

INSTRUCTIONS FOR AUTHORS

Cancer Research is the official organ of the American Association for Cancer Research, Inc., and is devoted to the publication of significant, original research in the fields of cancer research and cancer-related biomedical science. The Editors will be happy to consider manuscripts from any country in the world that contain material falling within the Journal's publication scope. Only those papers that report results of novel and timely studies and that meet high standards of scientific quality will be accepted. Such papers will be subjected to stringent review and are published within about three months after acceptance.

When a manuscript is received for consideration, the Editors assume that no similar paper, other than an abstract or preliminary report, has been or will be submitted for publication elsewhere. Editorial decisions, forwarded from the Editorial Office to authors, are rendered as promptly as possible consistent with thoroughness of review.

Journal policy requires that a single manuscript processing fee of \$50 be assessed for all manuscripts, regardless of the number of resubmissions required, to defray the expenses incurred in review. Payment of this processing fee should not accompany the manuscript; invoice will be mailed with acknowledgment of receipt at the Editorial Office. Editorial review will not be delayed for receipt of payment.

Contributions must be submitted in quadruplicate (the original typescript and three clear copies, with at least two sets of original illustrations) to Dr. Sidney Weinhouse, Editor, *Cancer Research* Editorial Office, Fels Research Institute, Temple University School of Medicine, Philadelphia, Pa. 19140 (Telephone: 215-221-4720). Papers should be submitted only by an author, preferably the senior author, who should indicate in a covering letter the exact address to which all related correspondence should be sent and a telephone number at which the author can be reached. The original *plus a photocopy* of this letter are required. If the manuscript contains any quoted information conveyed by either personal communication or release of unpublished experimental data, the covering letter should state specifically that authorization to use this material has been given.

The Editorial Office cannot accept collect telephone calls from authors.

Authors are urged to read carefully and follow these instructions to minimize the time and expense involved in processing manuscripts.

Revised Manuscripts

Revised manuscripts should be submitted in triplicate, with two sets of original illustrations. A covering letter in *duplicate* must accompany all revised manuscripts and indicate clearly what alterations have been made in response to the reviewers' comments. Satisfactory reasons should be given for noncompliance with any of the recommendations of the Editors.

Categories of Publication

The following types of manuscripts are accepted: (1) Papers containing results of original experimental, clinical, or statistical studies that are sufficiently well documented to be acceptable to the critical reader. (2) Concise reviews on subjects of importance to cancer researchers. Such articles are given particularly stringent editorial evaluation before acceptance. (3) Communications that are brief and of unusual timeliness and significance. These papers are given especially rigid and rapid review and, if deemed acceptable, are published one month earlier than regular papers. (4) Letters to the Editor which deal with issues of importance to cancer researchers. If experimental data are included, these should be kept to the minimum required for adequate understanding for proper literature retrieval. Included under this category are commentaries on manuscripts published in the Journal. If accepted, replies by the authors are invited for simultaneous publication. (5) Brief reports of meetings, symposia, and conferences related to cancer research. (6) Proceedings of symposia, published as external supplements to the Journal, the full expenses of which are assumed by the sponsoring agency. (7) Brief announcements of scientific meetings of interest to readers, of courses in cancer-related biomedical science, and of the availability of fellowships and scholarships. These should be submitted at least 3 months prior to the expected month of issue. (8) Books received at the Editorial Office are listed; the Journal does not publish book reviews.

Format and Style

Papers should conform strictly to Journal style. A recent issue of *Cancer Research* will provide authors with assistance in the proper arrangement of papers. Manuscripts are to be written in clear, grammatical English. Papers that are not in good idiomatic English will be returned to the author without review. Investigators not fluent in the English language can avoid long delays in publication by conferring with colleagues knowledgeable in written English expression in the preparation of their manuscripts.

The Journal recommends that authors follow Webster's *Third New International Dictionary* for spelling and punctuation. For general and technical assistance, authors may refer to the following publications: *Stedman's Medical Dictionary* (Twenty-third Edition, 1976, The Williams & Wilkins Co., Baltimore, Md.); *CBE Style Manual* (Third Edition, 1972, published for the Council of Biology Editors by the American Institute of Biological Sciences, Washington, D. C. 20016; Fourth Edition, in press, 1978); *How to Write Scientific and Technical Papers* (1966, Sam F. Trelease, The Williams & Wilkins Co., Baltimore, Md.); *Medical Writing: The Technic and the Art* (Fourth Edition, 1972, Morris Fishbein, Charles C Thomas, Publisher, Springfield, Ill.); and *Handbook for Authors of Papers in the Journals of the American Chemical Society* (Second

Edition, 1967, American Chemical Society Publications, Washington, D. C. 20036).

Data must be presented concisely. Large masses of data of peripheral significance to the main thesis of the investigation will not be published in *Cancer Research* but may be deposited by the author in the National Auxiliary Publications Service, c/o Microfiche Publications, 440 Park Avenue South, New York, N. Y. 10016. The manuscript should contain a footnote that indicates how this ancillary material can be obtained. Forms needed to store these data are available from the Editorial Office. Such data should be submitted for review along with the manuscript and will be returned to the author upon acceptance.

Authors should edit their typescripts to eliminate unnecessary words and phrases and to detect typographical errors, inconsistencies in the use of tenses, or misleading, ambiguous phrases. Laboratory slang as well as terminology and abbreviations not consistent with internationally accepted guidelines should be avoided.

The manuscript should be typed on 21.6- x 28-cm (8½- x 11-inch) paper with double spacing *throughout*, allowing for ample margins. Consecutive numbering of all pages is requested, with the title page as page 1. The typescript should be arranged in the following order: (a) title, (b) author(s) and complete name(s) and location(s) of institution(s) or laboratory(ies), (c) running title, (d) footnotes, (e) text, (f) tables, (g) legends for all illustrations (charts and figures), (h) illustrations, and (i) other subsidiary material. Numbered and lettered sections in the text should be avoided. The appropriate location for each table and illustration should be indicated by marginal notes. Simple chemical formulas or mathematical equations should be presented in a form that allows their reproduction in single horizontal lines of type; more complicated mathematical formulas or chemical structures difficult to set in type should be provided in the form of India ink drawings or glossy photographs for camera-ready reproduction.

Title. Titles should be brief but informative, and limited if possible to about 100 characters. It is important for literature retrieval to include in the title the key words necessary to identify the nature of the subject matter. Use of expressions such as "Studies on . . ." or "Observations of . . ." should be avoided, since they are imprecise and not sufficiently informative. *Titles in the form of declarative sentences are not acceptable.* Chemical formulas or abbreviations should not be used. Subtitles, whether set off by Roman numerals or punctuation, are not permitted, as these present difficulties for indexers. If the paper is one of a series, a footnote to this effect may be included.

Authors and Their Affiliations. Authors are urged to include their full names, complete with first and middle names or initials. This request is made in accordance with the recommendation of the IUB Commission of Editors of Biochemical Journals because confusion often arises when authors are identified by surname and initials only. Authors' academic degrees should not be included. The full names of institutions and subsidiary laboratories should be given, together with a useful address (including postal number). If several authors and institutions are listed on a paper, it should be clearly indicated with which department and institution each author is affiliated.

Running Title. A brief running title should be provided, not to exceed 50 characters.

Footnotes. Lengthy footnotes are discouraged since the same information can in most instances be presented more effectively in the text.

Footnotes to the title page and text are to be designated consecutively with superscript Arabic numerals. A footnote to the title should contain information on financial support, including the source(s) and number(s) of the grant(s). Authors should also include a footnote designating to whom reprint requests should be addressed. An all-inclusive abbreviation footnote should contain a definition for every nonstandard abbreviation used in the paper.

For footnotes to tables, see section on **Tables** below.

Abstract. The Abstract, to appear at the beginning of the paper, should be concise, yet indicative of the content of the paper. As Abstracts are often photocopied directly by the secondary services, they should recapitulate in abbreviated form the purpose of the study and the experimental technique, results, and interpretations of the data. The inclusion of data on the number of test subjects and controls, strains of animals or viruses, drug dosages and routes of administration, tumor yields and latent periods, length of observation period, and magnitude of activity is recommended. Vague, general statements such as "The significance of the results is discussed," or "Some physical properties were studied," are uninformative and not acceptable. Abbreviations should be kept to an absolute minimum; however, if they are needed, they must be properly identified so as to make the Abstract independent of the text.

Introduction. It is not necessary to include all of the background literature in this section. Brief reference to the most pertinent papers generally suffices to acquaint the reader with the findings of others in the field and with the problem or question to which the author's particular investigation is being addressed.

Materials and Methods. Explanation of the experimental methods should be brief but adequate for repetition by qualified investigators. Procedures that have been published previously should not be described in detail but merely cited in appropriate references. Only new and significant modifications of previously published procedures need complete exposition. The sources of special chemicals or preparations used should be given along with their locations [city and state (country if foreign)].

Results. This section should include a concise textual description of the data presented in tables, charts, and figures. Excessive elaboration of data already given in tables and illustrations should be avoided. The Results and Discussion sections may be combined if, by so doing, space is saved or the logical sequence of the material is improved.

Discussion. In this section, the data should be interpreted concisely without repeating material already presented in the *Results* section. Speculation is permissible, but it must be well founded.

References. Any recent issue of the Journal can serve as a model for style of references. It is important that the references be typed in double-spaced form to ensure accurate copy editing. References should be arranged in alpha-

betical order and should include *all* authors' names (with initials). The bibliography should be limited to only those citations essential to the author's presentation. When comprehensive review articles are available, they are preferred to many separate references (an exception to this rule would be if the manuscript being prepared is a *Review*).

Before submission of the paper authors should verify the accuracy of all references and should check that all references have been cited in the text.

Journal articles and serial compendia. The complete title, journal, volume number, inclusive pages, and year should be given. Serial compendia, such as *Advances in Cancer Research* and the *Annual Review of Biochemistry*, which appear annually in numbered sequence, should be cited as journals rather than books, thus omitting the names of publishers and editors. *Chemical Abstracts* should be consulted for abbreviations of journals and serials.

Books and chapter citations. Citation of a specific chapter or article in a book should carry the author(s) of the chapter, its title, editor(s) of the book, book title, edition, volume, inclusive pages of the chapter, location and name of the publisher, and year. For references to complete books, give all of the above information that is pertinent.

Papers in press and unpublished material. Papers in press may be listed among the references with the journal name and tentative year of publication. References to papers in preparation or submitted for publication should be cited in a footnote, *not* in the References section; unpublished data or personal communications should be given in parenthetical form in the text. The names of all authors should be given, along with titles if possible. Material conveyed by "personal communication" may be used only if permission for its publication and verification of the wording of the citation have been obtained.

Addenda. Data acquired after acceptance of the paper, by the authors themselves or by others, cannot be added to the text. An addendum may be added in proof upon approval by the Editor. Addenda should be kept extremely brief. The full expense of printing an addendum will be charged to the author.

Tables. Tables should be constructed to fit within a single Journal column (8.9 cm or 3½ inches). This will be enforced with few exceptions because of the Journal's budgetary constraints. Tabular material should not duplicate data already presented in the charts. Unnecessary columns of data that can easily be derived from the rest of the results in the table should not be included. Large masses of individual values should be avoided; instead, these should be averaged and an appropriate designation of the dispersion such as standard deviation or standard error included.

Authors are obliged to indicate the significance of their observations by appropriate statistical analysis; tables without such information are not acceptable.

Every table *must* have a descriptive title and an explanatory paragraph that clearly gives the experimental details for understanding by the reader without reference to the text. Each column must carry an appropriate heading and, if numerical measurements are given, these units should be

added to the column heading. Tables should be numbered with Arabic numerals and table footnotes should be indicated with superscript italic letters (^a, ^b, ^c, etc.).

All units of measurement and concentration should be clearly designated. Exponential terminology is discouraged (the term mM is preferable to 10⁻³ M). If exponentials are absolutely unavoidable in column headings, the quantity expressed should be preceded, not followed, by the power of 10 by which its value has been multiplied, *i.e.*, 10⁻³ × concentration (M). This will prevent confusion as to whether the quantity should be multiplied or divided to obtain the correct value.

Charts. Line-cut illustrations (graphs and drawings) are to be designated *charts*. Flow diagrams and complex biochemical structures should be professionally prepared (not simply typewritten) and considered *charts*.

Graphs should be used sparingly and only when a salient point needs illustration. Straight-line functions such as relationships between concentration and absorbance, or Lineweaver-Burk plots when these are linear, should instead be described in a few lines in the text. To conserve space each chart should include those curves that may appropriately appear together.

The use of exponentials for labeling coordinates in charts is considered ambiguous and should, if at all possible, be avoided. If exponentials must be used, the quantity expressed should be *preceded* by the power of 10 by which its value has been multiplied, *i.e.*, 10³ × concentration (M). The form "Concentration (M × 10⁻³)" is not acceptable. If powers of 10 are used, the legend should designate how the quantity is to be calculated (whether multiplied or divided) to give the correct value.

Preparation of charts. Charts must be drawn with professional instruments and may be on Bristol board, tracing paper or cloth, or coordinate paper printed in light blue. *Charts should not be mounted on heavy cardboard.* Clear, glossy prints are acceptable in lieu of original drawings, provided that all parts of the chart are in focus. X-ray films or Polaroid photographs are not acceptable. If original drawings are submitted, an overall size of not more than 21.6 × 28 cm (8½ × 11 inches) is required.

Except for especially complicated drawings showing large amounts of data, all charts will be reduced to one-column width (8.9 cm or 3½ inches) or less. It is the responsibility of the author to see that the abscissas, ordinates, lines, and *especially* the symbols are sufficiently large so that when the charts are reduced to the size of a single column, the letters and numbers will be at least 1.5 mm high and the smallest part of the illustration will be discernible. In original charts, this can be accomplished by having the minimum height for lower-case letters 5 mm; numerals and upper-case letters 6 mm; and symbols within the drawings 5 mm. The thickness of ruled lines on charts is also vital for clear presentation of the data. Size recommendations for lines are as follows: #1 Leroy for graph grids, bonds, and arrows; #2 Leroy for graph borders or reference lines; and #5 Leroy for graph curves or emphasis lines.

Points of observation should be denoted with different symbols rather than with different types of lines; their significance can be explained directly in the body of the

chart or in the legend. Only those common symbols for which the printer has type (×, ○, ●, □, ■, △, ▲, ⊙) should be used.

Charts should be ruled off on all four sides close to the area occupied by the curve, and abscissas and ordinates should be clearly marked with appropriate units. Explanations of the coordinates should not extend beyond the respective lines. If a chart contains a left- and a right-hand ordinate, explanation of the left ordinate should read in the upward direction and that of the right ordinate should read downward. Titles printed outside the confines of the charts waste space; all of this information can easily be included in the legend.

Each chart should be labeled in pencil on the reverse side with Arabic numerals and the first author's name.

Chart legends. Legends are required for *all* charts. They should briefly describe the data shown; details in the text need not be repeated. Each legend should adequately identify all units, abbreviations, mathematical expressions, abscissas, ordinates, and symbols.

Figures. Because halftone illustrations (photomicrographs and photographs) are expensive to reproduce, only those photographs that are absolutely essential to the clarity of the presentation can be accepted.

It is often difficult for the printer to judge accurately the amount of reduction possible with electrophoretic patterns. Therefore, this material should be submitted in reduced form ready for photoreproduction.

Color photographs are discouraged and will be published only if the Editors deem them indispensable. The complete expense of reproducing such photographs will be charged to the author. Current estimates for color reproduction can be obtained by corresponding with the Editor.

Preparation of plates. Photographs should be mounted on "plates" of white cardboard; the overall dimensions of photographs on a given plate should not exceed 18.4 x 22.4 cm (7¹/₄ x 9 inches). All photographs should be correctly exposed, sharply focused, and submitted on glossy white paper.

Karyotypes should be presented in the form of cardboard plates onto which chromosome sections from an *original* photomicrograph are pasted. This "original" is needed for clear Journal reproduction. The back of the plate should indicate how much it can be reduced in size if published. For review purposes, two additional glossy photographs are requested.

Considerable space may be saved by suitably cropping figures so that 4 to 6 photographs can be presented on one plate. Plates with only single photographs are not acceptable and will be returned for cropping or reduction unless the authors can justify their necessity.

Tooling (thin white lines) between the photographs should be uniform. Figure numbers, in Arabic numerals, should appear in India ink *directly* on the photographs and, if possible, should be in the lower right-hand corner of each photograph. These numbers should be no larger than 1/4 inch. Wax-based lettering such as PRES-TYPE or LETTASET is discouraged because of its tendency to crumble and adhere to vinyl overlays. Tissue overlays on plates are a necessary protection for figures. The first author's name

should be given in pencil on the reverse side of each plate.

Figure legends. An appropriate legend for each figure, including stains and magnifications where applicable, is required. Any abbreviations or reference points on a figure should be explained in the legend. All attempts will be made to place legends under the plates to which they refer. To facilitate proper layout, authors may wish to keep their plates to 7¹/₄ x 8¹/₂ inches.

Abbreviations

Abbreviations are in general a hindrance to readers in fields other than that of the author(s), to abstractors, and to scientists in foreign countries. It is therefore the policy of this Journal, which publishes material on several subspecialties of cancer research, to limit their use to an absolute minimum. Short terms need not be abbreviated, *e.g.*, daunomycin, folate, vincristine. Abbreviations are not to be used in titles, but running titles may carry abbreviations for purposes of brevity. Abstracts may contain abbreviations for terms mentioned many times in that section but their identification is mandatory.

Authors should follow the recommendations of the IUPAC-IUB Commission on Biochemical Nomenclature (see section below on **Terminology**). All nonstandard abbreviations should be identified in an inclusive abbreviation footnote to the first such abbreviation after the Abstract.

Abbreviations that form recognizable words, such as EAT and MOPS are not acceptable.

Standard Abbreviations. Authors may use, without definition, the abbreviations in the following lists.

NAD ⁺ , NADH	nicotinamide adenine dinucleotide and its reduced form
NADP ⁺ , NADPH	nicotinamide adenine dinucleotide phosphate and its reduced form (DPN ⁺ , TPN ⁺ , and their reduced forms are not acceptable.)
CoA, acyl-CoA	coenzyme A and its acyl derivatives (<i>e.g.</i> , acetyl)
AMP, GMP, IMP, UMP, CMP, TMP	the 5'-phosphates of ribosyladenine, -guanine, -inosine, -uracil, -cytosine, and -thymine
ADP, etc.	the 5'(pyro)-diphosphates of adenosine, etc.
ATP, etc.	the 5'(pyro)-triphosphates of adenosine, etc.
dAMP, dGMP, dIMP	the 5'-phosphates of 2'-deoxyribosyladenine, etc.
RNA, DNA	ribonucleic acid, deoxyribonucleic acid
RNase, DNase	ribonuclease, deoxyribonuclease
mRNA	messenger RNA
nRNA	nuclear RNA
rRNA	ribosomal RNA
tRNA	transfer RNA (sRNA is not recommended for RNA preparations that accept amino acids.)
P _i , PP _i	orthophosphate, pyrophosphate

Instructions for Authors

Tris	tris(hydroxymethyl)aminomethane
EDTA	ethylenediaminetetraacetate
POPOP	1,4-bis[2-(5-phenyloxazolyl)]benzene
PPO	2,5-diphenyloxazole
DEAE, TEAE	diethylaminoethyl, triethylaminoethyl
UV, IR	ultraviolet light, infrared
RBC, WBC	red blood cell(s), white blood cell(s)

Others	
mole	mol
Curie	Ci
equivalent	eq
counts per minute	cpm
disintegrations per minute	dpm
revolutions per minute	rpm
volt	V
Svedberg unit	S
absorbance	A (not O.D.)
probability	<i>p</i>
roentgen	R
standard deviation	S.D.
standard error of the mean	S.E.
logarithm (Briggsian)	log
logarithm (natural)	ln
entropy	S

Other Standard Abbreviations

Units of Concentration

molar (moles/liter)	M (not used for moles)
millimolar (millimoles/liter)	mM (preferred to 10^{-3} M)
micromolar (micromoles/liter)	μ M (preferred to 10^{-6} M)
nanomolar	nM (not $m\mu$ M)
picomolar	pM (not $\mu\mu$ M)

The expression mg % should be avoided; weight concentrations should be given as g per ml, g per 100 ml, g per liter, etc.

Units of Length, Area, Volume, Mass, Time

The abbreviations below are correct for both singular and plural forms of each term.

meter	m
centimeter	cm
square centimeter	sq cm
millimeter	mm
micrometer (not micron)	μ m (not μ)
nanometer (not millimicron)	nm (not $m\mu$)
picometer (not micromicron)	pm (not $\mu\mu$)
Angstrom (0.1 nm)	Å
liter	not abbreviated
milliliter	ml (use instead of cc or cm^3)
microliter	μ l (not λ)
gram	g
milligram	mg
microgram	μ g (not γ)
kilogram	kg
hour	hr
minute	min
second	sec

Physical and Chemical Units

retardation factor	R_F
acceleration of gravity	<i>g</i>
sedimentation coefficient	<i>s</i>
sedimentation coefficient in water at 20°	$S_{20,w}$
degree Celsius (Centigrade)	° (not °C)
degree Kelvin	°K
diffusion coefficient	<i>D</i>
equilibrium constant	<i>K</i>
inhibition constant	K_i
Michaelis constant	K_m
maximum velocity	V_{max}

in chemical compounds

ortho	<i>o</i>
meta	<i>m</i>
para	<i>p</i>
secondary	<i>sec</i>
tertiary	<i>tert</i>

routes of administration

intramuscular	i.m.
intraperitoneal	i.p.
intravenous	i.v.
oral	p.o.
subcutaneous	s.c.

Terminology

Approved terms and abbreviations for chemical substances have been published in *Collected Tentative Rules and Recommendations of the Commission on Biochemical Nomenclature IUPAC-IUB*. The Second Edition (1975) is available for \$3 (to accompany order) from the American Society of Biological Chemists, Inc., 9650 Rockville Pike, Bethesda, Maryland 20014. Individual listings have appeared in many journals as follows:

1. for abbreviations and symbols (general). *European J. Biochem.*, 74: 1-6, 1977
2. for nucleic acids, polynucleotides, and their constituents, *J. Biol. Chem.*, 245: 5171-5176, 1970, and its supplement, *J. Biol. Chem.*, 246: 4894, 1971
3. for symbols for amino acid derivatives and peptides, *J. Biol. Chem.*, 247: 977-983, 1972
4. for single-letter abbreviations for amino acid sequences, *J. Biol. Chem.*, 243: 3557-3559, 1968
5. for the conformation of polypeptide chains, *J. Biol. Chem.*, 245: 6489-6497, 1970
6. for coenzymes, vitamins, etc., *J. Biol. Chem.*, 241: 2987-2994, 1966; *European J. Biochem.*, 40: 325-327, 1973; 45: 7-12, 1974; 46: 217-219, 1974; 53: 15-18, 1975
7. for synthetic peptides and polypeptides, *J. Biol. Chem.*, 247: 323-325, 1972

8. for synthetic modifications of natural peptides, *J. Biol. Chem.*, **242**: 555–557, 1967
9. for lipids, *Lipids*, **12**: 455–468, 1977
10. for cyclitols, *European J. Biochem.*, **57**: 1–7, 1975
11. for steroids, *Biochemistry*, **8**: 2227–2242, 1969, and its amendments, *Biochemistry*, **10**: 4994–4995, 1971
12. for iron-sulfur proteins, *J. Biol. Chem.*, **248**: 5907–5908, 1973
13. for carbohydrates, *J. Biol. Chem.*, **247**: 613–634, 1972, and *European J. Biochem.*, **25**: 4, 1972
14. for carotenoids, *J. Biol. Chem.*, **247**: 2633–2643, 1972, and revision, *Biochemistry*, **14**: 1803, 1975
15. for α -amino acids, *Biochemistry*, **14**: 449–462, 1975
16. for peptide hormones, *J. Biol. Chem.*, **250**: 3215–3216, 1975
17. for human immunoglobulins, *European J. Biochem.*, **45**: 5–6, 1974
18. for quinones with isoprenoid side chains, *European J. Biochem.*, **53**: 15–18, 1975
19. for folic acid and related compounds, *J. Biol. Chem.*, **241**: 2991–2992, 1966
20. for corrinoids, *Biochemistry*, **13**: 1555–1560, 1974
21. for multiple forms of enzymes, *J. Biol. Chem.*, **252**: 5939–5941, 1977
22. for phosphorus-containing compounds of biochemical importance, *Proc. Natl. Acad. Sci. U. S.*, **74**: 2222–2230, 1977
23. for fundamental stereochemistry, *European J. Biochem.*, **18**: 151–170, 1971
24. for immunoglobulins (WHO document), *J. Biol. Chem.*, **245**: 3033–3034, 1970
25. for spectrophotometric data, *Pure Appl. Chem.*, **21**: 1–44, 1970
26. for the major human histocompatibility complex (HLA), *Transplantation*, **21**: 353–358, 1976.

Isotopically Labeled Compounds. A radioactive nuclide is indicated by its mass number as a superscript to the left of the symbol (^{32}P); when written out, it should correspond to the spoken word (phosphorus-32).

In an isotopically labeled compound, the isotopic prefix should be placed in *square brackets and immediately precede the name* (word) to which it refers, as in [^{14}C]-thymidine, [α - ^{14}C]leucine, L-[*methyl*- ^{14}C]methionine, [^3H]-3-hydroxykynurenine. When more than one position in a substance is labeled by means of the same isotope and the positions are not indicated, the number of labeled atoms is added as a subscript to the right of the element, as in [$^{14}\text{C}_2$]glycolic acid. The symbol *U* indicates uniform labeling and *G*, general labeling, e.g., [U - ^{14}C]glucose (where the ^{14}C is uniformly distributed among all six positions) and [G - ^{14}C]glucose (where the ^{14}C is distributed among all six positions, but not necessarily uniformly).

The isotopic prefix precedes that part of the name to which it refers, as in sodium [^{14}C]formate, iodo[$^{14}\text{C}_2$]acetic acid, 1-amino[^{14}C]methylcyclopentanol, α -naphth[^{14}C]oic acid, 2-acetamido-7-[^{131}I]iodofluorene, fructose 1,6-[1- ^{32}P]-bisphosphate, 17 β -[^3H]estradiol. Terms such as " ^{131}I -labeled albumin" should *not* be contracted to "[^{131}I]albumin" (since native albumin does not contain iodine), and " ^{14}C -labeled amino acids" should similarly *not* be written as "[^{14}C]amino

acids" (since there is no carbon in the amino group).

When isotopes of more than one element are introduced, their symbols should be arranged in alphabetical order, e.g., [3 - ^{14}C ; 2 , 3 -D; ^{15}N]serine. Deuterium and tritium may be designated as ^2H and ^3H or as D and T, respectively.

When not sufficiently distinguished by the foregoing means, the positions of isotopic labeling are indicated by Arabic numerals, Greek letters, or prefixes in italics, as appropriate; these are to be placed within square brackets to appear before the symbol of the element concerned and are attached to it by a hyphen. Examples of this style are [1 - ^{14}C]alanine, L-[2 - ^{14}C]leucine or L-[α - ^{14}C]leucine, [*carboxy*- ^{14}C]leucine, [2 , 3 - ^{14}C]maleic anhydride, [3 , 4 - ^{14}C , ^{35}S]methionine, L-[*methyl*- ^{14}C]methionine. The symbol indicating configuration always precedes the bracketed isotope, and a hyphen is used to separate it from the brackets, e.g., D-[^{14}C]glucose; L-[1 - ^{14}C]leucine.

The same rules apply when the labeled compound is designated by a standard abbreviation or symbol other than the atomic symbol, e.g., [α - ^{32}P]ATP, [^{32}P]CMP, or [^{125}I]dUrd. The square brackets are not to be used, however, with atomic symbols, or when the isotopic symbol is attached to a word that is not a specific chemical name, abbreviation, or symbol. Proper usage here is: $^{14}\text{CO}_2$, $^2\text{H}_2\text{O}$, $\text{H}_2^{35}\text{SO}_4$, $^{32}\text{P}_1$, ^{131}I -labeled, ^3H -ligands, ^{14}C -steroids.

Enzymes. Authors should use the Recommended (trivial) Name given by the IUB Commission on Enzyme Nomenclature Recommendations (1972) of the International Union of Pure and Applied Chemistry and the International Union of Biochemistry (Elsevier Publishing Company, Amsterdam, 1973). In some cases the Systematic Name or the reaction catalyzed should also be included. It is strongly recommended that the Enzyme Commission number be stated at first mention.

For information on isozyme nomenclature, consult the "Collected Tentative Rules . . ." mentioned above or the specific listing published in the *Journal of Biological Chemistry* (reference above).

Histones. Histone nomenclature should conform to the following system proposed at a Ciba conference held on April 4–5, 1974, in London: the six histone fractions are to be labeled H1, H1 0 , H2A, H2B, H3, and H4, rather than F1, F1 0 , F2a2, F2b, F3, and F2a1, respectively.

Inbred Strains. Designations for inbred mouse strains should conform to the guidelines in "Standardized Nomenclature for Inbred Strains of Mice: Sixth Listing," *Cancer Res.*, **36**: 4333–4377, 1976, prepared by Joan Staats for the Committee on Standardized Nomenclature for Mice; for designations of inbred strains of rats, please refer to "Standardized Nomenclature for Inbred Strains of Rats: Fourth Listing," Michael Festing and Joan Staats, *Transplantation*, **16** (No. 3): 221–245, 1973.

Outbred Animal Stocks. Nomenclature for outbred laboratory animals should conform to that recommended by the Committee on Nomenclature, Institute of Laboratory Animal Resources: "A Nomenclature System for Outbred Animals," *Lab. Animal Care*, **20**: 903–906, 1970.

Drugs. Generic names of drugs are preferred; a proprietary name may be used only after the first mention of the generic name and should be avoided in titles unless both names can easily be listed. If a foreign proprietary name is

used, the name of the comparable U. S. product should be given. When there is no generic name for a drug, authors should give the chemical name or formula or a description of the active ingredients.

Authors should refer to the formally adopted generic names listed in *AMA Drug Evaluations* (Second Edition, 1973), *The United States Pharmacopeia (USP, Nineteenth Revision, 1975)*, *National Formulary (NF, Fourteenth Edition, 1975)*, *1st Supplement of USP XIX and NF XIV (1975)*, and *USAN* and the *USP Dictionary of Drug Names (1975)*. In addition, the Council on Drugs reports in *The Journal (New Names)* drug names adopted by the *USAN* (United States Adopted Names) Council. These monographs include both the generic and proprietary names for the newest drugs, usually prior to their publication elsewhere.

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Ionic charge should be designated by a superscript immediately following the chemical symbol, e.g., Mg^{2+} , S^{-} .

Advice on biochemical nomenclature is readily available from Dr. Waldo E. Cohn, Director, NAS-NRC Office of Biochemical Nomenclature, Biology Division, Oak Ridge National Laboratory, Box Y, Oak Ridge, Tennessee 37380.

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AUTHOR INDEX

January 1978

- Anderson, L. M., 137
 Antonson, K., 177
 Arcos, J. C., 226
 Argus, M. F., 226
 Atkins, D., 23
 Au, J. L., 210
- Baldwin, R. W., 69
 Barth, R. F., 32
 Becker, F. F., 163
 Betz, E. H., 52
 Bianchi, V., 110
 Bigner, D. D., 74
 Blakemore, W. S., 193
 Bodgen, A. E., 59
 Boguski, M. S., 88
 Boniver, J., 52
 Bowen, D., 219
 Brooks, W. H., 74
 Brown, C. E., 159
 Budinger, J. M., 137
 Buttignol, M., 110
- Chen, C-h. B., 215
 Chou, T-H., 181
 Clifton, K. H., 189
 Cobb, W. R., 59
 Conrad, H. E., 185
 Cortese, R., 13
 Courtoy, R., 52
 Crowley, J., 189
- De Lorenzo, F., 13
 Dray, S., 223
- Erickson, J., 177
 Evans, W. H., 130
- Feldmann, G., 16
 Fisher, B., 38
 Fox, P., 65
 Frank, J. J., 88
 Frayssinet, C., 16
 Freedman, S. O., 6
- Garcia-Suarez, S., 142
 Gebhardt, M., 38
 Gold, P., 6
 Goldman, I. D., 219
 Good, R. A., 137
- Gosalvez, M., 142
 Gould, M. N., 189
 Greager, J. A., 69
 Guesnon, J., 16
 Gulkin, T. A., 59
- Hale, A. H., 185
 Hammonds, J. C., 23
 Hanlon, J., 38
 Hanna, M. G., Jr., 204
 Hatzfeld, A., 16
 Hecht, S. S., 215
 Hefter, K., 83
 Himmelhoch, S. R., 130
 Hoffmann, D., 215
 Hsu, C. K., 130
 Hunt, N. H., 23
- Jirtle, R., 189
 Johnson, R. K., 59
- Kahn, C. R., 94
 Kelton, D. E., 59
 Kessel, D., 181
 Khilanani, P., 181
 Kimura, J., 78
 Kleinman, R., 223
 Krupey, J., 6
 Kwock, L., 83
- Labitan, A., 6
 Leatherland, J. F., 149
 Leonard, J. G., 185
 Levis, A. G., 110
 Levy, C. C., 88
 Lin, P-S., 83
 Linta, J., 38
 Lippman, M. E., 94
 Loader, K. R., 168
 Lopez-Alarcon, L., 142
- Mage, M. G., 130
 Markesbery, W. R., 74
 Maronpot, R. R., 137
 Martin, T. J., 23
 Michelangeli, V. P., 23
 Minkel, D. T., 117, 124
 Moccia, R., 149
 Monaco, M. E., 94
- Nagel, D., 177
 Nagourney, R. A., 65
 Nakayasu, M., 103
 Nathaniel, E. J. H., 168
 Neuwelt, E. A., 88
- Osborne, C. K., 94
 O'Toole, C., 199
- Patil, K., 177
 Perin, A., 1
 Petering, D. H., 117, 124
 Peters, L. C., 204
 Procter-Appich, K., 88
- Roll, D. E., 185
 Roszman, T. L., 74
- Sadee, W., 210
 Saffer, E., 38
 Saryan, L. A., 124
 Sato, S., 103
 Schapira, F., 16
 Schein, P. S., 65
 Sessa, A., 1
 Shimamura, S., 103
 Shortland, J. R., 23
 Shuster, J., 6
 Silengo, L., 13
 Simar, L. J., 52
 Singh, I., 193
 Singla, O., 32
 Smith, G. H., 130
 Sofen, H., 199
 Sonstegard, R., 149
 Sponza, G., 110
 Staiano, N., 13
 Sugimura, T., 103
- Takeuchi, T., 103
 Toh, Y. C., 42
 Toth, B., 177
 Tsang, K. Y., 193
- Wallach, D. F. H., 83
 Warren, S., 159
 Weber, M. J., 185
 White, J. C., 219
 Wong, H. C. G., 6
 Wu, A. T., 210

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