

INFECTION AND IMMUNITY

Volume 76

December 2008

No. 12

SPOTLIGHT

Articles of Significant Interest Selected from This Issue by
the Editors

5437

MOLECULAR PATHOGENESIS

Identification of Concomitant Infection with *Chlamydia trachomatis* IncA-Negative Mutant and Wild-Type Strains by Genomic, Transcriptional, and Biological Characterizations

Robert J. Suchland, Brendan M. Jeffrey, Minsheng Xia, Ajay Bhatia, Hencelyn G. Chu, Daniel D. Rockey, and Walter E. Stamm 5438–5446

A Type IV Secretion System Contributes to Intracellular Survival and Replication of *Burkholderia cenocepacia*

S. Umadevi Sajjan, Lisa A. Carmody, Carlos F. Gonzalez, and John J. LiPuma 5447–5455

Regulatory T Cells Are Locally Induced during Intravaginal Infection of Mice with *Neisseria gonorrhoeae*

Mónica Imarai, Enzo Candia, Carolina Rodriguez-Tirado, Javier Tognarelli, Mirka Pardo, Tomas Pérez, Daniel Valdés, Sebastián Reyes-Cerpa, Pablo Nelson, Claudio Acuna-Castillo, and Kevin Maisey 5456–5465

Bacteriophage 2851 Is a Prototype Phage for Dissemination of the Shiga Toxin Variant Gene 2c in *Escherichia coli* O157:H7

Eckhard Strauch, Jens Andre Hammerl, Antje Konietzny, Susanne Schneider-Bekel, Walter Arnold, Alexander Goesmann, Alfred Pühler, and Lothar Beutin 5466–5477

Functional Characterization of AasP, a Maturation Protease Autotransporter Protein of *Actinobacillus pleuropneumoniae*

Tehmeena Ali, Neil J. Oldfield, Karl G. Wooldridge, David P. Turner, and Dlawer A. A. Ala'Aldeen 5608–5614

More than One Tandem Repeat Domain of the Extracellular Adherence Protein of *Staphylococcus aureus* Is Required for Aggregation, Adherence, and Host Cell Invasion but Not for Leukocyte Activation

Muzaffar Hussain, Axana Haggar, Georg Peters, Gursharan S. Chhatwal, Mathias Herrmann, Jan-Ingmar Flock, and Bhanu Sinha 5615–5623

A Conserved C-Terminal 13-Amino-Acid Motif of Gap1 Is Required for Gap1 Function and Necessary for the Biogenesis of a Serine-Rich Glycoprotein of *Streptococcus parasanguinis*

Meixian Zhou, Zhixiang Peng, Paula Fives-Taylor, and Hui Wu 5624–5631

Recombination-Based In Vivo Expression Technology Identifies *Helicobacter pylori* Genes Important for Host Colonization

Andrea R. Castillo, Andrew J. Woodruff, Lynn E. Connolly, William E. Sause, and Karen M. Ottemann 5632–5644

MgrA Represses Biofilm Formation in *Staphylococcus aureus*

María Pilar Trotonda, Sandeep Tamber, Guido Memmi, and Ambrose L. Cheung 5645–5654

Characterization of Two *Campylobacter jejuni* Strains for Use in Volunteer Experimental-Infection Studies

Frédéric Poly, Timothy D. Read, Yu-Han Chen, Mario A. Monteiro, Oralak Serichantalergs, Piyarat Pootong, Ladaporn Bodhidatta, Carl J. Mason, David Rockabrand, Shahida Baqar, Chad K. Porter, David Tribble, Michael Darsley, and Patricia Guerry 5655–5667

Continued on following page

An AraC-Type Transcriptional Regulator Encoded on the <i>Enterococcus faecalis</i> Pathogenicity Island Contributes to Pathogenesis and Intracellular Macrophage Survival	Phillip S. Coburn, Arto S. Baghdayan, GT Dolan, and Nathan Shankar	5668–5676
Mutation of Two <i>Mycoplasma arthritidis</i> Surface Lipoproteins with Divergent Functions in Cytadherence	Daniel W. Bird, Kelly Graber, Allison Knutson, and Leigh R. Washburn	5768–5776
Targeted Mutagenesis in Pathogenic <i>Leptospira</i> Species: Disruption of the LigB Gene Does Not Affect Virulence in Animal Models of Leptospirosis	Julio Croda, Claudio Pereira Figueira, Elsie A. Wunder, Jr., Cleiton S. Santos, Mitermayer G. Reis, Albert I. Ko, and Mathieu Picardeau	5826–5833
CELLULAR MICROBIOLOGY: PATHOGEN-HOST CELL MOLECULAR INTERACTIONS		
Evidence for Pore Formation in Host Cell Membranes by ESX-1-Secreted ESAT-6 and Its Role in <i>Mycobacterium marinum</i> Escape from the Vacuole	Jennifer Smith, Joanna Manoranjan, Miao Pan, Amro Bohsali, Junjie Xu, Jun Liu, Kent L. McDonald, Agnieszka Szyk, Nicole LaRonde-LeBlanc, and Lian-Yong Gao	5478–5487
The Early Phagosomal Stage of <i>Francisella tularensis</i> Determines Optimal Phagosomal Escape and <i>Francisella</i> Pathogenicity Island Protein Expression	Audrey Chong, Tara D. Wehrly, Vinod Nair, Elizabeth R. Fischer, Jeffrey R. Barker, Karl E. Klose, and Jean Celli	5488–5499
Evidence that Membrane Rafts Are Not Required for the Action of <i>Clostridium perfringens</i> Enterotoxin	Justin A. Caserta, Martha L. Hale, Michel R. Popoff, Bradley G. Stiles, and Bruce A. McClane	5677–5685
<i>Schistosoma mansoni</i> Egg Antigen-Mediated Modulation of Toll-Like Receptor (TLR)-Induced Activation Occurs Independently of TLR2, TLR4, and MyD88	Colleen M. Kane, Euihye Jung, and Edward J. Pearce	5754–5759
Modification of Lipooligosaccharide with Phosphoethanolamine by LptA in <i>Neisseria meningitidis</i> Enhances Meningococcal Adhesion to Human Endothelial and Epithelial Cells	Hideyuki Takahashi, Russel W. Carlson, Artur Muszynski, Biswa Choudhury, Kwang Sik Kim, David S. Stephens, and Haruo Watanabe	5777–5789
The <i>Toxoplasma gondii</i> Dense Granule Protein GRA7 Is Phosphorylated upon Invasion and Forms an Unexpected Association with the Rhoptry Proteins ROP2 and ROP4	Joe Dan Dunn, Sandeep Ravindran, Seon-Kyeong Kim, and John C. Boothroyd	5853–5861
BACTERIAL INFECTIONS		
Adenoviral Delivery of Interleukin-10 Fails To Attenuate Experimental Lyme Disease	Charles R. Brown, Annie Y.-C. Lai, Steven T. Callen, Victoria A. Blaho, Jennifer M. Hughes, and William J. Mitchell	5500–5507
Pathogenic Potential of Emergent Sorbitol-Fermenting <i>Escherichia coli</i> O157:NM	Tracy Rosser, Tracy Dransfield, Lesley Allison, Mary Hanson, Nicola Holden, Judith Evans, Stuart Naylor, Roberto La Ragione, J. Christopher Low, and David L. Gally	5598–5607
Mechanisms of T-Lymphocyte Accumulation during Experimental Pleural Infection Induced by <i>Mycobacterium bovis</i> BCG	Mariana C. Souza, Carmen Penido, Maria F. S. Costa, and Maria Graças Henriques	5686–5693
<i>Borrelia burgdorferi</i> Lacking DbpBA Exhibits an Early Survival Defect during Experimental Infection	Eric H. Weening, Nikhat Parveen, Jerome P. Trzeciakowski, John M. Leong, Magnus Höök, and Jonathan T. Skare	5694–5705

Uropathogenic <i>Escherichia coli</i> CFT073 Is Adapted to Acetogenic Growth but Does Not Require Acetate during Murine Urinary Tract Infection	Andrew T. Anfora, David K. Halladin, Brian J. Haugen, and Rodney A. Welch	5760–5767
Identification of a Surrogate Marker for Infection in the African Green Monkey Model of Inhalation Anthrax	Cynthia A. Rossi, Melanie Ulrich, Sarah Norris, Douglas S. Reed, Louise M. Pitt, and Elizabeth K. Leffel	5790–5801
HOST RESPONSE AND INFLAMMATION		
Relapsing Fever Borreliosis in Interleukin-10-Deficient Mice	Diana Londoño, Adriana Marques, Ronald L. Hornung, and Diego Cadavid	5508–5513
<i>Porphyromonas gingivalis</i>, Gamma Interferon, and a Proapoptotic Fibronectin Matrix Form a Synergistic Trio That Induces c-Jun N-Terminal Kinase 1-Mediated Nitric Oxide Generation and Cell Death	Abhijit Ghosh, Ji Young Park, Christopher Fenno, and Yvonne L. Kapila	5514–5523
<i>Vibrio cholerae</i> Flagellins Induce Toll-Like Receptor 5-Mediated Interleukin-8 Production through Mitogen-Activated Protein Kinase and NF-κB Activation	Lisa M. Harrison, Prasad Rallabhandi, Jane Michalski, Xin Zhou, Susan R. Steyert, Stefanie N. Vogel, and James B. Kaper	5524–5534
Platelet Antistaphylococcal Responses Occur through P2X₁ and P2Y₁₂ Receptor-Induced Activation and Kinocidin Release	Darin A. Trier, Kimberly D. Gank, Deborah Kupferwasser, Nannette Y. Yount, William J. French, Alan D. Michelson, Leon I. Kupferwasser, Yan Q. Xiong, Arnold S. Bayer, and Michael R. Yeaman	5706–5713
Human α- and β-Defensins Bind to Immobilized Adhesins from <i>Porphyromonas gingivalis</i>	Deborah E. Dietrich, Xiangjun Xiao, Deborah V. Dawson, Myriam Bélanger, Hua Xie, Ann Progulsk-Fox, and Kim A. Brogden	5714–5720
Cytotoxic-T-Lymphocyte-Associated Antigen 4 Blockade Abrogates Protection by Regulatory T Cells in a Mouse Model of Microbially Induced Innate Immune-Driven Colitis	Koichiro Watanabe, Varada P. Rao, Theofilos Poutahidis, Barry H. Rickman, Masahiro Ohtani, Shilu Xu, Arlin B. Rogers, Zhongming Ge, Bruce H. Horwitz, Toshio Fujioka, Susan E. Erdman, and James G. Fox	5834–5842
Infected-Host-Cell Repertoire and Cellular Response in the Lung following Inhalation of <i>Francisella tularensis</i> Schu S4, LVS, or U112	Joshua D. Hall, Matthew D. Woolard, Bronwyn M. Gunn, Robin R. Craven, Sharon Taft-Benz, Jeffrey A. Frelinger, and Thomas H. Kawula	5843–5852
<i>Staphylococcus aureus</i> Elicits Marked Alterations in the Airway Proteome during Early Pneumonia	Christy L. Ventura, Roger Higdon, Laura Hohmann, Daniel Martin, Eugene Kolker, H. Denny Liggitt, Shawn J. Skerrett, and Craig E. Rubens	5862–5872
Experimental Malaria Infection Triggers Early Expansion of Natural Killer Cells	Charles C. Kim, Sunil Parikh, Joseph C. Sun, Alissa Myrick, Lewis L. Lanier, Philip J. Rosenthal, and Joseph L. DeRisi	5873–5882
Isolation, Synthesis, and Antimicrobial Activities of Naturally Occurring θ-Defensin Isoforms from Baboon Leukocytes	Angie E. Garcia, George Ösapay, Patti A. Tran, Jun Yuan, and Michael E. Selsted	5883–5891

FUNGAL AND PARASITIC INFECTIONS

Interleukin-4-Promoted T Helper 2 Responses Enhance *Nippostrongylus brasiliensis*-Induced Pulmonary Pathology

Helen Mearns, William G. C. Horsnell, J. Claire Hoving, Benjamin Dewals, Antony J. Cutler, Frank Kirstein, Elmarie Myburgh, Berenice Arendse, and Frank Brombacher 5535–5542

***Trypanosoma cruzi* Infection Is Enhanced by Vector Saliva through Immunosuppressant Mechanisms Mediated by Lysophosphatidylcholine**

Rafael D. Mesquita, Alan Brito Carneiro, André Bafica, Felipe Gazos-Lopes, Christina M. Takiya, Thaís Souto-Padron, Danielle P. Vieira, Antônio Ferreira-Pereira, Igor C. Almeida, Rodrigo T. Figueiredo, Bárbara N. Porto, Marcelo T. Bozza, Aurélio V. Graça-Souza, Angela H. C. S. Lopes, Geórgia C. Atella, and Mário A. C. Silva-Neto 5543–5552

Vaccine-Induced Cellular Immune Responses Differ from Innate Responses in Susceptible and Resistant Strains of Mice Infected with *Coccidioides posadasii*

Lisa F. Shubitz, Sharon M. Dial, Robert Perrill, Rachael Casement, and John N. Galgiani 5553–5564

An In Vivo and In Vitro Model of *Plasmodium falciparum* Rosetting and Autoagglutination Mediated by *varO*, a Group A *var* Gene Encoding a Frequent Serotype

Inès Vigan-Womas, Micheline Guillotte, Cécile Le Scanf, Sébastien Igonet, Stéphane Petres, Alexandre Juillerat, Cyril Badaut, Farida Nato, Achim Schneider, Anne Lavergne, Hugues Contamin, Adama Tall, Laurence Baril, Graham A. Bentley, and Odile Mercereau-Puijalon 5565–5580

Low Prevalence of Antibodies to Preerythrocytic but Not Blood-Stage *Plasmodium falciparum* Antigens in an Area of Unstable Malaria Transmission Compared to Prevalence in an Area of Stable Malaria Transmission

Gregory S. Noland, Brett Hendel-Paterson, Xinan M. Min, Ann M. Moormann, John M. Vulule, David L. Narum, David E. Lanar, James W. Kazura, and Chandy C. John 5721–5728

The *Cryptococcus neoformans* Rho-GDP Dissociation Inhibitor Mediates Intracellular Survival and Virulence

Michael S. Price, Connie B. Nichols, and J. Andrew Alspaugh 5729–5737

Chronic Intestinal Nematode Infection Exacerbates Experimental *Schistosoma mansoni* Infection

Quentin D. Bickle, Julie Solum, and Helena Helmby 5802–5809

Binding of Excreted and/or Secreted Products of Adult Hookworms to Human NK Cells in *Necator americanus*-Infected Individuals from Brazil

Andréa Teixeira-Carvalho, Ricardo T. Fujiwara, Erik J. Stemmy, Denise Olive, Jesse M. Damsker, Alex Loukas, Rodrigo Corrêa-Oliveira, Stephanie L. Constant, and Jeffrey M. Bethony 5810–5816

MICROBIAL IMMUNITY AND VACCINES

Protection of Wild-Type and Severe Combined Immunodeficiency Mice against an Intranasal Challenge by Passive Immunization with Monoclonal Antibodies to the *Chlamydia trachomatis* Mouse Pneumonitis Major Outer Membrane Protein

Sukumar Pal, Jose Bravo, Ellena M. Peterson, and Luis M. de la Maza 5581–5587

Immunization with Recombinant V10 Protects Cynomolgus Macaques from Lethal Pneumonic Plague

Claire A. Cornelius, Lauriane E. Quenee, Katie A. Overheim, Frederick Koster, Trevor L. Brasel, Derek Elli, Nancy A. Ciletti, and Olaf Schneewind 5588–5597

Continued from preceding page

Antibodies to Capsular Polysaccharide and Clumping Factor A Prevent Mastitis and the Emergence of Unencapsulated and Small-Colony Variants of <i>Staphylococcus aureus</i> in Mice	Lorena P. N. Tuchscher, Fernanda R. Buzzola, Lucía P. Alvarez, Jean C. Lee, and Daniel O. Sordelli	5738–5744
Immunogenicity of Recombinant Attenuated <i>Salmonella enterica</i> Serovar Typhimurium Vaccine Strains Carrying a Gene That Encodes <i>Eimeria tenella</i> Antigen SO7	Vjollca Konjufca, Mark Jenkins, Shifeng Wang, Maria Dolores Juarez-Rodriguez, and Roy Curtiss III	5745–5753
Primary Activation of Antigen-Specific Naive CD4⁺ and CD8⁺ T Cells following Intranasal Vaccination with Recombinant Bacteria	Annalisa Ciabattini, Elena Pettini, Peter Andersen, Gianni Pozzi, and Donata Medaglini	5817–5825
ERRATUM		
D-Alanylation of Lipoteichoic Acid Contributes to the Virulence of <i>Streptococcus suis</i>	Nahuel Fittipaldi, Tsutomu Sekizaki, Daisuke Takamatsu, Josée Harel, María de la Cruz Domínguez-Punaro, Sonja Von Aulock, Christian Draing, Corinne Marois, Marylène Kobisch, and Marcelo Gottschalk	5892–5893

Cover photograph (Copyright © 2008, American Society for Microbiology. All Rights Reserved.): Immunofluorescence microscopy of epithelial cells infected in vitro with a clinical isolate of *Chlamydia trachomatis* (red), showing a mixture of an IncA-positive strain and an IncA-negative strain of the organism. IncA (green) is localized to the inclusion membrane within *C. trachomatis*-infected cells and also is found in fibers extending away from the inclusion and over the nucleus (blue) to empty vacuoles, termed secondary inclusions. Some individuals are concomitantly infected with nearly isogenic *C. trachomatis* strains that differ in the production of IncA. (Image assembled by B. Suchland and D. Rockey.) (See related article on page 5438.)