

# Table of Contents

The Journal  
of Immunology

VOL. 208 | NO. 3 | February 1, 2022 | Pages 529–782

## TOP READS

- 529 **Aging T Cells Can't Chew the Fat** *See article p. 562*  
**Proinflammatory Effects of Inactive IDO2** *See article p. 571*  
**LAG-3 and Autoimmunity** *See article p. 594*  
**BCL-2 Promotes Survival of Intraepithelial Lymphocyte Precursors** *See article p. 651*  
**Rhesus Macaque Ag Receptor Repertoires** *See article p. 762*  
**Engineered IgE for Clinical Assay Standardization** *See article p. 772*

## IMMUNOLOGY NOTES AND RESOURCES

- 531 Minimal Information about MHC Multimers (MIAMM)  
*Randi Vita, Apurva Mody, James A. Overton, Soren Buus, Stephen T. Haley, Alessandro Sette, Vamsee Mallajosyula, Mark M. Davis, Dale L. Long, Richard A. Willis, Bjoern Peters, and John D. Altman*

## BRIEF REVIEWS

- 539 Variegated Outcomes of T Cell Activation by Dendritic Cells in the Steady State  
*Jessica Bourque and Daniel Hawiger*

## ANTIGEN RECOGNITION AND RESPONSES

- 549 Systematic Determination of TCR–Antigen and Peptide–MHC Binding Kinetics among Field Variants of a *Theileria parva* Polymorphic CTL Epitope  
*Nicholas Svitek, Rosemary Saya, Houshuang Zhang, Vishvanath Nene, and Lucilla Steinaa*
- 562 Altered Basal Lipid Metabolism Underlies the Functional Impairment of Naive CD8<sup>+</sup> T Cells in Elderly Humans  
*Francesco Nicoli, Mariela P. Cabral-Piccin, Laura Papagno, Eleonora Gallerani, Mathieu Fusaro, Victor Folcher, Marion Dubois, Emmanuel Clave, Hélène Vallet, Justin J. Frere, Emma Gostick, Sian Llewellyn-Lacey, David A. Price, Antoine Toubert, Loïc Dupré, Jacques Boddaert, Antonella Caputo, Riccardo Gavioli, and Victor Appay*

On the cover: Bone marrow cells stained with Ly6G-AF647 (cyan) and CD115 (red) were perfused into a microfluidic chamber to roll on a substrate of P-selectin and ICAM-1. Real-time fluorescence microscopy was used to image CCL2-induced adhesion of CD115<sup>+</sup>Ly6G<sup>-</sup> monocytes from wild-type or cystic fibrosis mice. Fan, Z., E. Pitmon, L. Wen, J. Miller, E. Ehinger, R. Herro, W. Liu, J. Chen, Z. Mikulski, D. J. Conrad, A. Marki, M. Orechchioni, P. Kumari, Y. P. Zhu, P. M. Marcovecchio, C. C. Hedrick, C. A. Hodges, V. A. Rathinam, K. Wang, and K. Ley. 2022. Bone marrow transplantation rescues monocyte recruitment defect and improves cystic fibrosis in mice. *J. Immunol.* 208: 745–752.

*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: 301-246-8401. Subscription terms: New subscriptions and renewals begin January 1 and expire one year later (see <http://www.jimmunol.org/subscription> 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/Subscription/Claims>). 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 © 2022 by The American Association of Immunologists, Inc.

## AUTOIMMUNITY

- 571 The Immunomodulatory Enzyme IDO2 Mediates Autoimmune Arthritis through a Nonenzymatic Mechanism  
*Lauren M. F. Merlo, Weidan Peng, James B. DuHadaway, James D. Montgomery, George C. Prendergast, Alexander J. Muller, and Laura Mandik-Nayak*
- 582 IgM to IgG Class Switching Is a Necessary Step for Pemphigus Phenotype Induction in Desmoglein 3–Specific B Cell Receptor Knock-in Mouse  
*Hisashi Nomura, Naoko Wada, Hayato Takahashi, Yuko Kase, Jun Yamagami, Shohei Egami, Hisato Iriki, Miho Mukai, Aki Kamata, Hiromi Ito, Hideki Fujii, Tomoyuki Ishikura, Haruhiko Koseki, Takashi Watanabe, Takeru Yamada, Osamu Ohara, Shigeo Koyasu, and Masayuki Amagai*
- 594 Fewer LAG-3<sup>+</sup> T Cells in Relapsing-Remitting Multiple Sclerosis and Type 1 Diabetes  
*Britta E. Jones, Megan D. Maerz, Henry T. Bahnsen, Ashwin Somasundaram, Lucas H. McCarthy, Cate Speake, and Jane H. Buckner*

## IMMUNE REGULATION

- 603 MicroRNA-139 Expression Is Dispensable for the Generation of Influenza-Specific CD8<sup>+</sup> T Cell Responses  
*Jennifer L. Hope, Manzhi Zhao, Christopher J. Stairiker, Caoimhe H. Kiernan, Alison J. Carey, Yvonne M. Mueller, Marjan van Meurs, Inge Brouwers-Haspels, Dennis C. Otero, Eun-Ah Bae, Hannah A. Faso, Alex Maas, Hans de Looper, Paolo M. Fortina, Isidore Rigoutsos, Linda M. Bradley, Stefan J. Erkland, and Peter D. Katsikis*
- 618 Long Noncoding RNA HOTAIRM1 Promotes Immunosuppression in Sepsis by Inducing T Cell Exhaustion  
*Wankun Chen, Jinlong Liu, Feng Ge, Zhaoyuan Chen, Mengdi Qu, Ke Nan, Jiahui Gu, Yi Jiang, Shenjia Gao, Yun Liao, Chengji Wang, Hao Zhang, and Changhong Miao*
- 633 Regulation of Cutaneous Immunity In Vivo by Calcitonin Gene–Related Peptide Signaling through Endothelial Cells  
*Wanhong Ding, Lori L. Stohl, Jad Saab, Shayan Azizi, Xi K. Zhou, Devina Mehta, and Richard D. Granstein*
- 642 TNF Receptor–Associated Factor 5 Limits IL-27 Receptor Signaling in CD4<sup>+</sup> T Lymphocytes  
*Eigo Kawahara, Mitsuki Azuma, Hiroyuki Nagashima, Koki Omori, Sho Akiyama, Yuka Fujimori, Mayu Oishi, Nagito Shibui, Kosuke Kawaguchi, Masashi Morita, Yuko Okuyama, Naoto Ishii, and Takanori So*

## IMMUNE SYSTEM DEVELOPMENT

- 651 Bcl-2 Is Necessary to Counteract Bim and Promote Survival of TCRαβ<sup>+</sup>CD8αα<sup>+</sup> Intraepithelial Lymphocyte Precursors in the Thymus  
*Sharmila Shanmuganad, Sarah A. Hummel, Vivian Varghese, and David A. Hildeman*

## INFECTIOUS DISEASE AND HOST RESPONSE

- 660 IL-33 Coordinates Innate Defense to Systemic *Candida albicans* Infection by Regulating IL-23 and IL-10 in an Opposite Way  
*Nu Z. N. Nguyen, Vuvi G. Tran, Jiyeon Baek, Younghhee Kim, Eun H. Youn, Seung W. Na, Sang J. Park, Su-Kil Seo, and Byungsuk Kwon*
- 672 Hepatitis B and Hepatitis C Virus Infection Promote Liver Fibrogenesis through a TGF-β1–Induced OCT4/Nanog Pathway  
*Wenting Li, Xiaoqiong Duan, Chuanlong Zhu, Xiao Liu, Andre J. Jeyarajan, Min Xu, Zeng Tu, Qiuju Sheng, Dong Chen, Chuanwu Zhu, Tuo Shao, Zhimeng Cheng, Shadi Salloom, Esperance A. Schaefer, Annie J. Kruger, Jacinta A. Holmes, Raymond T. Chung, and Wenyu Lin*

- 685 Comprehensive Immune Profiling Reveals CD56<sup>+</sup> Monocytes and CD31<sup>+</sup> Endothelial Cells Are Increased in Severe COVID-19 Disease  
*Taru S. Dutt, Stephanie M. LaVergne, Tracy L. Webb, Bridget A. Baxter, Sophia Stromberg, Kim McFann, Kailey Berry, Madison Tipton, Omar Alnachoukati, Linda Zier, Greg Ebel, Julie Dunn, Marcela Henao-Tamayo, and Elizabeth P. Ryan*
- 697 Diagnostic Value of Circulating Antigens in the Serum of Piglets with Experimental Acute Toxoplasmosis  
*Qi Liu, Man-yu Zhang, Bing Zhao, Yun Chen, Wei Jiang, Xiao-ling Geng, and Quan Wang*
- 707 Grass Carp Reovirus Nonstructural Proteins Avoid Host Antiviral Immune Response by Targeting the RLR Signaling Pathway  
*Jie Zhang, Xiao Man Wu, Qin Fang, Yong Hong Bi, Pin Nie, and Ming Xian Chang*
- 720 Respiratory Syncytial Virus Provides Protection against a Subsequent Influenza A Virus Infection  
*Stacey M. Hartwig, Ann M. Miller, and Steven M. Varga*

## INNATE IMMUNITY AND INFLAMMATION

- 732 Siglec-F Promotes IL-33-Induced Cytokine Release from Bone Marrow-Derived Eosinophils Independently of the ITIM and ITIM-like Motif Phosphorylation  
*Stefanie Westermann, Axel Dietschmann, Daniela Doebler, Kirstin Castiglione, Bruce S. Bochner, David Voehringer, and Daniel Radtke*
- 745 Bone Marrow Transplantation Rescues Monocyte Recruitment Defect and Improves Cystic Fibrosis in Mice  
*Zhichao Fan, Elise Pitmon, Lai Wen, Jacqueline Miller, Erik Ehinger, Rana Herro, Wei Liu, Ju Chen, Zbigniew Mikulski, Douglas J. Conrad, Alex Marki, Marco Orecchioni, Puja Kumari, Yanfang Peipei Zhu, Paola M. Marcovecchio, Catherine C. Hedrick, Craig A. Hodges, Vijay A. Rathinam, Kepeng Wang, and Klaus Ley*
- 753 SARS-CoV-2 NSP13 Inhibits Type I IFN Production by Degradation of TBK1 via p62-Dependent Selective Autophagy  
*Chao Sui, Tongyang Xiao, Shengyuan Zhang, Hongxiang Zeng, Yi Zheng, Bingyu Liu, Gang Xu, Chengjiang Gao, and Zheng Zhang*

## NOVEL IMMUNOLOGICAL METHODS

- 762 Single-Cell-Based High-Throughput Ig and TCR Repertoire Sequencing Analysis in Rhesus Macaques  
*Evan S. Walsh, Tammy S. Tollison, Hayden N. Brochu, Brian I. Shaw, Kayleigh R. Diveley, Hsuan Chou, Lynn Law, Allan D. Kirk, Michael Gale, Jr., and Xinxia Peng*
- 772 A Recombinant Ig Fragment (IgCw-γεκ) Comprising the C $\gamma$ <sub>1</sub>-C $\varepsilon$ <sub>2-4</sub> and C $\kappa$  Domains Is an Alternative Reagent to Human IgE  
*Minjae Kim, Jeonghyun Lee, Juho Choi, Youngsil Seo, Gye seo Park, Jinah Jeon, Yerin Jeon, Mi-Gi Lee, and Myung-Hee Kwon*

## 780 AUTHOR INDEX