

# INFORMATION FOR AUTHORS

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## INFORMATION FOR AUTHORS

### Scope and Overview

Turkish Journal of Biochemistry (TJB), official journal of Turkish Biochemical Society. The annual volume consists of six (6) issues, to be published in February, April, June, August, October and December. Research articles, reviews, short communications, technical reports, case presentations, opinions, and letters to the editor, that have not been published elsewhere, on biochemistry, clinical biochemistry, molecular biology, molecular genetics, biotechnology, bioinformatics, bioengineering, translational research, and their educational disciplines are published in the journal.

The main aim of the journal is to support the research and publishing culture by ensuring that every published manuscript including the studies on regional research has an added value and thus providing international acceptance of the “readability” of the manuscripts published in the journal.

Compliance to the ethical principles on research and publishing are essential for the publication of manuscripts. Manuscripts should focus to their main aim, be clearly and concisely written, and adhere to grammar and general good writing principles. Authors should clearly declare any kind of conflict of interest related to the subject and/or any other author in both the abstract and Conflict of Interest sections. All manuscripts should be prepared in compliance with the “Uniform Requirements for Manuscripts Submitted to Biomedical Journals” of International Committee of Medical Journal Editors ([www.icmje.org](http://www.icmje.org)).

Manuscripts and any other printed material published in the Turkish Journal of Biochemistry represent the opinions of authors and should not be construed to reflect the opinions of the Editorial Board and/or the Executive Committee of the Turkish Biochemical Society.

### On-line Submitting

Manuscripts could be submitted on-line through the web page of the Turkish Journal of Biochemistry ([www.turkjbiochem.com](http://www.turkjbiochem.com) or <http://www.journalagent.com/tjb/>). All submissions are done through the “On-line Manuscript Submission” link found at the on-line submission system named as ‘JournalAgent™’. Systems contain informative explanations and guidance through each step. **Names of the authors and their affiliations should not be**

**stated in the file containing main text.** The related information should be submitted separately.

Contribution of each author should be declared **in a separate file**. If the study originates from a thesis or has been previously presented in a meeting, this should also be indicated in this file. Additionally, if the work address of an author during the research has changed, his/her current address should be given in this file.

Figures should be submitted as **separate files** as Tagged Image File Format (with .tiff extension) or Joint Photographic Experts Group Format (with .jpeg extension). Resolution of the figures should be at least 600 dpi. Text, tables, and figures should not be saved as MS Power Point.

Copyright Transfer Agreement and approval of Ethics Committee (if required) should be sent by post or by fax to the information below.

Turkish Journal of Biochemistry  
Turk Biyokimya Dergisi  
Hirfanli Sokak 9/3 Gaziosmanpasa 06700 Ankara  
Fax: +90 312 447 09 63

Editorial correspondence other than manuscript submission can be sent to [editor@turkjbiochem.com](mailto:editor@turkjbiochem.com).

If previously published material such as a table, figure, graphic, etc. is used exactly as the original, permission received from the publishers for this usage should also be sent; even though the material was published in a previous manuscript of the author(s).

## Review process

Editorial Board preliminary reviews the submitted manuscripts for compliance with the publishing concept and instructions of the journal, whether manuscripts are focused to their main aim, validity of the statistical method used and adherence to ethical principles. Upon the preliminary evaluation, if required, manuscripts are sent back to the authors for revision. If revision is not required or upon the completion of required editorial revision, manuscripts are sent to at least 2 reviewers specialized in the topic and concept of the manuscript. Editorial Board makes sure that there is no conflict of interest while assigning the reviewers and names of the authors are not declared to the reviewers.

Authors should clearly declare any kind of conflict of interest by filling the required form available on the website related to the subject and/or any other author in both the **Abstract** and **Conflict of Interest** sections.

Members of the Scientific Advisory Board and other scientists related to the topic of the manuscript are assigned as reviewers. All reviewers' reports are sent to authors and the revisions of authors or their replies/opinions on reports are sent to the reviewers. Whether the manuscript will be published or not is decided upon the reviewers' opinions. If there is an editorial opinion for publishing the manuscript, it is also sent to the authors as editorial opinion.

## Rejection of Manuscripts

Manuscripts dealing with subjects that have been well studied in the literature, and that do not resolve questions raised by previous studies, or manuscripts that are statistically underpowered, are likely to be rejected without peer review. This applies in particular to studies of genetic associations, which will be considered only if they contribute new insights and are statistically valid according to generally accepted criteria. Articles which are likely to affect the choice, performance or interpretation of clinical tests will be favored over those which do not, and animal or cell-culture studies need to justify their eligibility. Reporting of negative results must be justified by prior evidence that a positive result would be expected. Manuscripts are also returned to authors if they do not comply with the Information for Authors (e.g., if the number of words allowed for a certain article type will be exceeded).

## Publication Language

Manuscripts must be written in clear and concise English language. Manuscripts in Turkish are also welcomed together with direct full translation to English. The manuscript should be written in the third person avoiding the passive voice. Please have your text proofread by a native English speaker before you submit it for consideration. Either British or American spelling is acceptable. Title, abstract and key words must be in both English and Turkish languages. If needed, our technical editors will be at your help to translate to Turkish.

## Types of Manuscripts

**Information on the different types of manuscripts and the criteria that authors should adhere are given below:**

### Research articles

Consists of Title, Authors, their addresses, Abstract, Key Words, Introduction, Materials and Methods, Results, Discussion, Ethical Considerations (if necessary), Acknowledgements, Conflict of Interest, References, Figure Legends, Figures, and Tables. Manuscript should include adequate information for reproducibility by specialists. **For research articles, main text should not exceed 3,500 words and number of references should not exceed 40.**

### Review articles

Highly focused review articles written by experts on the relevant subject will be published upon invitation of the Editorial Board and without evaluation of the reviewers. Submitted review articles, in compliance with the publishing principles of Turk J Biochem can be published in the issue containing related research articles upon reviewers' evaluation. A review article consists of Title, Authors, their addresses, Abstract, Key Words, Introduction, Main Sections under headings written in bold and sentence case, Subsections (if any) under headings written in italic and numbered consecutively with Arabic numerals, Conclusion, Acknowledgements, Conflict of Interest, References, Figure Legends, Figures, and Tables. **For the review articles, main text should not exceed 5,000 words. There is no limitation for number of references.**

### Short communications

These manuscripts are intended to concise and quick publishing of a new finding. Publishing of research articles under this concept is decided by the Editorial Board, providing that the authors adhere to the publishing format. The general format of this type of manuscript is similar to that of research articles except the word and reference limitations. **For the short communications, main text should not exceed 1,500 words and number of references should not exceed 20.**

### Technical reports

Manuscripts on development and application of new methodologies are published in this category. A technical report consists of Title, Authors, their addresses, Abstract, Key Words, Introduction including the main aspects of the method involved, Materials and Methods, Results, Discussion, Ethical Considerations (if necessary), Acknowledgements, Conflict of Interest, References, Figure Legends, Figures, and Tables. Data analysis should be presented in Materials and Methods. Clinical technical reports should include and discuss the clinical significance of values and their deviations. **For the technical reports, main text should not exceed 1,500 words and number of references should not exceed 10.**

### Case presentations

Manuscripts documenting informative patient presentations on clinical and/or molecular pathology or original manuscripts on the diagnosis and follow-up of a group of disease (such as determination of variation or probability) are considered in this category. A case presentation consists of Title, Authors, their addresses, Abstract, Key Words, Introduction, Patients and Methods, Results, Discussion, Conclusion, Ethical Considerations, Acknowledgements, Conflict of Interest, References, Figure Legends, Figures, and Tables. **For the case presentations, main text should not exceed 1,500 words and number of references should not exceed 10.**

**Opinions:** Opinions on the topics within the scope of the journal that are prepared by the experts are published in this section. An opinion consists of Title, Authors, their addresses, Abstract, Key Words, Introduction, Discussion, Conclusion, Ethical Considerations (if necessary), Acknowledgements, Conflict Of Interest, References, Figure Legends, Figures, and Tables. Editorial Board decides the eligibility of an opinion with respect to its concept and language. **For the opinions, main text should not exceed 1,000 words and number of references should not exceed 10.**

### Letters to the Editor

Questions and/or comments on published articles or other related topics are welcomed in this section to establish a discussion forum. For the letters, concept and ethical compatibility are taken into consideration. Concept should be summarized with 2-3 sentences at the beginning of the letter in both languages. Authors should clearly declare any kind of conflict of interest related to the subject and/or any other author at the end of the text. **For the letters to the editor, main text should not exceed 1,000 words and number of references should not exceed 5.**

### Manuscript preparation

Manuscripts should be prepared according to the above mentioned word and reference limitations and other related information. Text and tables should be prepared with MS Word

application) and figures and images should be sent as Tagged Image File Format (with .tiff extension) or Joint Photographic Experts Group Format (with .jpeg extension). All text should be written with Arial font type at 12 font size and double spaced on A4 sized paper with 1 cm right margin and 3 cm other margins. Header and/or footer should not be inserted in the text except that the pages should be numbered with Arabic numerals.

Title, type of the manuscript, full names of the authors, and their addresses at the time the research was carried out should be submitted during **on-line submission**. Title should be written in sentence case; that is, first letter of the initial word should be written in capital letter and rest of the title should be typed with lower case letters except proper nouns and abbreviations. The first letters of authors' names and surnames should begin with capital letter and the rest should be written in lower case letters. If there is more than one author, corresponding author should be indicated. The name, surname, title, work address, telephone, fax and e-mail address of the corresponding author should be submitted at the related page. The e-mail address should be the most permanent one.

## **Titles**

Title should reflect the content of the manuscript and should not exceed 17 words except the compelling reasons. If the title exceeds 17 words, its reason should be explained during submission.

## **Abstract**

**Abstract should contain the aim and main aspects of the study and should be structured under the following headings:**

Background – Facts about the hypothesis

Objective – Aim of the study

Material and Methods – Design and place of the study, subjects/patients and if applicable, treatment procedures

Results – Findings of the study

Conclusion – Significance of these findings

**Abstracts in both languages should consist of maximum 280 words for research and review articles, and maximum 200 words for other types of manuscripts.**

Use of abbreviations other than universally accepted ones should be avoided as possible.

## **Key Words**

Minimum 3, maximum 8 key words should be provided at the end of the abstracts. It is of prime importance that the keywords should be in accordance with MeSH. This keyword database may be reached through main page of PubMed.

## **Main text**

Main text should consist of title, abstract, introduction, materials and methods, results and discussion.

**Introduction** – why was the study undertaken?

The introduction should solely consist of the literature background that allows the appreciation of the manuscript. The unnecessary details and excessive references should be avoided. Hypothesis and aim of the study should be stated in the introduction.

**Materials and methods** – how was the study conducted?

Design and place of the study, subjects/patients, if applicable, information on the treatment procedures, statistical methods and information on the adherence to the ethical rules should be indicated.

**Results** – what did the study find?

Results must be concise and include figures and tables. Descriptive statistics should be compatible with the nature of data and statistical analyses used. The graphs should be prepared to reflect the important features of data. Please avoid excessive figures and tables. For figures and tables, requirements are listed below.

**Discussion** – what might it mean, why does it matter, what is next, what is the added value of the study?

Extent of the discussion should be parallel to other sections. Under some conditions results and discussion sections can be combined.

## Statistics

Statistical methods should be explained in detail in the Materials and Methods so that if original data is given, the results can be verified. If possible, quantitative results should be given and appropriate indicators should be used to indicate measurement error or uncertainty.

## Ethical Considerations

In any kind of study involving human and/or animal subjects, authors must state in Materials and Methods that researchers have obeyed the ethical rules and written consent of the volunteers have been obtained. Furthermore, name of the ethical committee and the date and number of the permission obtained for the study should also be provided in the Ethical Considerations section following main text.

**Ethical principles for in vivo research involving human and animal subjects** All manuscripts reporting studies that involve human or animal subjects must be accompanied by a letter of approval obtained from the Ethical Committee of the institution where the work is accomplished. Editorial Board reserves the right to ask similar reports for in vitro studies.

## Acknowledgements

Financial and/or technical (running of tests, evaluation of results, etc.) supports of the study should be mentioned following Ethical Considerations including the project number, if applicable. If the study originates from a thesis or has been previously presented in a meeting, this should also be indicated in this section. Contribution of each author should be declared in this section. Additionally, if the work address of an author during the study has changed, his/her current address should be given here.

## Conflict of Interest

Authors should clearly declare any kind of conflict of interest by filling the “Conflict of Interest Form” available at the website. Authors should state any financial link related to the study (including the supports obtained for the presented study) starting from 24 months prior to the initiation of the research. Conflict of interest should be extensively evaluated. For example, within the 2 years prior to the initiation of the research, authors should indicate if:

- One of the authors is also the Section Editor of Turkish Journal of Biochemistry,
- The study was carried out by the aid of a fund, even partially,
- One of the researchers received grant,
- One of the authors was a consultant for any kind of support, even for non-financial supports,
- One of the authors has financial interest with a firm regarding the study, even with a non-profitable organization, including congress attendance, travel support, etc.
- One of the authors has a financial relation with the equipment and reactive manufacturers including financial shares.

If authors do not have any conflict of interest, it should be mentioned as “authors have no conflict of interest regarding this study”.

## References

References should start on a separate page. Published manuscripts and manuscripts that have been accepted and are pending publication should be cited in the reference list. Acceptance letter of the manuscripts that are pending publication should be submitted with the manuscript. Citations of unpublished results, manuscripts in preparation or under review, personal communications, and manufacturers’ information should only be cited in the text and should not appear in the reference list. Unpublished results should be written in text in parenthesis as “(unpublished result)”. If such a work is cited, permission from the responsible researcher should be obtained and submitted with the manuscript. Personal communications should also be listed in parentheses and should contain the first initial and last name of the contact as well as the month and year of the communication.

References should be numbered in the text by Arabic numerals **in square brackets** in the order of appearance. When more than one reference is cited consecutively, not all of the reference numbers should be written separated by comas; instead the numbers of first and the last reference cited for that section should be written with a dash in the middle (i.e.: writing as “23, 24, 25, 26” is wrong, but “23-26” is correct).

**The number of references should not exceed 40 in research articles, 20 in short communications, 10 in technical reports, case presentations and opinions, and 5 in letters to the editor. There is no limitation for review articles.**

While citing a reference, the main source should be referred instead of a reference that cites the source.

The layout for references should be done according to the following examples. **Please adhere strictly to the punctuation format!** In manuscripts with 6 or more authors, the first 5 should be provided followed by *et al.* In manuscripts with up to five authors, all names of the authors should be provided.

Journal Article: Surname(s) and initial(s) of the author(s), title of the manuscript, name of the journal, publication year, volume number, if available, issue number in parenthesis, the first and the final pages of the manuscript.

*For example:*

[1] Mosbach K. *Molecular imprinting. Trends Biochem Sci* 1994; 19(1):9–14.

[2] Rothermel A, Biedermann T, Weigel W, Kurz R, Ruffer M, et al. *Artificial design of three-dimensional retina-like tissue from dissociated cells of the mammalian retina by rotation-mediated cell aggregation. Tissue Eng* 2005; 11(11–12):1749–56.

Books: Surname(s) and initial(s) of the author(s), title of the book, publication year, the first and the last pages of the part used, edition number, the publisher company, the place of the publication.

*For example:*

[1] Dryer RL, Lata GF. *Experimental Biochemistry* 1989; pp. 83–100, Oxford University Press, New York.

Edited Books: Surname(s) and initial(s) of the authors, title of the chapter, in parenthesis: Eds., surnames and initial(s) of the editors, title of the book, publication year, the first and the last pages of the chapter, edition number, the publisher company, place of the publication.

*For example:*

[1] Staines NA. *Monoclonal antibodies. In (Ed. Wrigglesworth JM) Biochemical Research Techniques* 1983; pp. 177–209, Wiley, Chichester.

Patents: Surname(s) and initial(s) of the inventor(s), patent title, patent number and issue date.

*For example:*

[1] Stern MK, Cheng BK. *Process for preparing N-(p-nitroaryl)amides via reaction of nitrobenzene with nitriles. US Patent 5,380,946, January 10, 1995.*

Technical Reports: Surname(s) and initial(s) of the author(s), title of the technical report, name and place of the publisher, report number, if applicable, publication year.

*For example:*

[1] Tschantz BA, Moran B. *Modeling of the hydrologic transport of mercury in the Upper East Fork Poplar Creek (UEFPC) watershed. Technical Report for Lockheed Martin Energy Systems: Bethesda, MD, September 2004.*

Abstracts from Conference Proceedings or Abstract Books: Surname(s) and initial(s) of the presenter(s), title of the abstract, name of the conference, location of conference, publisher, place of the publisher, publication year, page number (abstract number).

*For example:*

[1] Goodman PW. *Abstracts of Papers, International Chemical Congress of Pacific Basin Societies, Honolulu, HI. American Chemical Society: Washington, DC. 1984; Abstract 05F14.*

Web pages: Name of the host, name of the page, URL, date last accessed in parenthesis.

For example:

[1] TAL Technologies. Bar code symbologies.  
[www.taltech.com/resources/intro\\_to\\_bc/bcsymbol.htm](http://www.taltech.com/resources/intro_to_bc/bcsymbol.htm) (Last accessed: October 2010)

### Abbreviations for journals

Journal names should be abbreviated according to the Index Medicus database (Superintendent of Documents, US Government Printing Office, Washington, DC 20402, USA, DHEW Publication No. 95-267). Some examples for the abbreviations of journals are given below.

*Acta Neurol Scand*

*Acta Physiol Scand*

*Anal Biochem*

*Arch Biochem Biophys*

*Biochem J*

*Biochem Pharmacol*

*Biochim Biophys Acta*

*Biol Chem Hoppe Seyler*

*Br J Pharmacol*

*Eur J Pharmacol*

*Experientia*

*J Biol Chem*

*J Cell Biol*

*J Mol Biol*

*J Pharmacol Exp Ther*

*J Physiol (Lond)*

*Mol Pharmacol*

*Nature*

*Proc Natl Acad Sci USA*

*Proc Soc Exp Biol Med*

*Science*

*Turk J Biochem*

## Figures

Figures should be submitted individually **as separate files** as Tagged Image File Format (with .tiff extension) or Joint Photographic Experts Group Format (with .jpeg extension). Resolution of the figures should be at least 600 dpi. Figures should be numbered with Arabic numerals in order of appearance in the text. The figure titles and the legends should be listed at the end of the manuscript as a separate page. Figure legends should contain enough information that can be comprehended without referring to the text. If the figure was previously published elsewhere, the reference should be given and written permission should be received from the copyright owner. Quality of the figures should be considered while forming them.

Figures are printed in 1 (7.9 cm) or 2 (16.3 cm) columns. Symbols in the figures should be visible at these sizes and font size of the characters should be at least 8-10. In the graphs, names of the abscissa and the ordinate should be given together with their units. Since the journal is published electronically, colored photographs are accepted.

## Tables

Tables should be submitted as separate MS Word documents, not as pictures. Tables should be numbered consecutively with Arabic numerals in order of appearance in the text. Each table should have a brief explanatory title on top together with the table number. Explanations should be at the bottom of the table as footnotes. Each column in the table should have a precise, explanatory heading.

## Other Issues:

### Abbreviations

Abbreviations should be given in parenthesis following their first appearance in the text. Authors should avoid using excessive abbreviations.

All abbreviations should be in the internationally recognized format. Authors can refer to The Journal of Biological Chemistry (April 18, 2011)

Abbreviations listed below can be used without mentioning the open forms.

#### A. Acceptable abbreviations for article titles

**AMP, ADP, ATP** adenosine 5'-mono, di-, and triphosphates

**ATPase** adenosine triphosphatase

**cAMP** cyclic AMP (adenosine 3':5'-monophosphate), etc.

**CMP, CDP, CTP** cytidine 5'-mono-, di-, and triphosphates

**cGMP** cyclic guanosine monophosphate

**CoA** coenzyme A

**d** as in **dADP, dTMP, etc.** deoxy

**DNA** deoxyribonucleic acid or deoxyribonucleate

**EDTA** ethylenediaminetetraacetate

**EGTA** [Ethylenebis(oxyethylenenitrilo)]tetraacetic acid

**EPR** electron paramagnetic resonance

**FAD, FADH<sub>2</sub>** flavin-adenine dinucleotide and its fully reduced form

**FMN** riboflavin 5'-phosphate

**GDP, GMP, GTP** Guanosine 5'-mono-, di-, and triphosphates

**HIV** human immunodeficiency virus

**IDP, IMP, ITP** inosine 5'-mono-, di-, and triphosphates

**kDa or Da** kilodalton, dalton

**Mg-ATP** magnesium-ATP

**mRNA** messenger RNA

**Na,K-ATPase** sodium-potassium pump

**NAD, NAD<sup>+</sup>, NADH** nicotinamide-adenine dinucleotide and its oxidized and reduced forms

**NADP, NADP<sup>+</sup>, NADPH** nicotinamide-adenine dinucleotide phosphate and its oxidized and reduced forms

**NMR** nuclear magnetic resonance

**P<sub>i</sub>** inorganic phosphate

**Poly(A)[minus] RNA** lacking 3'-polyadenylate

**Poly(dG)Poly(dC), etc** Single-stranded DNA composed of polydeoxyguanylate, polydeoxycytidylate, etc.

**Poly[d(A-T)], etc.** Double-stranded DNA composed of polydeoxyadenylate and polydeoxythymidylate, etc.

**PP<sub>i</sub>** inorganic pyrophosphate

**RNA** ribonucleic acid or ribonucleate

**TDP, TMP, TTP** ribosylthymine 5'-mono, di-, and triphosphates

**Tris** Tris(hydroxymethyl)aminomethane

**tRNA** transfer RNA

**UDP, UMP, UTP** uridine 5'-mono, di-, and triphosphates

**UDP-galactose** uridine 5'-diphosphate-galactose

**UDP-glucose** uridine 5'-diphosphate-glucose

## **B. Acceptable abbreviations for article text (not titles)**

**Ac** acetyl

**ACTH** adrenocorticotrophic hormone

**ADP, AMP, ATP** adenosine 5'-mono, di-, and triphosphates

**AIDS** acquired immunodeficiency syndrome

**ALS** amyotrophic lateral sclerosis

**AMPA** a-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid

**ATPase** adenosine triphosphatase

**BDNF** brain-derived neurotrophic factor

**bp** base pair

**BrdU** 5-bromodeoxyuridine

**BSA** bovine serum albumin

**cAMP** cyclic AMP (adenosine 3':5'-monophosphate), etc.

**CD** circular dichroism

**CMP, CDP, CTP** cytidine 5'-mono-, di-, and triphosphates

**cfu** colony-forming unit(s)

**cGMP** cyclic guanosine monophosphate

**CHAPS** 3-(3-cholamidopropyl) diethyl-ammonio-1- propanesulfonate

**ChIP** chromatin immunoprecipitation

**CHO** Chinese hamster ovary

**CM** centimorgan

**CMV** cytomegalovirus

**CNS** central nervous system

**CoA (or CoASH)** coenzyme A

**Co-eIF-2** co-eukaryotic initiation factor-2

**COSY** correlated spectroscopy

**COX** cyclooxygenase

**cpm** counts per minute

**d in dADP, dTMP, etc.** deoxy

**DAPI** 4'-6-diamidino-2-phenylindole

**DEAE-cellulose** O-(Diethylaminoethyl)cellulose

**DMEM** Dulbecco's modified Eagle's medium

**DMSO** dimethyl sulfoxide

**DNA** deoxyribonucleic acid or deoxyribonucleate

**DNase** deoxyribonuclease

**dpm** disintegration per minute

**dsDNA** double-stranded DNA

**DTT** dithiothreitol

**EBV** Epstein-Barr virus

**ECG** electrocardiogram

**ECL** enhanced chemiluminescence

**ED50** effective dose, 50%

**EDTA** ethylenediaminetetraacetate

**EEG** electroencephalogram

**EGF** epidermal growth factor

**EGTA** [Ethylenebis(oxyethylenenitrilo)]tetraacetic acid

**eIF-1,2,3, etc.** eukaryotic initiation factor

**ELISA** enzyme-linked immunosorbent assay

**EM** electron microscopy

**EMSA** electrophoretic mobility-shift assay

**EPR** electron paramagnetic resonance

**ERK** extracellular-signal-regulated kinase

**ES cell** embryonic stem cell

**ESR** electron spin resonance

**FACS** fluorescence-activated cell sorter

**FAD, FADH2** flavin-adenine dinucleotide and its fully reduced form

**FBS** fetal bovine serum

**FCS** fetal calf serum

**FFA** free fatty acid

**FGF** fibroblast growth factor

**FISH** fluorescence in situ hybridization

**FITC** fluorescein isothiocyanate

**fMet** formylmethionine

**FMN** riboflavin 5'-phosphate

**FPLC** fast protein liquid chromatography

**FRET** fluorescence resonance energy transfer

**FSH** follicle-stimulating hormone

**FTIR** Fourier transform infrared

**GABA** gamma-aminobutyric acid

**β-gal** β-galactosidase

**GalNAc** N-acetylgalactosamine

**GAPDH** glyceraldehyde-3-phosphate dehydrogenase

**GC, GLC** gas chromatography, gas/liquid chromatography

**GDP, GMP, GTP** Guanosine 5'-mono-, di-, and triphosphates

**GFP** green fluorescent protein

**GM-CSF** granulocyte macrophage colony-stimulating factor

**G-protein** guanine-nucleotide-binding regulatory protein

**GSH** Glutathione and its disulfide form

**GSST** 4-aminobutyrate transaminase, GABA transferase or glutamate-succinic semialdehyde transaminase

**GST** glutathione S-transferase

**H&E** hematoxylin and eosin

**HA** hemagglutinin

**Hb** hemoglobin

**HDL** high density lipoprotein

**HEK** human embryonic kidney

**Hepes or HEPES** 4-(2-Hydroxyethyl)-1-piperazineethanesulfonic acid

**HIV** human immunodeficiency virus

**HLA** human leukocyte antigen

**HMG-CoA** 3-hydroxy-3-methylglutaryl-CoA

**HPLC** high-performance liquid chromatography

**HRP** horseradish peroxidase

**HSV** herpes simplex virus

**i.m., i.p., i.v.** intramuscular(ly), intraperitoneal(ly), intravenous(ly)

**IC50** concentration giving half-maximal inhibition

**ID50** infective dose, 50%

**IDP, IMP, ITP** inosine 5'-mono-, di-, and triphosphates

**IFN** interferon

**IgG, etc.** immunoglobulin G, etc.

**IκB** inhibitor of KB

**IL, IL-1, etc.** interleukin, interleukin 1, etc.

**IR** infrared

**JAK** Janus kinase

**JNK** c-Jun N-terminal kinase

**kDa or Da** kilodalton, dalton

**K<sub>m</sub>** Michaelis-Menten constant

**KO** knockout

**LC/MS** liquid chromatography/mass spectrometry

**LD<sub>50</sub>** lethal dose, median

**LDL** low density lipoprotein

**LPS** lipopolysaccharide

**LTR** long terminal repeat

**m/z** mass-to-charge ratio, from mass spectral data

**mAb** monoclonal antibody

**MALDI** matrix-assisted laser desorption/ionization

**MAPK** mitogen-activated protein kinase

**MAPKK** mitogen-activated protein kinase kinase

**MEK** mitogen-activated protein kinase/extracellular signal-regulated kinase kinase

**MEKK** MEK kinase

**Mes or MES** 2-(N-morpholino)ethanesulfonic acid

**Mg-ATP** magnesium-ATP

**MHC** major histocompatibility complex

**MLV or MuLV** murine leukemia virus

**Mops or MOPS** 3-(N-morpholino) propanesulfonic acid

**MRI** magnetic resonance imaging

**mRNA** messenger RNA

**MS** mass spectrometry or spectroscopy

**Na<sup>+</sup>/K<sup>+</sup>-ATPase** sodium-potassium pump

**NAD, NAD<sup>+</sup>, NADH** nicotinamide-adenine dinucleotide and its oxidized and reduced forms

**NADP, NADP<sup>+</sup>, and NADPH** nicotinamide-adenine dinucleotide phosphate and its oxidized and reduced forms

**NGF** nerve growth factor

**NMDA** N-methyl-D-aspartate

**NMR** nuclear magnetic resonance

**NO** nitric oxide

**NOE** nuclear Overhauser effect/enhancement

**NOESY** nuclear Overhauser effect/enhancement spectroscopy

**NOS** nitric-oxide synthase

**ORF** open reading frame

**PAGE** polyacrylamide gel electrophoresis

**PBS** phosphate-buffered saline

**PCR** polymerase chain reaction

**PDGF** platelet-derived growth factor

**PEG** polyethylene glycol

**PEI-cellulose** polyethylenimine-cellulose

**PET** positron-emission tomography

**Pfu** plaque-forming unit(s)

**Pi** inorganic phosphate

**pl** isoelectric point

**PI3K** phosphatidylinositol 3-kinase

**Pipes or PIPES** piperazine-N-N'-bis(2-ethanesulfonic acid)

**PK, PKC** protein kinase, protein kinase C

**PMSF** phenylmethylsulfonyl fluoride or phenylmethanesulfonyl fluoride

**Poly(A)[minus] RNA** lacking 3'-polyadenylate

**Poly(dG), Poly(dC), etc.** Single-stranded DNA composed of polydeoxyguanylate, polydeoxycytidylate, etc.

**Poly[d(A-T)], etc.** Double-stranded DNA composed of polydeoxyadenylate and polydeoxythymidylate, etc.

**PPi** inorganic pyrophosphate

**PUFA** polyunsaturated fatty acid

**PVC** PVDF

**PVDF** poly(vinylidene difluoride)

**RA** retanoic acid

**RBC** red blood cell

**Rf** thin layer chromatography, the distance traveled by a substance divided by the distance traveled by the solvent front

**RIA** radioimmunoassay

**RNA** ribonucleic acid or ribonucleate

**RNAi** RNA interference

**RNase** ribonuclease

**rpm** revolutions per minute

**RT** reverse transcriptase

**RT-PCR** reverse transcription-polymerase chain reaction

**SAPK** stress-activated protein kinase

**SCID** severe combined immunodeficient/immunodeficiency

**SDS** sodium dodecyl sulfate

**SEM** scanning electron microscopy

**shRNA** short hairpin RNA

**siRNA** small/short interfering RNA

**SNARE** soluble-N-ethylmaleimide-sensitive factor attachment protein receptor

**SNP** single-nucleotide polymorphism

**snRNA** small nuclear RNA

**SSC** standard saline citrate

**STAT** signal transducers and activators of transcription

**SV40** simian virus 40

**t<sub>1/2</sub>** half-life (half-time)

**TBS** Tris-buffered saline

**TCA** trichloroacetic acid

**TDP, TMP, TTP** ribosylthymine 5'-mono,di-, and triphosphates

**TFA** trifluoroacetic acid

**TGF** transforming growth factor

**THF** tetrahydrofuran

**TLC** thin-layer chromatography

**TMS** Trimethylsilyl, a common derivative of alcohols, amines, and carboxyl groups for gas chromatography (and thermal) stabilization/mass spectrometry

**TNF** tumor necrosis factor

**TOF** time-of-flight

**Tris** Tris(hydroxymethyl)aminomethane

**tRNA** transfer RNA

**TUNEL** terminal deoxynucleotidyltransferase-mediated dUTP nick end labeling

**UDP, UMP, UTP** uridine 5'-mono, di-, and triphosphates

**UDP-galactose** uridine 5'-diphosphate-galactose

**UDP-glucose** uridine 5'-diphosphate-glucose

**UTR** untranslated region

**UV** ultraviolet

**VEGF** vascular endothelial growth factor

**VLDL** very low density lipoprotein

**V<sub>max</sub>** maximum velocity

**WBC** white blood cell

**WT** wild type

**X-Gal** 5-bromo-4-chloro-3-indolyl β-D-galactoside

**YFP** yellow fluorescent protein

**Enzymes:** Full name of an enzyme and its International Union of Biochemistry and Molecular Biology (IUBMB) Enzyme Commission number (EC number) should be given when that enzyme was first mentioned in the text. Its abbreviation can be used after that. For detailed information, authors can refer to the Enzyme Nomenclature of IUBMB ([www.chem.qmul.ac.uk/iubmb/enzyme](http://www.chem.qmul.ac.uk/iubmb/enzyme)).

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