although in the latter case, a definition and references are desirable.

(j) *Receptors for 5-hydroxytryptamine* The name 5-hydroxytryptamine (5-HT) is preferred to serotonin (see 4 (b) below). The principal subtypes recognised are 5-HT<sub>1A,1B,1C,1D</sub>, 5-HT<sub>1</sub>-like, 5-HT<sub>2</sub> and 5-HT<sub>3</sub>. All three should be defined and referenced.

Further putative subtypes may be debated in the Discussion section but, until there is international agreement on the nomenclature, names, such as 5-HT<sub>1E</sub>, 5-HT<sub>4</sub>, are not acceptable, except as discussion points.

(k) *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.

Editors should be aware that the interpretation of [<sup>3</sup>H]-LTC<sub>4</sub>-binding is hampered by the presence of a binding site for LTC<sub>4</sub> on glutathione S-transferase.

(l) *Neuropeptide Y receptors* Despite some attempts to create subtypes, the view of experts was that no subtypes should be recognised except as discussion points. Full explanations of the basis for proposed subtypes would be required.

(m) *Opioid receptors* The principal subtypes are  $\mu$ -,  $\delta$ - and  $\kappa$ -opioid receptors. Other possible subtypes (e.g.  $\epsilon$ ) are acceptable only as discussion points.

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

(o) *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<sub>n</sub>, (e.g. EP<sub>1</sub>, EP<sub>2</sub>, EP<sub>3</sub>) receptors.

In the event of possible confusion between a subtype of receptors for prostacyclin IP<sub>3</sub> and a 'receptor' for one of the phosphatidyl inositol (inositol trisphosphate; InsP<sub>3</sub>), the term prostanoid IP<sub>3</sub> receptor should be used.

(p) *Purinoceptors* The main subtypes permissible are P<sub>1</sub> and P<sub>2</sub>. Subdivisions of P<sub>1</sub> into A<sub>1</sub> and A<sub>2</sub> types and of P<sub>2</sub> into P<sub>2X</sub> and P<sub>2Y</sub> types are acceptable with appropriate supporting references, provided they are based on agonist potencies and results with antagonists but not on activation of particular Second Messenger Systems.

(q) *Tachykinin receptors* Except as discussion points, only the following tachykinin (NK) receptor subtypes are acceptable at present: NK<sub>1</sub>, NK<sub>2</sub> and NK<sub>3</sub> and must be fully referenced.

(r) *Vasoactive intestinal peptide (VIP) receptors* Despite some attempts to create subtypes, the view of experts was that no subtypes should be recognised except as discussion points. Full explanations of the basis for proposed subtypes would be required.

(s) *Vasopressin and oxytocin receptors* The principal subtypes are to be designated V<sub>1</sub>, V<sub>2</sub>, V<sub>3</sub> and OT receptors; V<sub>3</sub> has sometimes been known as V<sub>1B</sub> but the original term V<sub>3</sub> 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 cholinceptor) is an inappropriate use of the term.

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

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 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 stereo-isomers. 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).

(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.

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