

FMM
J80/21

THE JOURNAL OF IMMUNOLOGY

Volume 190 | No. 11 | June 1, 2013



www.jimmunol.org

5339 IN THIS ISSUE

LETTERS TO THE EDITOR

- 5341 Comment on “Myeloid-Derived Suppressor Cells Suppress Antitumor Immune Responses through IDO Expression and Correlate with Lymph Node Metastasis in Patients with Breast Cancer”

Mads Hald Andersen

- 5341 Response to Comment on “Myeloid-Derived Suppressor Cells Suppress Antitumor Immune Responses through IDO Expression and Correlate with Lymph Node Metastasis in Patients with Breast Cancer”

Jinpu Yu, Yue Wang, Fang Yan, Hui Li, and Xiubao Ren

PILLARS OF IMMUNOLOGY

- 5343 Opening the Frontier of the T Cell Surface: Schlossman and Goldstein

Michael L. Dustin

- 5346 Pillars Article: Separation of Functional Subsets of Human T Cells by a Monoclonal Antibody. *Proc. Natl. Acad. Sci.* 1979. 76: 4061–4065

Ellis L. Reinherz, Patrick C. Kung, Gideon Goldstein, and Stuart F. Schlossman

- 5351 Pillars Article: Monoclonal Antibodies Defining Distinctive Human T Cell Surface Antigens. *Science.* 1979. 206: 347–349

Patrick C. Kung, Gideon Goldstein, Ellis L. Reinherz, and Stuart F. Schlossman

BRIEF REVIEWS

- 5355 NK Cells in Central Nervous System Disorders

Aurélien Poli, Justyna Kmiecik, Olivia Domingues, François Hentges, Mathieu Bléry, Martha Chekenya, José Boucraut, and Jacques Zimmer

On the cover: H&E-stained sagittal section of a hind paw from a wild-type BALB/c mouse after immunization with human aggregan G1-domain protein in adjuvant. The authors show that mice immunized by different routes, i.p. versus s.c., develop a similar histological appearance of joint inflammation despite different requirements for Th1 and Th17 cytokines. Rodeghero, R., Y. Cao, S. A. Olalekan, Y. Iwakua, T. T. Glant, and A. Finnegan. 2013. Location of CD4⁺ T cell priming regulates the differentiation of Th1 and Th17 cells and their contribution to arthritis. *J. Immunol.* 190: 5423–5435.

The Journal of Immunology (ISSN 0022-1767) is published twice each month by The American Association of Immunologists, Inc., 9650 Rockville Pike, Bethesda, MD 20814-3994, 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). Reprints of individual articles are available only from authors. Periodicals postage paid at Bethesda, MD 20814-3994, 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, 9650 Rockville Pike, Bethesda, MD 20814-3994. Copyright © 2013 by The American Association of Immunologists, Inc.

ANTIGEN RECOGNITION AND RESPONSES

- 5363 Age-Associated Increase of Low-Avidity Cytomegalovirus-Specific CD8⁺ T Cells That Re-Express CD45RA
Stephen J. Griffiths, Natalie E. Riddell, Joanne Masters, Valentina Libri, Sian M. Henson, Anne Wertheimer, Diana Wallace, Stuart Sims, Laura Rivino, Anis Larbi, David M. Kemeny, Janko Nikolich-Zugich, Florian Kern, Paul Klenerman, Vince C. Emery, and Arne N. Akbar

AUTOIMMUNITY

- 5373 *Yersinia enterocolitica* Provides the Link between Thyroid-Stimulating Antibodies and Their Germline Counterparts in Graves' Disease
Chantal E. Hargreaves, Marco Grasso, Christiane S. Hampe, Anna Stenkova, Steve Atkinson, George W. P. Joshua, Brendan W. Wren, Ashley M. Buckle, Deborah Dunn-Walters, and J. Paul Banga
- 5382 Engineered Regulatory T Cells Coexpressing MHC Class II:Peptide Complexes Are Efficient Inhibitors of Autoimmune T Cell Function and Prevent the Development of Autoimmune Arthritis
Zhaohui Qian, Kary A. Latham, Karen B. Whittington, David C. Miller, David D. Brand, and Edward F. Rosloniec
- 5392 $\gamma\delta$ T Cells Are Essential Effectors of Type 1 Diabetes in the Nonobese Diabetic Mouse Model
Janet G. M. Markle, Steve Mortin-Toth, Andrea S. L. Wong, Liping Geng, Adrian Hayday, and Jayne S. Danska
- 5402 Blockade of Programmed Death-1 in Young (New Zealand Black \times New Zealand White)F₁ Mice Promotes the Suppressible Capacity of CD4⁺ Regulatory T Cells Protecting from Lupus-like Disease
Maida Wong, Antonio La Cava, and Bevra H. Hahn
- 5411 Autoantibody Induction by DNA-Containing Immune Complexes Requires HMGB1 with the TLR2/MicroRNA-155 Pathway
Zhenke Wen, Lin Xu, Xi Chen, Wei Xu, Zhinan Yin, Xiaoming Gao, and Sidong Xiong
- 5423 Location of CD4⁺ T Cell Priming Regulates the Differentiation of Th1 and Th17 Cells and Their Contribution to Arthritis
Rachel Rodeghero, Yanxia Cao, Susan A. Olalekan, Yoichiro Iwakura, Tibor T. Glant, and Alison Finnegan
- 5436 *Cd72^e* Is a Modifier Gene that Regulates *Fas^{lpr}*-Induced Autoimmune Disease
Miduo Xu, Rong Hou, Aya Sato-Hayashizaki, Rongyong Man, Chenghua Zhu, Chisato Wakabayashi, Sachiko Hirose, Takahiro Adachi, and Takeshi Tsubata

CLINICAL AND HUMAN IMMUNOLOGY

- 5446 Reversal of Global CD4⁺ Subset Dysfunction Is Associated with Spontaneous Clinical Resolution of Pulmonary Sarcoidosis
Kyra A. Oswald-Richter, Bradley W. Richmond, Nicole A. Braun, Joan Isom, Susamma Abraham, Thyneice R. Taylor, John M. Drake, Daniel A. Culver, David S. Wilkes, and Wonder P. Drake

IMMUNE REGULATION

- 5454 Antigen-Stimulated CD4 T Cell Expansion Can Be Limited by Their Grazing of Peptide-MHC Complexes
Rob J. De Boer and Alan S. Perelson
- 5459 Estradiol Promotes Functional Responses in Inflammatory and Steady-State Dendritic Cells through Differential Requirement for Activation Function-1 of Estrogen Receptor α
Cyril Seillet, Nelly Rouquié, Eliane Foulon, Victorine Douin-Echinard, Andrée Krust, Pierre Chambon, Jean-François Arnal, Jean-Charles Guéry, and Sophie Laffont
- 5471 Altered Immunity and Dendritic Cell Activity in the Periphery of Mice after Long-Term Engraftment with Bone Marrow from Ultraviolet-Irradiated Mice
Royce L. X. Ng, Naomi M. Scott, Deborah H. Strickland, Shelley Gorman, Michele A. Grimbaldston, Mary Norval, Jason Waithman, and Prue H. Hart
- 5485 IL-2-Independent and TNF- α -Dependent Expansion of V β 5⁺ Natural Regulatory T Cells during Retrovirus Infection
Lara Myers, Jara J. Joedicke, Aaron B. Carmody, Ronald J. Messer, George Kassiotis, Jaquelin P. Dudley, Ulf Dittmer, and Kim J. Hasenkrug

- 5496 TRPC6 Regulates CXCR2-Mediated Chemotaxis of Murine Neutrophils
Otto Lindemann, Daniel Umlauf, Svetlana Frank, Sandra Schimmelpfennig, Jessica Bertrand, Thomas Pap, Peter J. Hanley, Anke Fabian, Alexander Dietrich, and Albrecht Schwab
- 5506 Regulation of the Expression of GARP/Latent TGF- β 1 Complexes on Mouse T Cells and Their Role in Regulatory T Cell and Th17 Differentiation
Justin P. Edwards, Hodaka Fujii, Angela X. Zhou, John Creemers, Derya Unutmaz, and Ethan M. Shevach
- 5516 OX40L/Jagged1 Cosignaling by GM-CSF-Induced Bone Marrow-Derived Dendritic Cells Is Required for the Expansion of Functional Regulatory T Cells
Anupama Gopisetty, Palash Bhattacharya, Christine Haddad, Joseph C. Bruno, Jr., Chenthamarakshan Vasu, Lucio Miele, and Bellur S. Prabhakar
- 5526 Galectin 1 Modulates Plasma Cell Homeostasis and Regulates the Humoral Immune Response
Adrienne Anginot, Marion Espeli, Lionel Chasson, Stéphane J. C. Mancini, and Claudine Schiff
- 5534 Mast Cell-deficient *Ki^{W-sh}* “Sash” Mutant Mice Display Aberrant Myelopoiesis Leading to the Accumulation of Splenocytes That Act as Myeloid-Derived Suppressor Cells
Anastasija Michel, Andrea Schüler, Pamela Friedrich, Fatma Döner, Tobias Bopp, Markus Radsak, Markus Hoffmann, Manfred Relle, Ute Distler, Jörg Kuharev, Stefan Tenzer, Thorsten B. Feyerabend, Hans-Reimer Rodewald, Hansjörg Schild, Edgar Schmitt, Marc Becker, and Michael Stassen

IMMUNE SYSTEM DEVELOPMENT

- 5545 SWAP-70 Restricts Spontaneous Maturation of Dendritic Cells
Carlos Ocaña-Morgner, Anne Götz, Christine Wahren, and Rolf Jessberger
- 5559 Regulation of V_H Replacement by B Cell Receptor-Mediated Signaling in Human Immature B Cells
Jing Liu, Miles D. Lange, Sang Yong Hong, Wanqin Xie, Kerui Xu, Lin Huang, Yangsheng Yu, Götz R. A. Ehrhardt, Michael Zemlin, Peter D. Burrows, Kaihong Su, Robert H. Carter, and Zhixin Zhang

IMMUNOGENETICS

- 5567 The Restricted D_H Gene Reading Frame Usage in the Expressed Human Antibody Repertoire Is Selected Based upon its Amino Acid Content
Jennifer Benichou, Jacob Glanville, Eline T. Luning Prak, Roy Azran, Tracy C. Kuo, Jaume Pons, Cindy Desmarais, Lea Tsaban, and Yoram Louzoun
- 5578 Genome-wide Analysis of Immune System Genes by Expressed Sequence Tag Profiling
Cosmas C. Giallourakis, Yair Benita, Benoit Molinie, Zhifang Cao, Orion Despo, Henry E. Pratt, Lawrence R. Zukerberg, Mark J. Daly, John D. Rioux, and Rannik J. Xavier

IMMUNOTHERAPY AND VACCINES

- 5588 Targeting of Antigens to B Lymphocytes via CD19 as a Means for Tumor Vaccine Development
Yunfeng Ma, Dong Xiang, Jinwen Sun, Chuanlin Ding, Min Liu, Xiaoling Hu, Guoxin Li, Goetz Kloecker, Huang-ge Zhang, and Jun Yan
- 5600 Catecholamine-Induced β 2-Adrenergic Receptor Activation Mediates Desensitization of Gastric Cancer Cells to Trastuzumab by Upregulating MUC4 Expression
Ming Shi, Zhengyan Yang, Meiru Hu, Dan Liu, Yabin Hu, Lu Qian, Wei Zhang, Hongyu Chen, Liang Guo, Ming Yu, Lun Song, Yuanfang Ma, and Ning Guo
- 5609 Invariant NKT Cells Induce Plasmacytoid Dendritic Cell (DC) Cross-Talk with Conventional DCs for Efficient Memory CD8⁺ T Cell Induction
Kanako Shimizu, Miki Asakura, Jun Shinga, Yusuke Sato, Shuji Kitahara, Katsuaki Hoshino, Tsuneyasu Kaisho, Stephen P. Schoenberger, Taichi Ezaki, and Shin-ichiro Fujii
- 5620 Programmed Death Receptor-1/Programmed Death Receptor Ligand-1 Blockade after Transient Lymphodepletion To Treat Myeloma
Tyce J. Kearn, Weiqing Jing, Jill A. Gershan, and Bryon D. Johnson

INFECTIOUS DISEASE AND HOST RESPONSE

- 5629 *Aspergillus fumigatus*-Induced IL-22 Is Not Restricted to a Specific Th Cell Subset and Is Dependent on Complement Receptor 3
Mark S. Gresnigt, Katharina L. Becker, Sanne P. Smeekens, Cor W. M. Jacobs, Leo A. B. Joosten, Jos W. M. van der Meer, Mihai G. Netea, and Frank L. van de Veerdonk
- 5640 The Scavenger Receptor CD36 Downmodulates the Early Inflammatory Response while Enhancing Bacterial Phagocytosis during Pneumococcal Pneumonia
Omar Sharif, Ulrich Matt, Simona Saluzzo, Karin Lakovits, Isabella Haslinger, Tanja Furtner, Bianca Doninger, and Sylvia Knapp
- 5649 Mammalian Target of Rapamycin Regulates IL-10 and Resistance to *Pseudomonas aeruginosa* Corneal Infection
Megan E. B. Foldenauer, Sharon A. McClellan, Elizabeth A. Berger, and Linda D. Hazlett
- 5659 Human Fc γ RII Cytoplasmic Domains Differentially Influence Antibody-Mediated Dengue Virus Infection
Kobporn Boonnak, Bonnie M. Slike, Gina C. Donofrio, and Mary A. Marovich
- 5666 IL-33 Induces Neutrophils and Modulates Liver Injury in Viral Hepatitis
Yuejin Liang, Zuliang Jie, Lifei Hou, Renan Aguilar-Valenzuela, David Vu, Lynn Soong, and Jiaren Sun

INNATE IMMUNITY AND INFLAMMATION

- 5676 Loss of TLR2 Worsens Spontaneous Colitis in MDR1A Deficiency through Commensally Induced Pyroptosis
Birgit Ey, Annette Eyking, Magdalena Klepak, Nita H. Salzman, Joachim R. Göthert, Michael Rünzi, Kurt W. Schmid, Guido Gerken, Daniel K. Podolsky, and Elke Cario
- 5689 Anti-Inflammatory Mechanisms of the Annexin A1 Protein and Its Mimetic Peptide Ac2-26 in Models of Ocular Inflammation In Vivo and In Vitro
Ana P. Girol, Kallyne K. O. Mimura, Carine C. Drewes, Simone M. Bolonheis, Egle Solito, Sandra H. P. Farsky, Cristiane D. Gil, and Sonia M. Oliani
- 5702 Critical Role of AZI2 in GM-CSF-Induced Dendritic Cell Differentiation
Masahiro Fukasaka, Daisuke Ori, Tatsukata Kawagoe, Satoshi Uematsu, Kenta Maruyama, Toshihiko Okazaki, Tatsuya Kozaki, Tomoko Imamura, Sarang Tartey, Takashi Mino, Takashi Satoh, Shizuo Akira, and Osamu Takeuchi
- 5712 Rational Engineering of a Minimized Immune Inhibitor with Unique Triple-Targeting Properties
Christoph Q. Schmidt, Hongjun Bai, Zhuoer Lin, Antonio M. Risitano, Paul N. Barlow, Daniel Ricklin, and John D. Lambris
- 5722 Cord Factor and Peptidoglycan Recapitulate the Th17-Promoting Adjuvant Activity of Mycobacteria through Mincle/CARD9 Signaling and the Inflammasome
Kevin Shenderov, Daniel L. Barber, Katrin D. Mayer-Barber, Sudagar S. Gurcha, Dragana Jankovic, Carl G. Feng, Sandy Oland, Sara Hieny, Pat Caspar, Sho Yamasaki, Xin Lin, Jenny P. -Y. Ting, Giorgio Trinchieri, Gurdyal S. Besra, Vincenzo Cerundolo, and Alan Sher
- 5731 TGF- β 1 Limits the Onset of Innate Lung Inflammation by Promoting Mast Cell-Derived IL-6
Kirthana Ganeshan, Laura K. Johnston, and Paul J. Bryce

MOLECULAR AND STRUCTURAL IMMUNOLOGY

- 5739 Human Fc Receptor-Like 5 Binds Intact IgG via Mechanisms Distinct from Those of Fc Receptors
Andrea Franco, Bazarragchaa Damdinsuren, Tomoko Ise, Jessica Dement-Brown, Huifang Li, Satoshi Nagata, and Mate Tolnay
- 5747 Different GATA Factors Dictate *CCR3* Transcription in Allergic Inflammatory Cells in a Cell Type-Specific Manner
Su-Kang Kong, Byung Soo Kim, Tae Gi Uhm, Wonyong Lee, Gap Ryol Lee, Choon-Sik Park, Chul-Hoon Lee, and Il Yup Chung

5757 Hierarchy of CD4 T Cell Epitopes of the ANRS Lipo5 Synthetic Vaccine Relies on the Frequencies of Pre-Existing Peptide-Specific T Cells in Healthy Donors
Florence Anne Castelli, Natacha Szely, Alexis Olivain, Nicoletta Casartelli, Caroline Grygar, Aurélie Schneider, Aurore Besse, Yves Levy, Olivier Schwartz, and Bernard Maillère

5764 Lysine 313 of T-box Is Crucial for Modulation of Protein Stability, DNA Binding, and Threonine Phosphorylation of T-bet
Eun Jung Jang, Hye Ryeon Park, Jeong-Ho Hong, and Eun Sook Hwang

5771 Igs Expressed by Chronic Lymphocytic Leukemia B Cells Show Limited Binding-Site Structure Variability
Paolo Marcatili, Fabio Ghiotto, Claudya Tenca, Anna Chailyan, Andrea N. Mazzarello, Xiao-Jie Yan, Monica Colombo, Emilia Albesiano, Davide Bagnara, Giovanna Cutrona, Fortunato Morabito, Silvia Bruno, Manlio Ferrarini, Nicholas Chiorazzi, Anna Tramontano, and Franco Fais

MUCOSAL IMMUNOLOGY

5779 SerpinB2 Is Critical to Th2 Immunity against Enteric Nematode Infection
Aiping Zhao, Zhonghan Yang, Rex Sun, Viktoriya Grinchuk, Sarah Netzel-Arnett, Ian E. Anglin, Kathryn Hodge Driesbaugh, Luigi Notari, Jennifer A. Bohl, Kathleen B. Madden, Joseph F. Urban, Jr., Toni M. Antalis, and Terez Shea-Donohue

5788 Homeostatic Proliferation of Naive CD4⁺ T Cells in Mesenteric Lymph Nodes Generates Gut-Tropic Th17 Cells
Takeshi Kawabe, Shu-lan Sun, Tsuyoshi Fujita, Satoshi Yamaki, Atsuko Asao, Takeshi Takahashi, Takanori So, and Naoto Ishii

5799 Role of IL-22- and TNF- α -Producing Th22 Cells in Uveitis Patients with Behçet's Disease
Sunao Sugita, Yuko Kawazoe, Ayano Imai, Tatsushi Kawaguchi, Shintaro Horie, Hiroshi Keino, Masayo Takahashi, and Manabu Mochizuki

TRANSPLANTATION

5809 Prostaglandin E₂-Induced Changes in Alveolar Macrophage Scavenger Receptor Profiles Differentially Alter Phagocytosis of *Pseudomonas aeruginosa* and *Staphylococcus aureus* Post-Bone Marrow Transplant
Racquel Domingo-Gonzalez, Samuel Katz, C. Henrique Serezani, Thomas A. Moore, Ann Marie LeVine, and Bethany B. Moore

5818 T Cell-Specific Notch Inhibition Blocks Graft-versus-Host Disease by Inducing a Hyporesponsive Program in Alloreactive CD4⁺ and CD8⁺ T Cells
Ashley R. Sandy, Jooho Chung, Tomomi Toubai, Gloria T. Shan, Ivy T. Tran, Ann Friedman, Timothy S. Blackwell, Pavan Reddy, Philip D. King, and Ivan Maillard

5829 Copresentation of Intact and Processed MHC Alloantigen by Recipient Dendritic Cells Enables Delivery of Linked Help to Alloreactive CD8 T Cells by Indirect-Pathway CD4 T Cells
Siva Sivaganesb, Simon J. Harper, Thomas M. Conlon, Chris J. Callaghan, Kourosh Saeb-Parsy, Margaret C. Negus, Reza Motallebzadeh, Eleanor M. Bolton, J. Andrew Bradley, and Gavin J. Pettigrew

TUMOR IMMUNOLOGY

5839 Induction of Protective Antitumor Immunity through Attenuation of ERAAP Function
Edward James, Ian Bailey, Gessa Sugiyarto, and Tim Elliott

5847 Multiplex B Cell Characterization in Blood, Lymph Nodes, and Tumors from Patients with Malignancies
A. Ali Zirakzadeh, Per Marits, Amir Sherif, and Ola Winqvist

5856 Imprinting of Lymphocytes with Melanoma Antigens Acquired by Trophocytosis Facilitates Identification of Tumor-Reactive T Cells
Galit Eisenberg, Ronny Uzana, Aviad Pato, Shoshana Frankenburg, Sharon Merims, Eitan Yefenof, Soldano Ferrone, Tamar Peretz, Arthur Machlenkin, and Michal Lotem

- 5866 Local Administration of TLR Ligands Rescues the Function of Tumor-Infiltrating CD8 T Cells and Enhances the Antitumor Effect of Lentivector Immunization
Haiyan Xiao, Yibing Peng, Yuan Hong, Lei Huang, Z. Sheng Guo, David L. Bartlett, Ning Fu, David H. Munn, Andrew Mellor, and Yukai He
- 5874 Radiation-Induced Equilibrium Is a Balance between Tumor Cell Proliferation and T Cell–Mediated Killing
Hua Liang, Liufu Deng, Steven Chmura, Byron Burnette, Nicole Liadis, Thomas Darga, Michael A. Beckett, Mark W. Lingen, MaryEllyn Witt, Ralph R. Weichselbaum, and Yang-Xin Fu
- 5882 IL-6 Cooperates with G-CSF To Induce Protumor Function of Neutrophils in Bone Marrow by Enhancing STAT3 Activation
Bin Yan, Jing-Jing Wei, Ye Yuan, Rui Sun, Dong Li, Jing Luo, Sheng-Jun Liao, Yuan-Hong Zhou, Yu Shu, Qi Wang, Gui-Mei Zhang, and Zuo-Hua Feng
- 5894 Increased Th17 Cells in the Tumor Microenvironment Is Mediated by IL-23 via Tumor-Secreted Prostaglandin E₂
Xuesong Qian, Ling Gu, Huan Ning, Yanping Zhang, Eddy C. Hsueh, Mingui Fu, Xiaoyu Hu, Lin Wei, Daniel F. Hoff, and Jianguo Liu
- 5903 **AUTHOR INDEX**