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or investment trusts do not constitute competing financial interests). The conflict should be stated briefly on the online manuscript submission screen, e.g., "J. B. Doe has received royalty payments from PQR Incorporated." It is the responsibility of the corresponding author to review this policy with all authors and to list collectively the relevant relationships. All disclosures will remain confidential during the review process, but papers accepted for publication will acknowledge conflict of interest and financial interests in a published disclaimer describing the nature of the interests. If authors declare no conflict of interest or financial interests, this also will be noted in a published disclaimer.

Web Links in Submitted Manuscripts: Links to websites are permitted only if the information contained on the website is not essential to the understanding and assessment of the manuscript or to the ability to repeat the experiments described in the paper.

PEER REVIEW INFORMATION

The Process: By submitting a manuscript to *The JI*, the authors agree to subject it to the confidential peer-review process. Editors and reviewers are informed that the manuscript must be considered confidential. After a manuscript is received, it is assigned by the Science Coordinator to a Deputy Editor and a Section Editor, whose expertise is considered to be appropriate. The Section Editor prepares a list of expert reviewers, which may include some suggested by the Science Coordinator. Authors can indicate specific individuals whom they would like to have excluded as reviewers as well as individuals thought to be particularly appropriate, although these suggestions may not always be accepted. Generally, requests to exclude certain potential reviewers will be honored except in fields with a limited number of experts.

All potential reviewers are contacted individually to determine availability. Manuscript files are sent to at least two expert reviewers. Reviewers are asked to complete the review of the manuscript within two weeks and to return a short review form. Based on the reviewers' comments, the Section Editor recommends a course of action and communicates the reviews and recommendations to the Deputy Editor for a final decision.

The Deputy Editor considers the comments made by the reviewers and the recommendation of the Section Editor, selects those comments to be shared with the authors, makes a final decision concerning the manuscript, and prepares the decision letter for signature by the Editor-in-Chief. If revisions of the manuscript are suggested, the Deputy Editor also recommends who should review the revised paper when resubmitted. Authors are informed of the decision by e-mail; appropriate comments from reviewers and editors are appended.

Decisions: There are four categories for initial decisions: accept, accept with minor revision, return for revision, and reject. Some manuscripts are accepted provisionally, pending relatively minor revisions. In this case, the Deputy Editor may conduct the re-review. For many manuscripts, authors are invited to resubmit if revision or additional experimentation can address major criticisms. Typically, one or more reviewers will then be asked to consider the adequacy of the revisions. Cutting Edge papers are allowed only minor revisions because of time constraints. All revised manuscripts are carefully reexamined, and ultimate acceptability is not guaranteed. *The JI* does not provide for an advance determination of the acceptability of a particular manuscript for publication, nor does it promise expedited review of selected manuscripts.

Communication with Authors: To minimize the possibility of misinterpretation or errors in verbal communication, the Editorial

Office will provide information, in writing, only to the corresponding author and will not provide extensive details (e.g., exact status of a review or a predicted time to final decision). Deputy Editors do not take calls from authors concerning decisions or other related matters. All such inquiries should be addressed in writing to the Editor-in-Chief, who will discuss concerns with the Deputy Editor. This policy has been established to provide for uniformity and fairness in addressing concerns about the review process.

Rebuttals: If the authors believe that a serious scientific error occurred during the review, a letter of rebuttal may be sent to the Editor-in-Chief, explaining the reasons why the decision should be reconsidered. When appropriate, the matter will be taken up with the initial Deputy Editor, Section Editor, or additional reviewers. Rebuttals that challenge rejections that were based on priority alone are rarely successful, since the assignment of priority is necessarily a matter of opinion. If the authors of a rejected manuscript are able to make new advances that go far beyond the original submission, they will often expedite consideration of their paper through the submission of a completely new manuscript.

The JI Reviewers

Selection: Selection of reviewers is the responsibility of the Section Editor, although the Science Coordinator makes recommendations to the Section Editor from a list of individuals who have reviewed manuscripts previously. This database includes self-identified areas of expertise as well as information about the perceived usefulness and timeliness of past reviews. Individuals who consistently have provided tardy or unhelpful reviews are removed from the database. Every effort is made to avoid both real and apparent conflicts of interest with respect to research activities or collaborative or personal interactions. Reviewers are asked to withdraw from considering any manuscript in which they identify a conflict that has escaped the attention of the Section Editor.

Scientific Integrity: Information contained in manuscripts is considered confidential and should not be shared or distributed. If necessary, a reviewer can consult with others for an adequate evaluation of the research findings if all individuals involved maintain confidentiality, objectivity, and avoid conflict of interest. AAI is not responsible for acts and conduct by reviewers that are not in accordance with accepted professional standards. Reviewers are asked to be objective in their evaluations and to judge primarily the novelty and soundness of the information presented.

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The JI Editorial Board: The AAI Council, upon recommendation of the Publications Committee, appoints the Editor-in-Chief for a term of five years. Deputy Editors, Section Editors, and Associate Editors are nominated by the Editor-in-Chief and appointed by the Publications Committee. Deputy Editors are appointed for variable terms. Section Editors and Associate Editors are appointed for one renewable term of two years in most circumstances. The Editor-in-Chief, the Deputy Editors, and the Section Editors constitute the Editorial Board and as such are required to be members of AAI. The Editor-in-Chief is responsible for the specific editorial conduct of *The JI*. The AAI Publications Committee is responsible for the management and evaluation of *The JI* and any other official publications of AAI, subject to the general supervision of the AAI Council.

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Submit online at ji.msubmit.net. For the initial submission, either a PDF of the entire manuscript (text, figures and tables), or individual manuscript, figure and table files may be uploaded to the system. If individual files are uploaded, the system then creates a single PDF for review purposes. For all revised manuscripts, individual manuscript, high-resolution figure, and table files must be uploaded to the system. Authors should save copies for themselves of all the files in their original formats. See the Figures section (www.jimmunol.org/misc/authorfulllength.shtml#figures) for help with preparing digital art. The JI's online submission system requires browsers where Cookies and Javascript are enabled.

After the manuscript has been checked by journal staff, the Corresponding Author will receive an e-mail acknowledging receipt of the manuscript. The e-mail contains links to the Submission Form and Color Charges Form (if applicable). The Corresponding Author must download, sign, and fax these forms to 301-634-7831 to complete the submission. The manuscript **will not be sent for review** until *The JI* Editorial Office receives these forms signed by the Corresponding Author. Please contact infoji@aai.org if you do not receive the acknowledgment email. Please do NOT use the hard copy forms found in old copies of the printed journal.

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All publication fees are payable in U.S. dollars. Accepted manuscripts are published only upon commitment by the author(s) or institutional financial officer to pay these charges.

Submission Fee: If the corresponding author is not an AAI* member, a fee of \$50 per manuscript must be paid by credit card (American Express, MasterCard, or Visa) during the submission process. If payment by credit card is impossible, please contact infoji@aai.org to arrange payment by check (drawn on a U.S. bank). We do not accept cash or purchase orders. *There is no processing fee for regular, emeritus, or honorary AAI members in good standing.

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MANUSCRIPT PREPARATION

General Guidelines: A 12-point serif font, preferably Times New Roman, is required. Do not use compressed type format. Double-space entire manuscript. The average length of full-length articles is eight printed pages. Instructions for estimating the printed length of a manuscript are included below. Each of the following components should begin on a separate page:

1. The **Title Page** must include the full title; a running title (not to exceed 60 characters); each author's full name (first name, middle initial, last name); the affiliations of all authors and their institutions, departments, or organizations (use the following symbols in this order: *, †, ‡, §, ¶, ||, #, **, ††, ‡‡, §§, ¶¶, |||, ###); and three to five keywords, selected from the Keywords list that describe the topic of the manuscript. (Keywords are used in editor and reviewer assignments and are not published with the manuscript. Please note that the list of keywords does not represent an exhaustive view of what *The JI* considers important topics, but it has been found useful for reviewer assignment purposes.)

2. The **Abstract** must be 250 words or less for full-length manuscripts; 150 words or less for Cutting Edge. Reference citations should not be included in the *Abstract*. The species of animals or species of origin of cells used in the manuscript must be clearly stated in the *Abstract*.

3. The **Introduction, Materials and Methods, Results, and Discussion** sections should begin on separate pages. Do not combine the *Results* and *Discussion* sections for full-length papers.

4. If the manuscript contains human or animal studies, the *Materials and Methods* section must state that the studies have been reviewed and approved by an appropriate institutional review committee.

5. **Acknowledgments** appear immediately after the *Discussion* and before *References*.

6. **Grant support** must not be included in the *Acknowledgments* but should be cited as a footnote to the title.

7. **Disclosures** contain conflict of interest disclaimers. For more information, see the Editorial Policies Regarding Manuscript Submission.

8. **References** must be numbered as they appear in the text. All authors must be listed for each reference. If citations are included in tables or in figure legends, they must be numbered according to the position of citation of the table or figure in the text. Only published papers and papers in press may be included in the *References*. In press articles, i.e., papers not yet published, must be submitted as online attachments in PDF format at the time of article submission. NOTE: Do NOT submit as an attachment papers that are already published, e.g., manuscripts published ahead of print. Such papers must be incorporated into the *References* and cited with the DOI numbers and the publication dates. Citations of "manuscripts in preparation," "unpublished observations," and "personal communications" must appear parenthetically in the text. Manuscripts "submitted for publication" (i.e., not yet accepted) also are mentioned parenthetically in the text. Written approval by the persons cited in personal communications must accompany the manuscript unless they are also authors of the manuscript submitted to *The JI*.

Format for references:

Periodicals: Wells, A. D., M. C. Walsh, D. Sankaran, and L. A. Turka. 2000. T cell effector function and anergy avoidance are quantitatively linked to cell division. *J. Immunol.* 165: 2432–2443.

Books: McIntyre, T. M., and W. Strober. 1999. Gut-associated lymphoid tissue: regulation of IgA B-cell development. In *Mucosal Immunology*, 2nd ed. P. L. Ogra, J. Mestecky, E. Lamm, W. Strober, J. Bienenstock, and J. R. McGhee, eds. Academic Press, San Diego, CA. 319–356.

9. **Footnotes** should be used to designate the source of support, new or special abbreviations used, correspondence address, current address, manuscripts submitted for publication, etc. Footnotes should be numbered consecutively and will appear on the title page, but for submission are grouped together and placed on a separate page between the *References* and the *Figure Legends*.

10. **Abbreviations** that may be used without definition are provided in the Standard Abbreviations list. Spell out nonstandard abbreviations used less than three times. Nonstandard abbreviations used three or more times must be defined in a footnote. Abbreviations and their definitions must be consistent throughout the text.

11. **Figure legends** must be numbered with Arabic numerals in order of appearance in the text and should include a short title after the figure number. Where possible, symbols and patterns used to distinguish data should be defined in a key placed within the graphic rather than in the figure legend.

12. **Tables** must be numbered with Roman numerals in order of appearance in the text. Table legends are prepared as footnotes to the table and are included with the table. Tables must be in DOC file format. Each table should be submitted as a separate file.

13. **Figures** At initial submission, please submit low-resolution files of the smallest possible size that will convey the needed information. Smaller files can be downloaded more quickly by reviewers and will hasten the review process.

At submission of a revised manuscript, high-resolution figures that meet the following specifications must be submitted. For more information see the TIPS page on the online manuscript submission home page (ji.msubmit.net).

- **File Sizes:** Figures should not exceed 10 MB (average size is about 2 MB).
- **Image Sizes:** Figures should be submitted in final size (printed 1:1). Figures may be printed in one of two formats: single column (width from 3.37 to 8.23 cm or 20 picas) or double column (width from 12.65 to 17.1 cm or 42 picas). The single-column format is preferred. Unless the file is too large, multi-piece figures should be submitted as a single file.
- **Text and Lines:** Text in figures must be 6–8 points in size, except for single letter markers, which may be 12 points. Helvetica should be used for all figure text (except for the use of symbols). If Helvetica is not available, Times Roman may be used. Line widths must be greater than one point thick or they will not appear on the PDF version of the article.
- **Numbering:** Figures must be numbered as they appear in the text.
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- **Guidelines:** For general guidelines for creating digital art, go to the Cadmus Digital Art website (art.cadmus.com/da/guidelines.jsp) or the Cadmus FAQ page (art.cadmus.com/da/faq.jsp). Topics included are:
 - Resolution (dots per inch)
 - Color requirements
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- **Graphic Art Preflight:** To avoid production delays due to unacceptable digital art formats, authors of revised papers must check in advance whether figures meet the standards required for final print and online production. It is mandatory to use Rapid Inspector (rapidinspector.cadmus.com/RapidInspector/zim/index.jsp), a tool that walks authors through the process to make needed corrections.

14. **Cover art** changes with each issue of *The JI*. Authors are encouraged to submit color figures with their manuscripts for possible use as cover illustrations. Cover figures should be 8.5" × 11" with a resolution of at least 300 dpi.

15. **Estimation for printed pages:** One printed page in *The JI* contains approximately 8,000 characters, including spaces. Thus, an 8-page, full-length article would contain approximately 64,000 characters. Each line in a table occupies about 60 characters for a single-column table, and 120 characters for a double-column table. Figures occupy about 180 characters per centimeter height for single-column figures, and 360 characters for double-column figures. Determine the total character count for the text of your manuscript and add the character-equivalents for the tables and figures. This will provide a reasonable estimate for the printed length of a manuscript.

CUTTING EDGE MANUSCRIPT PREPARATION

Submit online at ji.msubmit.net. New manuscripts may be submitted as a single PDF containing text, tables and figures, in that order (figures and tables should not be embedded within the article), or as individual manuscript, figure, and table files (the system will then create a single PDF for review purposes). Authors should save copies for themselves of all the files in their original formats. Individual manuscript, high-resolution figure, and table files are required for all revised manuscripts. See the Figures section for help with preparing digital art. Manuscripts submitted to the Cutting Edge section should conform to the Information for Authors for full-length manuscripts presented above as well as the additional guidelines below:

1. **Cutting Edge articles, including figures and references, must fit within four journal pages.** Authors should estimate the size of figures and tables and limit the text accordingly. One printed page in *The JI* contains approximately 8,000 characters, including spaces. Thus, a 4-page Cutting Edge article would contain approximately 32,000 characters. The formula for estimating the number of pages is provided in Manuscript Preparation.

2. List the phone number, fax number, and e-mail address of the corresponding author on the title page.

3. The *Abstract* is limited to 150 words.

4. The *Materials and Methods* section may be sharply limited but should be sufficient to allow the evaluation of results and conclusions.

5. Authors may combine the *Results* and *Discussion* sections.

PREPARATION OF THE REVISED MANUSCRIPT

Submit the revised manuscript online at ji.msubmit.net. Follow *The JI* Editorial Office instructions contained in the previous decision letter carefully and thoroughly. A revised manuscript not returned within nine months of the date of the decision letter will be considered a new manuscript and subject to a new, complete review.

Individual manuscript files, files for each figure and table (even if they are unchanged from the previous submission), and a point-by-point reply to all referee comments must be uploaded to the system. The revised manuscript text must be marked to show

changes, using either yellow highlighting or the font color red (Microsoft Word files preferred). Do not show deletions, because if the manuscript is accepted, this version will be immediately sent for publication. High-resolution figure files should be submitted. Figures must be in **TIFF** or **EPS** format. Instructions for figures are available at the Cadmus Digital Art website (art.cadmus.com/da/index.jsp). Authors should retain for themselves copies of all the files in their original formats.

After the manuscript has been checked by journal staff, the Corresponding Author will receive an e-mail acknowledging receipt of the revised manuscript. The e-mail contains links to the Submission Form and Color Charges Form (if applicable). The Corresponding Author must download, sign, and fax these forms to 301-634-7831 to complete the submission of the revised manuscript. Your manuscript **will not be sent for review** until *The JI* Editorial Office receives these forms signed by the Corresponding Author. Please contact infoji@aai.org if you do not receive the acknowledgment e-mail. Please do NOT use the hard copy forms found in old copies of the printed journal.

SUPPLEMENTAL MATERIALS

Supplemental Data: The print version of the paper must stand on its own without the Supplemental Data. All supplemental material accompanying an article must be submitted with the original paper for peer review. Upload the file as "Supplemental Data" during the online submission. Supplemental material is primarily intended for short videos (must be no longer than 30 seconds and under 10 MB, with no sound or voice-over) or large tables, large sequence alignments, or large data sets such as those obtained with microarray hybridization experiments. Additional supplemental data *necessary* for the interpretation and conclusions drawn in the manuscript may, however, also be submitted for review with the manuscript.

Videos must be 320 × 480 pixels or smaller for best viewing within a browser. Submit videos in MPG or QuickTime format. Change QuickTime file extensions to ".mov" so that Web browsers will recognize the file type and play the movie. Compress videos as much as possible to help control file size. Name videos by order of citation appearance (e.g., video1.mov). Authors will be notified if problems exist with videos as submitted and will be asked to take responsibility for modifications. No editing will be done to videos at the Editorial Office.

Legends or short explanations of the material must accompany all supplemental material. Links to the material will appear in two places in the online journal: in the Table of Contents and in the information box associated with the first page of the full-text article. There will not be any links in the body of the article. In the printed paper, supplemental material will be footnoted the first time mentioned: "The online version of this article contains supplemental material."

Extended Methods: An Extended Methods supplement may accompany the submission of a manuscript. Extended Methods should reflect a "detailed laboratory method" used in the accompanied work that will allow others to recapitulate the experimental design. Extended Methods are not to replace standard methods provided in the Materials and Methods sections. The supplement may not be previously published or a repeat of what is already in the manuscript. Extended Methods should be submitted as a PDF and will be reviewed with the manuscript. Upload the file as "Supplemental Data" during the online submission.

Links to the Extended Methods will appear in two places in the online journal: in the Table of Contents and in the information box associated with the first page of the full-text article. There will not

be any links in the body of the article. In the printed paper, Extended Methods will be footnoted the first time mentioned: "The online version of this article contains Extended Methods."

DEPOSITION OF MATERIALS

Unique materials: It is required that unique materials described in manuscripts published in *The JI* will be made available, within reason, to qualified investigators for their own noncommercial use. A reasonable amount may be charged by authors to cover preparation and shipping of the requested material. An agreement to this effect is included in the Manuscript Submission Form.

High-resolution structural data: Any paper submitted to *The JI* that contains new high-resolution structural data requires an accession number from the Protein Data Bank (www.rcsb.org/pdb/Welcome.do) and assurance that unrestricted release will occur at or before the time of publication. The accession number should be accompanied by the website address of the databank.

Nucleotide sequences: Sequences of nucleotides or amino acids longer than 50 bases/residues should not be presented in the text or in table form, but rather should be submitted as a publication quality figure. Original nucleotide sequences, and determined nucleotide sequences encoding reported amino acid sequences, described in the manuscript must be submitted to GenBank or EMBL Data Library at the time of manuscript submission; an accession number and sequence availability are required at the time of publication. The accession number should be accompanied by the website address of the databank. Instructions on submission of data may be obtained directly from GenBank (Mail Stop K710, Los Alamos National Laboratory, Los Alamos, NM 87545) or from the European Molecular Biology Library, Nucleotide Sequence Library (Postfach 10.2209, Meyerhofstrasse 1, 6900 Heidelberg, Germany) or see NCBI's GenBank site (ncbi.nlm.nih.gov/Genbank/index.html).

Microarray data: *The JI* will not publish descriptive manuscripts that report microarray data, unless such information can be considered of unusual immunological significance and/or include functional experiments that provide novel insight into mechanism. As with other scientific approaches, current experimental, quantitation, verification, and statistical analyses are expected. Microarray experiments should be Minimum Information About a Microarray Experiment (MIAME) compliant (for guidelines see www.mged.org). Whereas limited online space may be available for supplemental tables associated with the manuscript, complete microarray data must be deposited in the appropriate public database; e.g., GEO (ncbi.nlm.nih.gov/geo/), ArrayExpress (www.ebi.ac.uk/arrayexpress/), or CIBEX (cibex.nig.ac.jp/index.jsp), and must be accessible without restriction from the date of publication. An entry name or accession number must be included in the paper before publication. The accession number should be accompanied by the website address of the databank.

STYLE GUIDE

General style conventions: In general, *The JI* follows *Scientific Style and Format*, *The CSE Style Manual for Authors, Editors, and Publishers*, seventh edition, published by the Council of Science Editors, Inc., in instances where journal style issues are not directly addressed.

Abbreviations for references: BIOSIS is the primary source for journal name abbreviations; *Index Medicus* is the secondary source.

Nomenclature: The most current links for nomenclature guidelines are posted online (www.jimmunol.org/misc/authorfulllength.shtml#style).

Allergen nomenclature: Nomenclature for allergens should be assigned in cooperation with the IUIS Allergen Sub-Committee. Authors of accepted manuscripts that describe novel allergens will be requested to complete a brief standard form available at IUIS Allergen Nomenclature (www.allergen.org/).

CD nomenclature: For the purpose of consistency, *The JI* will follow CD nomenclature. For murine molecules, *The JI* will follow the nomenclature previously published in *J. Immunol.* 160: 3861–3868, 1998. For human molecules, standard CD nomenclature will be followed as updated in *J. Immunol.* 168: 2083–2086, 2002. See also the Human Cell Differentiation Molecules website (www.HCDM.org).

Chemical names: *The JI* uses *The Merck Index* (library.dialog.com/bluesheets/html/bl0304.html) and the *IUPAC-IUB Commission on Biochemical Nomenclature-Chemical Abstracts* (www.chem.qmul.ac.uk/iupac/bibliog/white.html) as the primary references for proper spelling and style of chemical names.

Chemokine/chemokine receptor nomenclature: The systematic name for chemokines and chemokine receptors should be used. The original name may be given in parenthesis if desired. See *Cytokine* 21: 48–49, 2003.

Enzyme nomenclature: (www.chem.qmul.ac.uk/iubmb/enzyme/), is *The JI* source for style and spelling of enzyme names.

Gene nomenclature: The HUGO guidelines for gene nomenclature (www.genenames.org) may be used for naming human genes. Mouse Genome Informatics (www.informatics.jax.org/) is a reference source for naming mouse genes.

Genetic nomenclature for mice: *The JI* uses the revisions for standardized genetic nomenclature for mice published periodically in *Mouse Genome*. A current listing of inbred strains of mice and rats is available at Mouse Genome Informatics. Authors are encouraged to deposit their mapping data with the Mouse Genome Database (MGD) before publication and to include the assigned MGD accession numbers in their manuscripts (www.informatics.jax.org). Data may be submitted electronically by e-mail. Information about electronic submission of data sets can be obtained at the MGD home page. Gene symbols should be reserved with MGD in advance of publication. An electronic nomenclature submission form is available from the MGD website.

HLA nomenclature: HLA nomenclature is updated periodically by the WHO Nomenclature Committee for Factors of the HLA System. A recent reference is *Hum. Immunol.* 64: 919–920, 2003. Annual comprehensive revisions are published in *Human Immunology*, usually in the spring. See also the IMGT/HLA Database (www.ebi.ac.uk/imgt/hla/).

STANDARD ABBREVIATIONS

The abbreviations listed here are used without definition in articles published in *The JI*. The form may be used for both singular and plural, or made plural with “s” at the author’s option. The list of standard abbreviations is published in the first issue of each volume.

Å, angstrom
aa, amino acid (only with numbers)
Ab, antibody
ABTS, 2,2’-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid)
Ag, antigen
AIDS, acquired immunodeficiency syndrome
ANOVA, analysis of variance
AP-1, activator protein 1
APC, Ag-presenting cell
ATP, adenosine triphosphate (also ADP, AMP, CMP, CTP, GDP, GMP, GTP, ITP, NTP, TMP, UDP and UTP)
AZT, 3’-azido-3-deoxythymidine

BALT, bronchus-associated lymphoid tissue
BAPTA-AM, 1,2-bis(2-aminophenoxy)ethane-*N,N,N',N'*-tetraacetic acid acetoxymethyl ester
BCR, B cell receptor
bp, base pair (only with numbers)
BrdU, 5-bromo-2’-deoxyuridine
BSA, bovine serum albumin
C, complement
C region, constant region of Ig
cAMP, cyclic AMP
CCL, CC chemokine ligand
CCR, CC chemokine receptor
CD40L, CD40 ligand
cDNA, complementary DNA
CDR, complementarity determining region
C/EBP, CCAAT/enhancer-binding protein
CFA, complete Freund’s adjuvant
CFSE, 5-(and 6-)carboxyfluorescein diacetate succinimidyl ester
CFU, colony-forming unit
cGMP, guanosine 3’,5’-cyclic monophosphate
CHAPS, 3-[(3-cholamidopropyl)dimethylammonio]-1-propane sulfonate
Ci, curie
CIITA, class II transactivator
CLIP, class II-associated invariant-chain peptide
CMV, cytomegalovirus
CNS, central nervous system
CoA, coenzyme A
Con A, concanavalin A
CpG, cytosine guanine dinucleotide
cpm, counts per minute
CREB, cAMP response element binding protein
cRNA, complementary RNA
CSF, colony-stimulating factor
CTL, cytotoxic T lymphocyte
CTLA, cytolytic T lymphocyte-associated Ag
CXCL, CXC chemokine ligand
CXCR, CXC chemokine receptor
d, deoxy; distilled (as in dH₂O)
D region, diversity region of Ig or T cell receptor for Ag
Da, dalton (only with numbers)
dATP, 2’-deoxyadenosine triphosphate
DEAE, diethylaminoethyl
df, degrees of freedom
DMEM, Dulbecco’s modified Eagle’s medium
DMSO, dimethylsulfoxide
DNA, deoxyribonucleic acid
DNase, deoxyribonuclease
DNP, dinitrophenyl
dNTP, 2’-deoxynucleoside 5’-triphosphate
dpm, disintegrations per minute
ds, double-stranded (as dsDNA)
DTT, dithiothreitol
E, erythrocyte
EBV, Epstein-Barr virus
EC₅₀, 50% effective concentration
ECL, enhanced chemiluminescence
ED₅₀, 50% effective dose
EDTA, ethylenediaminetetraacetic acid
EGTA, ethylene glycol-bis(β-aminoethyl ester)-*N,N,N',N'*-tetraacetic acid
ELISA, enzyme-linked immunosorbent assay
ELISPOT, enzyme-linked immunospot
EMSA, electrophoretic mobility shift assay

- ERK, extracellular signal-regulated kinase
 E:T ratio, effector to target ratio
 Fab, Ag-binding fragment
 F-actin, filamentous actin
 FACS, fluorescence-activated cell sorter
 FAM, 6-carboxyfluorescein
 FBS, fetal bovine serum
 FcR, Fc receptors (e.g., FcγRI)
 FCS, fetal calf serum
 FITC, fluorescein isothiocyanate
 FLICE, Fas-associated death domain-like IL-1β-converting enzyme
 FLIP, FLICE inhibitory protein
 fMLP or FMLP, formyl-methionyl-leucyl-phenylalanine
 Fura 2-AM, fura 2-acetoxymethyl ester
 g, gram (only with numbers)
 GALT, gut-associated lymphoid tissue
 GAPDH or G3PDH, glyceraldehyde-3-phosphate dehydrogenase
 G-CSF, granulocyte CSF
 GFP, green fluorescent protein
 GM-CSF, granulocyte-macrophage CSF
 gp, glycoprotein (e.g., gp100)
 GPI, glycosylphosphatidylinositol
 GST, glutathione *S*-transferase
 h, hour (only with numbers)
 H chain, heavy chain
 H&E, hematoxylin and eosin
 HBSS, Hanks' balanced salt solution
 HEPES, *N*-2-hydroxyethylpiperazine-*N'*-2-ethanesulfonic acid
 HIV, human immunodeficiency virus
 HLA, human histocompatibility leukocyte Ag
 HPLC, high performance liquid chromatography
 HRP, horseradish peroxidase
 HSV, herpes simplex virus
 HUVEC, human umbilical vein endothelial cells
 IC₅₀, 50% inhibition/inhibitory concentration
 ICAM, intercellular adhesion molecule
 ICOS, inducible costimulator
 Id, idiotype; idiotypic determinant
 ID₅₀, 50% infective dose or 50% inhibiting dose
 IDO, indoleamine 2,3-dioxygenase
 IFA, incomplete Freund's adjuvant
 IFN, interferon (e.g., IFN-γ)
 Ig, immunoglobulin
 IgH, Ig heavy chain
 IκB, inhibitory NF-κB
 IL, interleukin (e.g., IL-2)
 i.m., intramuscular
 IMDM, Iscove's modified Dulbecco's medium
 IMEM, Iscove's minimal essential medium
 i.p., intraperitoneal
 ITAM, immunoreceptor tyrosine-based activation motif
 ITIM, immunoreceptor tyrosine-based inhibitory motif
 IU, international unit
 i.v., intravenous
 J region, joining region of Ig or T cell receptor for Ag
 JAK or Jak, Janus kinase
 JNK, c-Jun N-terminal kinase
 kb, kilobase (only with numbers)
 kbp, kilobase pair (only with numbers)
 K_a, association constant
 K_d, distribution coefficient; dissociation constant
 K_D, affinity constant
 kDa, kilodalton (only with numbers)
 L chain, light chain; light
 LD₅₀, 50% lethal dose
 LFA, leukocyte (lymphocyte) function-associated Ag
 LIF, leukemia inhibitory factor
 LPS, lipopolysaccharide
 LU, lytic unit
 mAb, monoclonal Ab
 2-ME, 2-mercaptoethanol
 MACS, magnetic-activated cell sorting
 MALDI, matrix-assisted laser desorption ionization
 MALDI-TOF, matrix-assisted laser desorption ionization-time of flight
 MALT, mucosa-associated lymphoid tissue
 MAPK, mitogen-activated protein kinase
 MCP-1, monocyte chemoattractant protein-1
 M-CSF, macrophage CSF
 MEK, mitogen-activated protein kinase kinase
 MEM, minimum essential medium
 MES, 2-(*N*-morpholino)ethanesulfonic acid
 mg, milligram (only with numbers)
 MHC, major histocompatibility complex
 min, minute (only with numbers)
 MIP, macrophage-inflammatory protein
 ml, milliliter (only with numbers)
 MLC, mixed lymphocyte culture
 MLR, mixed leukocyte reaction
 mo, month(s) (only with numbers)
 MOPS, 4-morpholinepropanesulfonic acid
 M_r, relative molecular mass
 mRNA, messenger RNA
 MTT, 3-(4,5-dimethylthiazol-2-yl)-2,5-dimethyltetrazolium bromide
 μg, microgram (only with numbers)
 μl, microliter (only with numbers)
 m.w., molecular weight
 MyD88, myeloid differentiating factor 88
n, number in study or group
 NAD, nicotinamide adenine dinucleotide
 NADH, reduced NAD
 NaDodSO₄, sodium dodecyl sulfate
 NADP, NAD phosphate
 NADPH, NAD phosphate (reduced)
 NBT, nitroblue tetrazolium
 ND, not determined
 NDP, nucleoside 5'-diphosphate
 NF, nuclear factor
 NFAT or NF-AT, nuclear factor of activated T cells
 NF-κB, nuclear factor κB
 Ni-NTA, nickel-nitrilotriacetic acid
 NK cell, natural killer cell
 NMP, nucleoside 5'-monophosphate
 NO, nitric oxide
 NS, not significant
 nt, nucleotide (only with numbers)
 OCT, octamer-binding factor
 OD, optical density
 OVA, ovalbumin
p, probability
 PAGE, polyacrylamide gel electrophoresis
 PBL, peripheral blood lymphocyte
 PBMC, peripheral blood mononuclear cell
 PBS, phosphate-buffered saline
 PCR, polymerase chain reaction
 PE, phycoerythrin

- PECAM-1, platelet endothelial cell adhesion molecule-1
 PerCP, peridinin chlorophyll protein
 PFU, plaque-forming unit
 PG, prostaglandin
 PHA, phytohemagglutinin
 PI3K, phosphatidylinositol 3-kinase
 PIPES, piperazine-*N,N'*-bis(2-ethane sulfonic acid)
 PMA, phorbol myristate acetate
 PMSF, phenylmethylsulfonyl fluoride
 PWM, pokeweed mitogen
 r, recombinant, (e.g., rIFN- γ)
 R, receptor (e.g., IL-2R)
 RACE, rapid amplification of cDNA end
 RAG, recombination-activating gene
 RANTES, regulated upon activation, normal T cell expressed and secreted
 RBC, red blood cell
 RFLP, restriction fragment length polymorphism
 RIA, radioimmunoassay
 RNA, ribonucleic acid
 RNase, ribonuclease
 rpm, revolutions per minute
 rRNA, ribosomal
 RNA RT-PCR, reverse transcriptase polymerase chain reaction
 s, second (use only with numbers)
 s.c., subcutaneous
 SCID, severe combined immunodeficiency
 SD, standard deviation
 SDS, sodium dodecyl sulfate
 SE, standard error
 SEM, standard error of the mean
 SHIP, src homology 2-containing inositol 5'-phosphatase
 SIV, simian immunodeficiency virus
 sp. act., specific activity
 SRBC, sheep red blood cells
 ss, single-stranded (e.g., ssDNA)
 SSC, standard saline citrate
 STAT, signal transducer and activator of transcription
 SV40, simian virus 40
 $t_{1/2}$, half-life, half-time
 TAMRA, 5-(and 6)-carboxytetramethylrhodamine
 TAP, transporter associated with Ag processing
 Tat, terminal deoxynucleotidyltransferase
 TBS, Tris-buffered saline
 TBST, TBS with Tween 20
 TCA, trichloroacetic acid
 TCR, T cell receptor for Ag
 TdR, thymidine deoxyribose (also UdR, AdR)
 TdT, terminal deoxynucleotidyltransferase
 TGF, transforming growth factor
 Th cell, T helper cell
 TLC, thin layer chromatography
 TLR, Toll-like receptor
 TNF, tumor necrosis factor
 TNP, trinitrophenyl
 TRAIL, TNF-related apoptosis-inducing ligand
 Tris, tris(hydroxymethyl)aminomethane
 tRNA, transfer RNA
 TUNEL, Tdt-mediated dUTP nick end labeling
 U, unit (only with numbers)
 UV, ultraviolet
 v/v, volume to volume ratio (%)
 V region, variable region of Ig
 VCAM, vascular cell adhesion molecule
 V(D)J, variable diversity joining
 VLA, very late activation Ag
 W, watt (only with numbers)
 wk, week (only with numbers)
 xid, X-linked immunodeficiency
 Zap70, ζ -associated protein 70 (or ζ -chain-associated protein 70)

KEYWORDS

Animals

Human
 Rodent
 Other Animals

Cells

B Cells
 Dendritic Cells
 Endothelial Cells
 Eosinophils
 Mast Cells/Basophils
 Monocytes/Macrophages
 Natural Killer Cells
 Neutrophils
 Stem Cells
 Stromal Cells
 T Cells
 T Cells, Cytotoxic
 Th1/Th2 Cells

Diseases

Autoimmunity
 Diabetes
 EAE/MS

Endotoxin Shock

Graft Versus Host Disease
 Immunodeficiency Diseases
 Rheumatoid Arthritis
 Systemic Lupus Erythematosus

Infections

AIDS
 Bacterial
 Fungal
 Parasitic-Helminth
 Parasitic-Protozoan
 Viral

Molecules

AcutePhase Reactants
 Adhesion Molecules
 Antibodies
 Antigens/Peptides/Epitopes
 Autoantibodies
 Cell Surface Molecules
 Chemokines
 Complement
 Cytokine Receptors

Cytokines

Fc Receptors
 Lipid Mediators
 Lipopolysaccharide
 MHC
 Nitric Oxide
 Protein Kinases/Phosphatases
 Superantigens
 T Cell Receptors
 Transcription Factors

Processes

Allergy
 Antigen Presentation/Processing
 Apoptosis
 Cell Activation
 Cell Differentiation
 Cell Proliferation
 Cell Trafficking
 Chemotaxis
 Comparative Immunology/Evolution
 Costimulation
 Cytotoxicity
 Gene Rearrangement

Gene Regulation

Hematopoiesis
 Inflammation
 Memory
 Neuroimmunology
 Phagocytosis
 Repertoire Development
 Reproductive Immunology
 Signal Transduction
 Tolerance/Suppression/Anergy
 Transplantation
 Tumor Immunity
 Vaccination

Techniques/Approaches

Gene Therapy
 Molecular Biology
 Transgenic/Knockout Mice

Tissues

Lung
 Mucosa
 Skin
 Spleen & Lymph Nodes
 Thymus

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