

**Luminex**  
complexity simplified.



**Capabilities for Today.  
Flexibility for Tomorrow.**

Amnis<sup>®</sup> CellStream<sup>®</sup> Flow Cytometry Systems.

LEARN MORE >



*The Journal of*  
**Immunology**

**198 (2)**

*J Immunol* 2017; 198:553-973; ;  
<http://www.jimmunol.org/content/198/2>

This information is current as  
of September 19, 2019.

**Why *The JI*? Submit online.**

- **Rapid Reviews! 30 days\*** from submission to initial decision
- **No Triage!** Every submission reviewed by practicing scientists
- **Fast Publication!** 4 weeks from acceptance to publication

*\*average*

**Subscription** Information about subscribing to *The Journal of Immunology* is online at:  
<http://jimmunol.org/subscription>

**Permissions** Submit copyright permission requests at:  
<http://www.aai.org/About/Publications/JI/copyright.html>

**Email Alerts** Receive free email-alerts when new articles cite this article. Sign up at:  
<http://jimmunol.org/alerts>

*The Journal of Immunology* is published twice each month by  
The American Association of Immunologists, Inc.,  
1451 Rockville Pike, Suite 650, Rockville, MD 20852  
All rights reserved.  
Print ISSN: 0022-1767 Online ISSN: 1550-6606.



## EDITORIAL

- 553 The Macro Influence of the Microbiome  
*Pamela J. Fink*

## IN THIS ISSUE

- 555 **TGF- $\beta$  Boosts Kidney T<sub>RM</sub> Cells** *See article p. 749*  
**A Null Allele of MPYS** *See article p. 776*  
**RvD2/DRV2 Squelch Sepsis** *See article p. 842*

## BRIEF REVIEWS

- 557 The Neonatal Window of Opportunity: Setting the Stage for Life-Long Host-Microbial Interaction and Immune Homeostasis  
*Natalia Torow and Mathias W. Hornef*
- 564 Host-Microbiota Interactions Shape Local and Systemic Inflammatory Diseases  
*John B. Grigg and Gregory F. Sonnenberg*
- 572 Microbiome-Modulated Metabolites at the Interface of Host Immunity  
*Eran Blacher, Maayan Levy, Evgeny Tatirovsky, and Eran Elinav*
- 581 The Influence of the Microbiome on Allergic Sensitization to Food  
*Catherine H. Plunkett and Cathryn R. Nagler*
- 590 The Influence of the Microbiome on Type 1 Diabetes  
*Alexandra Paun, Christopher Yau, and Jayne S. Danska*
- 596 Influence of the Gut Microbiome on Autoimmunity in the Central Nervous System  
*Sara L. Colpitts and Lloyd H. Kasper*

On the cover: Immunofluorescent staining of a distal colon section from an SPF C57BL/6 mouse. Staining was performed with Abs specific for Muc2 protein (green) and bacteria were stained using a universal 16S FISH probe (red). Nuclei were revealed using DAPI (blue). Image courtesy of Pedro Belda-Ferre, Nagler laboratory, The University of Chicago.

*The Journal of Immunology* (ISSN 0022-1767) is published twice each month by The American Association of Immunologists, Inc., 1451 Rockville Pike, Suite 650, Rockville, MD 20852, Phone: 301-634-7197, Fax: 301-634-7829. Subscription terms: New subscriptions and renewals begin January 1 and expire one year later (see <http://www.jimmunol.org/subscriptions> for prices and details). A special rate is available to members of The American Association of Immunologists, Inc. (see <http://www.aai.org/membership>). The American Association of Immunologists, Inc., is not responsible for undeliverable issues. Replacement issues can be obtained, if available, at the regular price of single issues (see [http://www.jimmunol.org/pdf/single\\_issue\\_purchase.pdf](http://www.jimmunol.org/pdf/single_issue_purchase.pdf)). Reprints of individual articles are available only from authors. Periodicals postage paid at Rockville, MD 20852, and at additional mailing offices. Country of origin U.S.A. Printed on acid-free recyclable paper. Postmaster: Send address changes 60 days in advance to *The Journal of Immunology*, Subscription Department, 1451 Rockville Pike, Suite 650, Rockville, MD 20852. Copyright © 2017 by The American Association of Immunologists, Inc.

- 605 Inside Out: HIV, the Gut Microbiome, and the Mucosal Immune System  
*Jay Liu, Brett Williams, Daniel Frank, Stephanie M. Dillon, Cara C. Wilson, and Alan L. Landay*

## CUTTING EDGE

- 617 Cutting Edge: IL-10 Is Essential for the Generation of Germinal Center B Cell Responses and Anti-*Plasmodium* Humoral Immunity  
*Jenna J. Guthmiller, Amy C. Graham, Ryan A. Zander, Rosemary L. Pope, and Noah S. Butler*
- 623 Cutting Edge: Adenosine A2a Receptor Signals Inhibit Germinal Center T Follicular Helper Cell Differentiation during the Primary Response to Vaccination  
*Shirdi E. Schmiel, Jessica A. Yang, Marc K. Jenkins, and Daniel L. Mueller*
- 629 Cutting Edge: LL-37–Mediated Formyl Peptide Receptor-2 Signaling in Follicular Dendritic Cells Contributes to B Cell Activation in Peyer’s Patch Germinal Centers  
*Sae-Hae Kim, Yu Na Kim, and Yong-Suk Jang*
- 634 Cutting Edge: Helminth Coinfection Blocks Effector Differentiation of CD8 T Cells through Alternate Host Th2- and IL-10–Mediated Responses  
*Andrew Marple, Wenhui Wu, Subagi Shah, Yanlin Zhao, Peicheng Du, William C. Gause, and George S. Yap*
- 640 Cutting Edge: Murine Mast Cells Rapidly Modulate Metabolic Pathways Essential for Distinct Effector Functions  
*Binh Phong, Lyndsay Avery, Ashley V. Menk, Greg M. Delgoffe, and Lawrence P. Kane*

## ALLERGY AND OTHER HYPERSENSITIVITIES

- 645 Role of CCL7 in Type I Hypersensitivity Reactions in Murine Experimental Allergic Conjunctivitis  
*Chuan-Hui Kuo, Andrea M. Collins, Douglas R. Boettner, YanFen Yang, and Santa J. Ono*

## ANTIGEN RECOGNITION AND RESPONSES

- 657 Endogenous Nur77 Is a Specific Indicator of Antigen Receptor Signaling in Human T and B Cells  
*Judith F. Ashouri and Arthur Weiss*

## AUTOIMMUNITY

- 669 IL-17C/IL-17RE Augments T Cell Function in Autoimmune Hepatitis  
*Jinling Huang, Qing Yuan, Hui Zhu, Lan Yin, Shanjuan Hong, Zhongjun Dong, Wei Jin, and Chen Dong*
- 681 Shedding New Light on the Process of “Licensing” for Pathogenicity by Th Lymphocytes  
*Cuiyan Tan, Wambui S. Wandu, R. Steven Lee, Samuel H. Hinshaw, Dennis M. Klinman, Eric Wawrousek, and Igal Gery*

## CLINICAL AND HUMAN IMMUNOLOGY

- 691 Dimethyl Fumarate Treatment Mediates an Anti-Inflammatory Shift in B Cell Subsets of Patients with Multiple Sclerosis  
*Rui Li, Ayman Rezk, Mathab Ghadiri, Felix Luessi, Frauke Zipp, Hulun Li, Paul S. Giacomini, Jack Antel, and Amit Bar-Or*

## IMMUNE REGULATION

- 699 TLR10 Is a B Cell Intrinsic Suppressor of Adaptive Immune Responses  
*Nicholas J. Hess, Song Jiang, Xinyan Li, Yue Guan, and Richard I. Tapping*
- 708 SOS1, ARHGEF1, and DOCK2 rho-GEFs Mediate JAK-Dependent LFA-1 Activation by Chemokines  
*Lara Toffali, Alessio Montresor, Michela Mirenda, Giorgio Scita, and Carlo Laudanna*
- 718 Neutrophil Resolvin E1 Receptor Expression and Function in Type 2 Diabetes  
*Marcelo O. Freire, Jesmond Dalli, Charles N. Serhan, and Thomas E. Van Dyke*

## IMMUNOTHERAPY AND VACCINES

- 729 Tolerogenic Dendritic Cells from Poorly Compensated Type 1 Diabetes Patients Have Decreased Ability To Induce Stable Antigen-Specific T Cell Hyporesponsiveness and Generation of Suppressive Regulatory T Cells  
*Klára Dáňová, Anna Grohová, Pavla Strnadová, David P. Funda, Zdeněk Šumník, Jan Lebl, Ondřej Cinek, Štěpánka Průhová, Stanislava Koloušková, Barbora Obermannová, Lenka Petruželková, Anna Šedivá, Petra Fundová, Karsten Buschard, Radek Špíšek, and Lenka Palová-Jelínková*

## INFECTIOUS DISEASE AND HOST RESPONSE

- 741 Divergent Functions of TLR2 on Hematopoietic and Nonhematopoietic Cells during Chronic *Mycobacterium tuberculosis* Infection  
*Jill Konowich, Archana Gopalakrishnan, Jillian Dietzold, Sheetal Verma, Kamlesh Bhatt, Wasiulla Rafi, and Padmini Salgame*
- 749 TGF- $\beta$  Controls the Formation of Kidney-Resident T Cells via Promoting Effector T Cell Extravasation  
*Chaoyu Ma, Shruti Mishra, Erika L. Demel, Yong Liu, and Nu Zhang*
- 757 Kinetics of Myeloid-Derived Suppressor Cell Frequency and Function during Simian Immunodeficiency Virus Infection, Combination Antiretroviral Therapy, and Treatment Interruption  
*Sandra E. Dross, Paul V. Munson, Se Eun Kim, Debra L. Bratt, Hillary C. Tunggal, Ana L. Gervassi, Deborah H. Fuller, and Helen Horton*

## INNATE IMMUNITY AND INFLAMMATION

- 767 MCP1/Regnase-1 Restricts IL-17A- and IL-17C-Dependent Skin Inflammation  
*Leticia Monin, Johann E. Gudjonsson, Erin E. Childs, Nilesch Amatya, Xianying Xing, Akash H. Verma, Bianca M. Coleman, Abhishek V. Garg, Meaghan Killeen, Alicia Mathers, Nicole L. Ward, and Sarah L. Gaffen*
- 776 The Common R71H-G230A-R293Q Human *TMEM173* Is a Null Allele  
*Seema Patel, Steven M. Blaauuboer, Heidi R. Tucker, Samira Mansouri, Juan Sebastian Ruiz-Moreno, Lutz Hamann, Ralf R. Schumann, Bastian Opitz, and Lei Jin*
- 788 Intracellular Activation of Complement 3 Is Responsible for Intestinal Tissue Damage during Mesenteric Ischemia  
*Abhigyan Satyam, Lakshmi Kannan, Naoya Matsumoto, Mayya Geba, Peter H. Lapchak, Robin Bosse, Guo-Ping Shi, Jurandir J. Dalle Lucca, Maria G. Tsokos, and George C. Tsokos*
- 798 Adipose Fatty Acid Binding Protein Promotes Saturated Fatty Acid-Induced Macrophage Cell Death through Enhancing Ceramide Production  
*Yuwen Zhang, Enyu Rao, Jun Zeng, Jiaqing Hao, Yanwen Sun, Shujun Liu, Edward R. Sauter, David A. Bernlohr, Margot P. Cleary, Jill Suttles, and Bing Li*
- 808 A Novel Function of F-Box Protein FBXO17 in Negative Regulation of Type I IFN Signaling by Recruiting PP2A for IFN Regulatory Factor 3 Deactivation  
*Di Peng, Zining Wang, Anfei Huang, Yong Zhao, and F. Xiao-Feng Qin*
- 820 A20 Ameliorates Intracerebral Hemorrhage-Induced Inflammatory Injury by Regulating TRAF6 Polyubiquitination  
*Zhaoyou Meng, Ting Zhao, Kai Zhou, Qi Zhong, Yanchun Wang, Xiaoyi Xiong, Faxiang Wang, Yuanrui Yang, Wenyaoyu Zhu, Juan Liu, Maofan Liao, Lirong Wu, Chunmei Duan, Jie Li, Qiuwen Gong, Liang Liu, Ao Xiong, Meihua Yang, Jian Wang, and Qingwu Yang*
- 832 Predictive Analysis of Mechanistic Triggers and Mitigation Strategies for Pathological Scarring in Skin Wounds  
*Sridevi Nagaraja, Lin Chen, Jian Zhou, Yan Zhao, David Fine, Luisa A. DiPietro, Jaques Reifman, and Alexander Y. Mitrophanov*
- 842 Novel Resolvin D2 Receptor Axis in Infectious Inflammation  
*Nan Chiang, Xavier de la Rosa, Stephania Libreros, and Charles N. Serhan*

- 852 MARCH1 E3 Ubiquitin Ligase Dampens the Innate Inflammatory Response by Modulating Monocyte Functions in Mice  
*Tristan Galbas, Maxime Raymond, Antoine Sabourin, Marie-Claude Bourgeois-Daigneault, Fanny Guimont-Desrochers, Tae Jin Yun, Jean-François Cailhier, Satoshi Ishido, Sylvie Lesage, Cheolho Cheong, and Jacques Thibodeau*
- 862 MEK1/2 Inhibition Promotes Macrophage Reparative Properties  
*Matthew E. Long, William E. Eddy, Ke-Qin Gong, Lara L. Lovelace-Macon, Ryan S. McMahan, Jean Charron, W. Conrad Liles, and Anne M. Manicone*

## MOLECULAR AND STRUCTURAL IMMUNOLOGY

- 873 Protective T Cell Responses Featured by Concordant Recognition of Middle East Respiratory Syndrome Coronavirus–Derived CD8<sup>+</sup> T Cell Epitopes and Host MHC  
*William J. Liu, Jiaming Lan, Kefang Liu, Yao Deng, Yanfeng Yao, Shaolian Wu, Hong Chen, Lingling Bao, Haifeng Zhang, Min Zhao, Qihui Wang, Lingxia Han, Yan Chai, Jianxun Qi, Jincun Zhao, Songdong Meng, Chuan Qin, George F. Gao, and Wenjie Tan*
- 883 The Systemic Lupus Erythematosus–Associated Single Nucleotide Polymorphism rs1143678 in Integrin  $\alpha_M$  Cytoplasmic Tail Generates a 14-3-3 $\zeta$  Binding Site That Is Proinflammatory  
*Li-Teng Ong, Hui-Foon Tan, Chen Feng, Jing Qu, Shuzk-Cheng Loh, Surajit Bhattacharyya, and Suet-Mien Tan*

## MUCOSAL IMMUNOLOGY

- 895 Allergen-Induced CD4<sup>+</sup> T Cell Cytokine Production within Airway Mucosal Dendritic Cell–T Cell Clusters Drives the Local Recruitment of Myeloid Effector Cells  
*Tibor Z. Veres, Tamás Kopcsányi, Nicholas van Panhuys, Michael Y. Gerner, Zhiduo Liu, Pia Rantakari, Johannes Dunkel, Masayuki Miyasaka, Marko Salmi, Sirpa Jalkanen, and Ronald N. Germain*
- 908  $\gamma\delta$  T Cells Coexpressing Gut Homing  $\alpha 4\beta 7$  and  $\alpha E$  Integrins Define a Novel Subset Promoting Intestinal Inflammation  
*Jeong-su Do, Sohee Kim, Karen Keslar, Eunjung Jang, Emina Huang, Robert L. Fairchild, Theresa T. Pizarro, and Booki Min*
- 916 Clr-a: A Novel Immune-Related C-Type Lectin-like Molecule Exclusively Expressed by Mouse Gut Epithelium  
*Emilia Rutkowski, Stefan Leibelt, Christina Born, Miriam E. Friede, Stefan Bauer, Sandra Weil, Joachim Koch, and Alexander Steinle*

## SYSTEMS IMMUNOLOGY

- 927 Establishing High Dimensional Immune Signatures from Peripheral Blood via Mass Cytometry in a Discovery Cohort of Stage IV Melanoma Patients  
*Kilian Wistuba-Hamprecht, Alexander Martens, Benjamin Weide, Karen Wei Weng Teng, Henning Zelba, Elena Guffart, Jinmiao Chen, Claus Garbe, Evan William Newell, Anis Larbi, and Graham Pawelec*
- 937 Epigenetic Networks Regulate the Transcriptional Program in Memory and Terminally Differentiated CD8<sup>+</sup> T Cells  
*Ramon M. Rodriguez, Beatriz Suarez-Alvarez, José L. Lavín, David Mosén-Ansorena, Aroa Baragaño Raneros, Leonardo Márquez-Kisinousky, Ana M. Aransay, and Carlos Lopez-Larrea*

## TUMOR IMMUNOLOGY

- 950 IL-23 Inhibits Melanoma Development by Augmenting DNA Repair and Modulating T Cell Subpopulations  
*Tabseen H. Nasti, J. Barry Cochran, Raj V. Vachhani, Kristopher McKay, Yuko Tsuruta, Mohammad Athar, Laura Timares, and Craig A. Elms*

## NOVEL IMMUNOLOGICAL METHODS

- 962 Combined Single-Cell Measurement of Cytokine mRNA and Protein Identifies T Cells with Persistent Effector Function  
*Benoit P. Nicolet, Aurelie Guislain, and Monika C. Wolkers*

## CORRECTIONS

- 971 Correction: Breakpoint Cluster Region–Mediated Inflammation Is Dependent on Casein Kinase II  
*Jie Meng, Jing-Jing Jiang, Toru Atsumi, Hidenori Bando, Yuko Okuyama, Lavannya Sabharwal, Ikuma Nakagawa, Haruka Higuchi, Mitsutoshi Ota, Momoko Okawara, Ryuichiro Ishitani, Osamu Nureki, Daisuke Higo, Yasunobu Arima, Hideki Ogura, Daisuke Kamimura, and Masaaki Murakami*
- 972 Correction: Hepatitis C Virus Sensing by Human Trophoblasts Induces Innate Immune Responses and Recruitment of Maternal NK Cells: Potential Implications for Limiting Vertical Transmission  
*Silvia Giugliano, Margaret G. Petroff, Bryce D. Warren, Susmita Jasti, Caitlin Linscheid, Ashley Ward, Anita Kramer, Evgenia Dobrinskikh, Melissa A. Sheiko, Michael Gale, Jr., Lucy Golden-Mason, Virginia D. Winn, and Hugo R. Rosen*
- 973 Correction: Regulation of Adenosine Deaminase on Induced Mouse Experimental Autoimmune Uveitis  
*Dongchun Liang, Aijun Zuo, Ronglan Zhao, Hui Shao, Henry J. Kaplan, and Deming Sun*

## 974 AUTHOR INDEX