



**National Jewish
Health**[®]

Science Transforming Life[®]

**BEST
HOSPITALS**

& WORLD REPORT
U.S. News

**NATIONAL
PULMONOLOGY
2015-16**

National Jewish Health PULMONARY HIGHLIGHTS 2015

Inside

Clinical Expertise
Frontiers of Pulmonary Science
Leadership





Inside

2-3 Clinical Expertise

4-5 Clinical Research

**6-7 Frontiers of
Pulmonary Science**

8-9 Education

10-11 Faculty Leadership

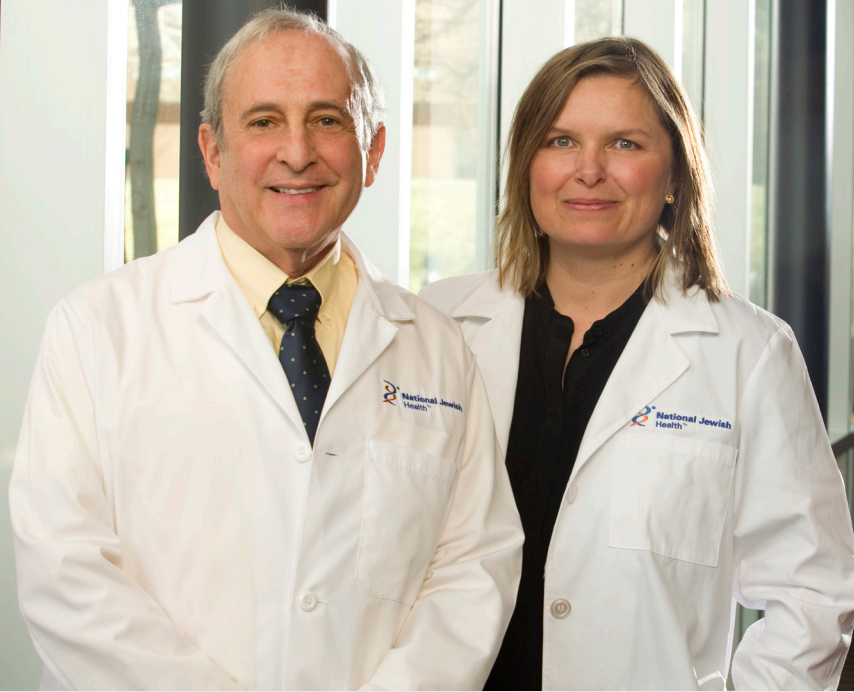
12-15 Selected 2015 Publications

How to reach us?

Call our Physician Line.

800.652.9555

Or learn more at njhealth.org.



Dear Colleague,

For more than 117 years, physicians, scientists and staff at National Jewish Health have focused on patients with respiratory disease. Based in Colorado, we recently opened the Mount Sinai – National Jewish Health Respiratory Institute in New York City in partnership with the Icahn School of Medicine at Mount Sinai.

At National Jewish Health, our team of expert pulmonologists conducts intensive, evaluations in collaboration with cardiologists, gastroenterologists, allergists, oncologists, immunologists and others on the National Jewish Health staff. Once we develop a diagnosis and a treatment plan, we then work with patients' hometown physicians to implement the plan and adjust care as necessary.

Our unparalleled care is backed by a robust research program that ranges from basic discovery to translational and clinical research. Our faculty, outstanding leaders in their fields, also train medical students, residents and postgraduate fellows in affiliation with the University of Colorado School of Medicine. Established physicians learn from our experts at conferences and in continuing medical education.

At National Jewish Health, our intense focus on respiratory disease – in patient care, research and education – positions us as leaders in pulmonary medicine. This publication, "National Jewish Health Pulmonary Highlights 2015," captures the state of pulmonary medicine at National Jewish Health – what we are working on, what we have learned and where we are headed. We hope you will find it informative and relevant to your own practice.

Richard J. Martin, MD
Chair, Department of Medicine
National Jewish Health

Irina Petrache, MD
Chief, Division of Pulmonary,
Critical Care and Sleep Medicine
National Jewish Health

Clinical Expertise

With 117 years of singular attention to respiratory disease, National Jewish Health provides unparalleled care for complex, symptomatic pulmonary patients. In one multi-day stay, patients from around the nation see our expert pulmonary subspecialists and their colleagues in cardiology, gastroenterology, oncology, immunology and radiology for evaluations, diagnoses and treatment plans.

Asthma

Thorough upper and lower airway evaluations in our multi-day adult and pediatric asthma programs help us phenotype patients and tease out complicating factors from aspiration to allergies, vocal cord dysfunction and inhaler technique. Our faculty members lead numerous NIH studies and industry-sponsored clinical trials.

Cardiology

Our cardiologists are experts in the heart-lung interface. They work closely with pulmonologists to diagnose and treat the cardiac causes *and* consequences of lung disease, including pulmonary hypertension, cardiac sarcoidosis and other rare diseases.

COPD

A complete medical and non-medical evaluation allows our team of physicians and therapists to address not only COPD medications, but also education, compliance, nutrition, and rehabilitation. Personalized management plans and education optimize care and quality of life. Our faculty is advancing pulmonary medicine with COPDGene and other studies to diagnose and phenotype COPD.

NTM

Mycobacterial disease is part of our DNA, with our origins as a hospital for destitute tuberculosis patients. The longevity of our program and our experience with thousands of complex mycobacterial infections have given us a deep knowledge of antibiotic regimens and surgical options. In addition to our intensive outpatient program, we provide inpatient care and surgical support through our new collaborative relationship with Saint Joseph Hospital.

Chronic Beryllium Disease

National Jewish Health has more experience with the diagnosis and treatment of beryllium disease than any other group in the world. We emphasize early disease

detection and intervention to halt or slow disease progression. We have published extensively on exposures, genetic factors and immune responses associated with chronic beryllium disease.

Cystic Fibrosis

We have the largest adult cystic fibrosis program in the nation. Our team of pulmonary specialists, nurse coordinators, respiratory therapists, registered dietitians and social workers provides treatment for more than 400 adults. We have more than two dozen ongoing clinical trials to evaluate new cystic fibrosis therapies.

Environmental Health

In step with increasing recognition that environmental pollutants cause disease, our multidisciplinary team has



Clinical Expertise

helped define, diagnose and treat patients with a broad range of occupational, environmental and granulomatous lung diseases. Our thorough evaluations have uncovered previously unknown causes of pulmonary disease.

Interstitial Lung Disease

We have vast experience with interstitial lung disease (ILD). A detailed evaluation, diagnosis and plan of care are based on the most current information about ILD, much of which has been discovered at National Jewish Health. We have ongoing trials of approved and experimental medications. We seek to broaden knowledge of ILD causes and develop new treatments.

Oncology

Expert pulmonologists, thoracic radiologists and gastroenterologists help us diagnose and treat cancers of the lungs, head and neck, and digestive system. Lung cancer screening and our tumor registry help us screen and monitor patients at high risk for lung cancer.

Pediatrics

For decades we have helped shape the evolving knowledge about diagnosis and treatment of asthma, vocal cord dysfunction, and other pediatric pulmonary diseases. Our Severe Asthma Clinic and Pediatric Day Program offer multi-day medical and psychological evaluations, education and management plans for children with pulmonary and atopic diseases.

Sarcoidosis

Support from our expert cardiologists, neurologists and network of providers positions National Jewish Health to address the multi-organ nature of sarcoidosis. Our experience with thousands of sarcoidosis patients has helped us better define the disease and gain insight into its causes.

Diagnostic Laboratories

The Advanced Diagnostic Laboratories have CAP15189 accreditation and decades of experience developing immunology, complement, infectious disease and molecular diagnostic tests. We help clients select, customize and interpret laboratory tests from around the world.

Pulmonary Physiology Services

Our state-of-the-art laboratory offers many unique tests, including exercise-induced bronchoconstriction; cardiopulmonary exercise test with full metabolic testing, arterial line, lactate levels, and cardiac data; and continuous laryngoscopy with exercise tolerance.

Interventional Pulmonology

Our minimally invasive diagnostic, therapeutic and palliative procedures include identification, diagnosis and treatment of pulmonary nodules; early detection of lung cancer; diagnosis and treatment of airway obstructions; pleural procedures; implantation and removal of airway stents and bronchial thermoplasty.

MOUNT SINAI – NATIONAL JEWISH HEALTH RESPIRATORY INSTITUTE

The Icahn School of Medicine at Mount Sinai, a leading academic medical center in New York City, and National Jewish Health have partnered to create the **Mount Sinai – National Jewish Health Respiratory Institute** in New York City. The Respiratory Institute brings together leading experts in diagnosing and treating respiratory disease and offers a model for multidisciplinary, personalized care for patients with respiratory disease.

MOUNT SINAI - NATIONAL JEWISH HEALTH

Respiratory Institute



Clinical Research

National Jewish Health is constantly searching for new, more effective treatments and medications for our patients and patients around the world. Today, we have more than **300 active clinical trials** that offer cutting-edge, experimental treatments for a wide range of respiratory and related diseases. We collaborate with the National Institutes of Health, industry and leading research institutions across the nation as members of numerous research networks and consortiums.

SELECTED 2015 CLINICAL RESEARCH RESULTS

Tiotropium a Reasonable Alternative to LABAs in Asthma

Tiotropium, an anti-cholinergic recently approved for use in asthma, offers a potential alternative to long-acting beta agonists (LABAs), whose safety, especially in African Americans, has been under a cloud of suspicion for several years. **Michael Wechsler, MD**, and his colleagues reported that tiotropium and various LABAs used for up to 18 months performed similarly in 1,107 black adults with asthma for time to first exacerbation, change in FEV1 and various patient-reported outcomes. The tiotropium group did suffer more hospitalizations (19) than the LABA group (10). However, due to study design, that difference was not considered statistically significant. **JAMA 2015:314(16)**

Normal Spirometry, Undiagnosed Lung Disease

More than half of long-term smokers and ex-smokers considered disease-free, based on spirometry results, have respiratory-related impairments when evaluated with imaging, functional and quality-of-life tests.

Elizabeth A. Regan, MD, James D. Crapo, MD, and their colleagues

evaluated 8,872 people ages 45 to 80 with at least a 10 pack-year history, about half of whom were considered disease-free. When the researchers considered other criteria, they found that 55 percent of the disease-free study participants had some form of respiratory related impairment. CT scans found emphysema or airway thickening in 42 percent of the disease-free participants. Twenty-three percent had significant shortness of breath compared to 3.7 percent of never smokers. Fifteen percent walked less than 350 meters in six minutes, compared to 4 percent of never smokers. Twenty-five percent had clinically significant reductions in quality of life. **JAMA Intern Med. 2015:175(9)**

Sildenafil for Cystic Fibrosis

Excessive neutrophil-mediated inflammation contributes significantly to the progression of cystic fibrosis. Anti-inflammatory agents such as oral corticosteroids and high-dose ibuprofen have been shown to have benefit, but are associated with significant side effects that limit their use.

Phosphodiesterase inhibitors, such as sildenafil (Viagra®), have been shown to have inflammatory activity. They also may potentiate potential CFTR-mediated chloride transport in respiratory and digestive tissues. **Jennifer Taylor-Cousar, MD, Jerry Nick, MD**, and their colleagues reported that 20 mild to moderate cystic fibrosis patients tolerated oral sildenafil 3 times a day with generally mild side effects and no drug-related serious adverse events. Cystic fibrosis patients eliminated sildenafil more rapidly than healthy subjects did. Sputum neutrophil elastase activity, a surrogate biomarker response to therapy, was also reduced. Sildenafil warrants further study as an anti-inflammatory in cystic fibrosis. **J Cyst Fibros 2015:14(2)**.

For additional research publications, see page 12.

Clinical Research

SELECTED OPEN CLINICAL TRIALS

COPD

PI: James Crapo, MD

COPDGene – Genetic Epidemiology of COPD.

PI: Barry Make, MD

Prostaglandin Inhibition for Emphysema (Pie)

Asthma

PI: Richard Martin, MD

Identification of Molecular Biomarkers to Stratify Patients with Refractory Asthma

Airway and Gut Microbiome in Allergy and Asthma: Relationships to Immune and Clinical Phenotype.

PI: Kendra Hammond, MD

A Prospective Observational Study of Biopredictors of Bronchial Thermoplasty Response in Patients with Severe Refractory Asthma

Interstitial Lung Disease

PI: Kevin K. Brown, MD

Lung Tissue Research Consortium Protocol

PI: Jeff Swigris, DO

Observing the Effects of Supplemental Oxygen on Patients with Pulmonary Fibrosis

Sarcoidosis

PI: Nabeel Hamzeh, MD

Role of TH17 and MCAM Positive Cells in Sarcoidosis

Association of Auto-Antibodies with Extra-Pulmonary Sarcoidosis

Churg Strauss Syndrome

PI: Michael Wechsler, MD

Anti-IL5 and Churg Strauss Syndrome



Cystic Fibrosis

PI: Jerry Nick, MD

Early Intervention in Cystic Fibrosis Exacerbation

Prospective Evaluation of Nontuberculous Mycobacterial Disease in Cystic Fibrosis (Predict) Trial

PI: Milene Saavedra, MD

Ultrasensitive Detection of Reductions in CF Airway Inflammation

Non-Tuberculosis Mycobacterial Disease

PI: Edward Chan, MD

Resistance of Nontuberculous Mycobacteria to the Cathelicidin Antibacterial Peptide

Determining the Phenotype and Genotype that Predisposes to Non-Tuberculous Mycobacterial Lung Disease

Other

PI: Russell Bowler, MD

Colorado Marijuana Users Health Cohort

PI: Evans Fernandez-Perez, MD

Peripheral Blood Mononuclear Cell Gene Expression Profiles in Chronic Hypersensitivity

In the laboratory, scientists at National Jewish Health are advancing the frontiers of pulmonary science. Working closely with physicians, who provide crucial insights and questions from clinical experience, our scientists are delving deeply into the genetics and epigenetics of lung disease, the fundamental mechanisms of lung injury and repair, and the immunological function of the lungs. The answers they find will inspire the therapies of tomorrow.

SELECTED 2015 RESEARCH REPORTS

CRISPR-Cas9 Gene Knockout in Epithelial Cells

Epithelial cells in the lungs serve as the first line of defense against inhaled environmental hazards such as pathogens and pollutants. Knockout of single genes in these cells would allow better analysis of the epithelial response to environmental insults. The powerful CRISPR-Cas9 gene editing technology has been used to edit single genes in transformed, pluripotent and mouse cells, but not human primary epithelial cells.

Max Seibold, PhD, and his colleagues used lentiviral delivery of the CRISPR-Cas9 machinery and modified culture conditions to successfully knock out the MUC18 gene in airway epithelial cells. The knock out indicated that MUC18 contributes to airway inflammation. More significantly, the methods developed by Seibold and colleagues contribute a valuable tool for genetic studies of disease processes.

***Gene Therapy* 2015:20(10)**

Microbiome Study Identifies Biomarker for Steroid Resistance

Corticosteroids are the most commonly prescribed controller medication for millions of asthma patients. However, an estimated 20 percent to 30 percent of asthma patients do not respond to corticosteroids. An effective biomarker for steroid resistance could help identify patients resistant to steroids and avoid ineffective treatments. Studies by **Donald Leung, MD, PhD**, and **Elena Goleva, MD**, of the microbiome and Vitamin D in cells from steroid resistant patients pointed to the inflammatory p38 MAPK pathway as an active participant in the response to steroids. In October 2015, they reported findings identifying activation of the p38 MAPK pathway in peripheral blood monocytes as a promising biomarker for corticosteroid resistance. Patents have been applied for. ***Plos ONE* 2015:10(10)**

Obesity as Risk Factor For Influenza Infection

Human alveolar epithelial cells (AEC) and alveolar macrophages are the first lines of lung defense. **Emily Travanty, PhD, Robert Mason, MD**, and their colleagues reported that alveolar epithelial cells are more susceptible to infection by H1N1 viruses, but that macrophages release higher levels of cytokines. Gender, age and smoking history did not affect susceptibility, but epithelial cells from obese individuals were more susceptible to H1N1 infection. Variants of the H1N1 virus responsible for the 2009 pandemic showed slight differences in infectivity. The variations in infectivity were traced to a single amino acid substitution in the hemagglutinin protein. ***J Virol.* 2015:89(23)**

For additional research publications, see page 12.

Frontiers of Pulmonary Science

NOTEWORTHY ONGOING RESEARCH

PI: Hong W. Chu

IRAK-M in lung defense against rhinovirus infection

PI: Rachel L. Zemans

Mechanisms of alveolar epithelial repair in lung injury

PI: William J. Janssen

Macrophage apoptosis in resolution of acute lung injury

PI: Irina Petrache

Ceramide-induced lung destruction in emphysema

PI: Gregory P. Downey

Targeting PTPalpha to prevent lung fibrosis

PI: Peter M. Henson

Macrophage endocytosis in resolving lung inflammation

PI: Magdalena Gorska

Asthma susceptibility due to environmental programming of innate immunity in utero

PI: Stijn DeLanghe

Role of WNT and FGF signaling in alveolar epithelial regeneration after bleomycin injury

RECENT PATENTS

Methods and Compositions for the Disruption of Biofilms (pat. no. 8,901,167)

Inventors: Jerry Nick, Travis Walker, Scott Worthen

Methods to Determine Susceptibility to Treatment with Leukotriene Modifiers (pat. no. 8,685,740)

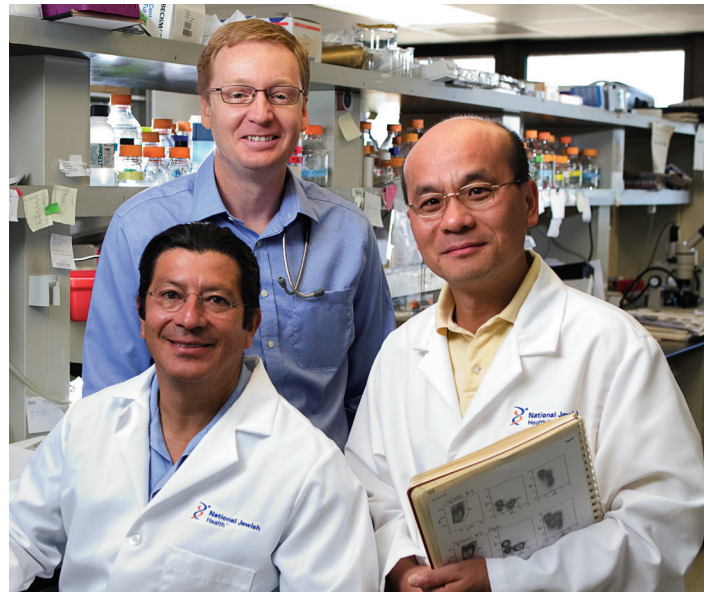
Inventors: Nathan Rabinovitch, Erwin Gelfand

Therapeutic Compositions and Methods for the Prevention of Autoimmune Diseases (pat. no. 8,673,300)

Inventors: George Eisenbarth, Li Zhang, John Kappler, Brian Stadinski

Methods and Compositions for Risk Prediction, Diagnosis, Prognosis and Treatment of Pulmonary Disorders (pat. no. 8,673,565)

Inventors: David Schwartz, Max Seibold



PRECISION MEDICINE AT NATIONAL JEWISH HEALTH

Precision, or personalized, medicine has been a central element of our approach to patient care and research since 2007. We have invested heavily in the tools of precision medicine, from the Institute for Advanced Biomedical Imaging, to the Integrated Bioinformation and Specimen Center, the Center for Genes Environment and Health, the Minimally Invasive Diagnostic Center and Advanced Diagnostic Laboratories.

In the clinic, our thorough evaluations seek to phenotype patients so we can prescribe more effective, targeted therapies. We have developed new tests to predict patients' response to therapy in cystic fibrosis, asthma and other diseases. Genetic testing guides our cancer treatment.

Research such as COPDGene, a genetic epidemiological study we co-lead of 10,000 smokers, seeks to identify new phenotypes that are more amenable to treatment. Researchers are discovering new genetic and epigenetic causes of lung disease. Clinical trials evaluate targeted therapies and identify phenotypes responsive to those medications.

Education

ACADEMIC TRAINING

National Jewish Health physicians and scientists are thought leaders in their fields providing fellowships and training, which serve to elevate the standard of patient care and teach the next generation of health professionals. National Jewish Health is an accredited teaching affiliate of the University of Colorado School of Medicine, where our physicians and scientists have faculty appointments.

Clinical Fellowships

In collaboration with the University of Colorado School of Medicine, National Jewish Health offers several fellowship programs.

Based at National Jewish Health:

- Adult Sleep Medicine
- Pediatric Allergy and Immunology
- Adult Allergy and Immunology
- Mycobacterial Disease

Based at University of Colorado School of Medicine with rotations at National Jewish Health:

- Adult Pulmonary and Critical Care Medicine
- Infectious Disease
- Pediatric Pulmonary Medicine
- Rheumatology
- Cardiothoracic Radiology

In collaboration with the Colorado School of Public Health, National Jewish Health also offers a fellowships in:

- Occupational and Environmental Medicine

Postdoctoral Fellowships

National Jewish Health has a robust discovery and translation research enterprise, placing National Jewish Health in the top 6 percent of institutions funded by the National Institutes of Health. Numerous opportunities exist for postdoctoral training in laboratories in the Department of Biomedical Research, the Division of Cell Biology and the Basic Science Section of the Department of Medicine.

Graduate Education

Students who are enrolled in one of the PhD programs offered by the Graduate School of the University of Colorado Denver, have the opportunity to perform their thesis research in the laboratories of the faculty at National Jewish Health.

Residents and Medical Students

Residents and medical students at the University of Colorado School of Medicine have rotations at National Jewish Health in a variety of specialties including pulmonary medicine, cardiology, allergy and gastroenterology.



CONTINUING MEDICAL EDUCATION

National Jewish Health offers a diverse and robust curriculum for continuing medical education both, live and online. Below are a few of the course offerings.

The 53rd Semi-Annual Denver TB Course April 2016

April 6-9, 2016, National Jewish Health, Denver, CO

The Denver TB Course, offered every year in April and October, provides a broad overview of active and latent TB, including its epidemiology, transmission, pathogenesis, diagnosis, treatment and management. This course presents this body of knowledge to any health care providers who will be responsible for the management and care of patients with tuberculosis.



39th Annual Pulmonary & Allergy Update at Keystone

February 1-4, 2017, Dillon, CO

The Pulmonary and Allergy Update highlights insights and recent advances in pulmonary medicine, asthma, allergy and immunology, presented by faculty from the leading respiratory hospital in the nation. Network with colleagues and nationally recognized experts, and learn the latest updates on management and treatment options for your patients. Workshops and small group sessions provide great opportunities to discuss key issues and interesting cases with colleagues and National Jewish Health faculty.

Online Courses

Asthma: Supraglottic Index Learning Program

Managing COPD: The Evolving Therapeutic Paradigm and Patient Education

Optimizing Cystic Fibrosis Nutrition

Outcomes: A Multidisciplinary Approach to Pancreatic Insufficiency

The Pharmacist's Role in Navigating the Expanding Treatment Armamentarium and Practice-Changing Advances in Cystic Fibrosis

Addressing the Burden of *Clostridium difficile* Infection: A Contemporary Assessment of Strategies for Prevention and Treatment

Idiopathic Pulmonary Fibrosis in Evolution: Proactive Recognition, Early Diagnosis, and an Advancing Standard of Care

Advanced NSCLC Case Round-Up: Emerging Strategies in Personalized Care

For more information about our courses please call 800.844.2305 or visit www.nationaljewish.org/professionals/education/pro-ed/overview.

Faculty Leadership



Richard J. Martin, MD



Debra S. Dyer, MD



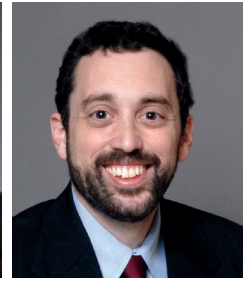
Gregory Downey, MD



Philippa Marrack, PhD



Erwin W. Gelfand, MD



Stephen K. Frankel, MD

DEPARTMENT OF MEDICINE

Richard J. Martin, MD, Chair
Kevin K. Brown, MD,
Vice Chair of Clinical Affairs
Brian J. Day, PhD,
Vice Chair of Research
Jeffrey A. Kern, MD,
Vice Chair of Finance

Division of Pulmonary, Critical Care and Sleep Medicine

Irina Petrache, MD, Chief

Division of Allergy and Clinical Immunology

Rafeul Alam, MD, PhD, Chief

Division of Cardiology

J. Kern Buckner, MD, Chief

Community Research Section

Lisa C. Cicutto, RN, PhD, Head

Division of Environmental and Occupational Health Sciences

Lisa A. Maier, MD, MSPH, Chief

Division of Gastroenterology

Richard J. Martin, MD, Acting Chief

Hospital and Internal Medicine Section

Carrie A. Horn, MD, Head

Division of Mycobacterial and Respiratory Infections

Charles L. Daley, MD, Chief

Michael D. Iseman, MD (Emeritus)

Nephrology/Diabetology Section

Elizabeth F. Owen Kern, MD, MS, Head

Neuropsychology Section

Sarah B. Viamonte, PhD, Head

Division of Oncology, Cancer Center

Jeffrey A. Kern, MD, Chief

Division of Pathology

Steve D. Groshong, MD, PhD, Chief

Critical Care Section

Kenneth Lyn-Kew, MD, Head

Division of Rheumatology

Kevin K. Brown, MD, Acting Chief

DEPARTMENT OF RADIOLOGY

Debra S. Dyer, MD, Chair

DEPARTMENT OF ACADEMIC AFFAIRS

Gregory Downey, MD,
Executive Vice President

Division of Biostatistics and Bioinformatics

Douglas C. Everett, PhD, Head

Center for Genes, Environment and Health

Tasha E. Fingerlin, PhD, Director

DEPARTMENT OF BIOMEDICAL RESEARCH

Philippa Marrack, PhD, Chair

DEPARTMENT OF PEDIATRICS

Erwin W. Gelfand, MD, Chair

Pulmonary

David P. Nichols, MD, Head

Allergy & Clinical Immunology Division

Donald Y. M. Leung, MD, PhD, Head

Ambulatory Pediatrics

Pia J. Hauk, MD, Head

Behavioral Health

Bruce G. Bender, PhD, Head

Cell Biology

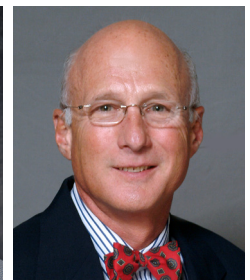
David W.H. Riches PhD, Head

CHIEF MEDICAL OFFICER

Stephen K. Frankel, MD



Rafeul Alam, MD, PhD



J. Kern Buckner, MD

Faculty Leadership



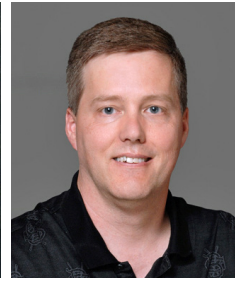
Irina Petrache, MD



Kenneth Lyn-Kew, MD



Kevin K. Brown, MD



Brian J. Day, PhD



Jeffrey A. Kern, MD



Charles L. Daley, MD

DIVISION OF PULMONARY, CRITICAL CARE AND SLEEP MEDICINE

Irina Petrache, MD, Chief

Evgeny Berdyshev, PhD
 David A. Beuther, MD
 Michelle A. Beutz, MD
 Russell P. Bowler, MD, PhD
 Reuben M. Cherniack, MD
 Hong Wei Chu, MD
 Gregory P. Cosgrove, MD
 Gary R. Cott, MD
 Vanessa Craig, MD
 James D. Crapo, MD
 Gregory P. Downey, MD
 Evans Fernandez-Perez, MD, MS
 James J. Fenton, MD
 Stephen K. Frankel, MD
 Anthony N. Gerber, MD, PhD
 James T. Good, MD
 Kendra Hammond, MD
 Tristan Huie, MD
 Yoko Ito, MD, PhD

William J. Janssen, MD
 Rebecca Keith, MD
 Susan Kotake, MD
 Esther L. Langmack, MD
 Robert Lapidus, MD
 Steven E. Lommatzsch, MD
 Barry J. Make, MD
 Kenneth Malcolm, PhD
 Laurie Manka, MD
 Robert J. Mason, MD
 Robert M. Maulitz, MD
 Richard D. Mountain, MD
 Mari Numata-Nakamura, MD, PhD
 Jerry A. Nick, MD
 Amy L. Olson, MD, MSPH
 William T. Pluss, MD
 Donald R. Rollins, MD
 Jennifer Taylor-Cousar, MD
 Milene T. Saavedra, MD
 Robert A. Sandhaus, MD, PhD
 Sarah Sasse, PhD
 Kelly Schweitzer, PhD
 Karina Serban, MD
 Daniel R. Smith, MD
 Evan L. Stepp, MD
 Jeffery J. Swigris, DO, MS
 David A. Taryle, MD
 Dennis R. Voelker, PhD

Zulma X. Yunt, MD
 Rachel L. Zemans, MD
 Michael E. Wechsler, MD, PhD
 James P. Woodrow, MD
 Qun Wu, MD, PhD

Critical Care Section

Kenneth Lyn-Kew, MD, Head
 Charlene E. Brady, MD
 Matthew Cohn, MD
 Luciano Lemos-Filho, MD, MMSc
 Sherstin T. Lommatzsch, MD
 Vipin Malik, MD
 Jason McCarl, MD
 Dionne Morgan, MD
 James O'Brien, MD
 Ahmad Rashid, MD
 Michael D. Schwartz, MD
 Elaine M.K. Schwartz, MD
 Amen Sergew, MD
 Joshua J. Solomon, MD, MSPH
 Peter Stubenrauch, MD
 Mary L. Warner, MD
 Jennifer S. Wink, MD

Sleep Medicine Section

Mark Aloia, PhD
 Jack D. Edinger, PhD
 Teofilo L. Lee-Chiong, MD
 Sheila Tsai, MD



Tasha E. Fingerlin, PhD



Lisa A. Maier, MD, MSPH

Selected 2015 Publications

National Jewish Health faculty publish more than 300 articles each year in peer-reviewed scientific journals. Below is a selection of leading articles from the past year.

- 1: **Garcia BJ, Datta G, Davidson RM, Strong M.** MycoBASE: expanding the functional annotation coverage of mycobacterial genomes. *BMC Genomics*. 2015 Dec 24;16(1):1102. doi: 10.1186/s12864-015-2311-9. PubMed PMID: 26704706; PubMed Central PMCID: PMC4690229.
- 2: **Brar K, Leung DY.** Recent Considerations in the Use of Recombinant Interferon Gamma for Biological Therapy of Atopic Dermatitis. *Expert Opin Biol Ther*. 2015 Dec 23. [Epub ahead of print] PubMed PMID: 26694988.
- 3: **Lang J, Ota T, Kelly M, Strauch P, Freed BM, Torres RM, Nemazee D, Pelanda R.** Receptor editing and genetic variability in human autoreactive B cells. *J Exp Med*. 2016 Jan 11;213(1):93-108. doi: 10.1084/jem.20151039. Epub 2015 Dec 22. PubMed PMID: 26694971.
- 4: **Cao M, Wamboldt FS, Brown KK, Hickman J, Olson AL, Solomon JJ, Swigris JJ.** Supplemental oxygen users with pulmonary fibrosis perceive greater dyspnea than oxygen non-users. *Multidiscip Respir Med*. 2015 Nov 30;10:37. doi: 10.1186/s40248-015-0035-y. eCollection 2015. PubMed PMID: 26693009; PubMed Central PMCID: PMC4676151.
- 5: **Fedele DA, McQuaid EL, Faino A, Strand M, Cohen S, Robinson J, Atkins D, Hourihane JO, Klinnert MD.** Patterns of Adaptation to Children's Food Allergies. *Allergy*. 2015 Dec 20. doi: 10.1111/all.12825. [Epub ahead of print] PubMed PMID: 26687298.
- 6: **Fontenot AP, Falta MT, Kappler JW, Dai S, McKee AS.** Beryllium-Induced Hypersensitivity: Genetic Susceptibility and Neoantigen Generation. *J Immunol*. 2016 Jan 1;196(1):22-7. doi: 10.4049/jimmunol.1502011. Review. PubMed PMID: 26685315; PubMed Central PMCID: PMC4685955.
- 7: **Mathai SK, Pedersen BS, Smith K, Russell P, Schwarz MI, Brown KK, Steele MP, Loyd JE, Crapo JD, Silverman EK, Nickerson D, Fingerlin TE, Yang IV, Schwartz DA.** Desmoplakin (DSP) Variants are Associated with Idiopathic Pulmonary Fibrosis. *Am J Respir Crit Care Med*. 2015 Dec 15. [Epub ahead of print] PubMed PMID: 26669357.
- 8: **Petrache I, Berdyshev EV.** Ceramide Signaling and Metabolism in Pathophysiological States of the Lung. *Annu Rev Physiol*. 2015 Nov 30. [Epub ahead of print] PubMed PMID: 26667073.
- 9: **Begum F, Ruczinski I, Li S, Silverman EK, Cho MH, Lynch DA, Curran-Everett D, Crapo J, Scharpf RB, Parker MM, Hetmanski JB, Beaty TH.** Identifying a Deletion Affecting Total Lung Capacity Among Subjects in the COPD Gene Study Cohort. *Genet Epidemiol*. 2016 Jan;40(1):81-8. doi: 10.1002/gepi.21943. Epub 2015 Dec 7. PubMed PMID: 26643968; PubMed Central PMCID: PMC4679532.
- 10: **Chung JH, Huitt G, Yagihashi K, Hobbs SB, Faino AV, Bolster BD Jr, Biederer J, Puderbach M, Lynch DA.** Proton Magnetic Resonance Imaging for Initial Assessment of Isolated Mycobacterium avium Complex Pneumonia. *Ann Am Thorac Soc*. 2016 Jan;13(1):49-57. doi: 10.1513/AnnalsATS.201505-2820C. PubMed PMID: 26633593.
- 11: **Sergew A, Brown KK.** Advances in the treatment of idiopathic pulmonary fibrosis. *Expert Opin Emerg Drugs*. 2015 Dec;20(4):537-52. doi: 10.1517/14728214.2015.1102886. Epub 2015 Dec 2. PubMed PMID: 26629731.
- 12: **Mannino DM, Make BJ.** Is it time to move beyond the "O" in early COPD? *Eur Respir J*. 2015 Dec;46(6):1535-7. doi: 10.1183/13993003.01436-2015. PubMed PMID: 26621878.
- 13: **Bender BG, Lockey RF.** Solving the Problem of Nonadherence to Immunotherapy. *Immunol Allergy Clin North Am*. 2016 Feb;36(1):205-13. doi: 10.1016/j.iac.2015.08.014. Review. PubMed PMID: 26617236.
- 14: **Baker RL, Bradley B, Wiles TA, Lindsay RS, Barbour G, Delong T, Friedman RS, Haskins K.** Cutting Edge: Nonobese Diabetic Mice Deficient in Chromogranin A Are Protected from Autoimmune Diabetes. *J Immunol*. 2016 Jan 1;196(1):39-43. doi: 10.4049/jimmunol.1501190. Epub 2015 Nov 25. PubMed PMID: 26608914; PubMed Central PMCID: PMC4684982.
- 15: **Mishra R, Foster D, Vasu VT, Thaikootathil JV, Kosmider B, Chu HW, Bowler RP, Finigan JH.** Cigarette Smoke Induces HER2 Dependent Changes in Epithelial Permeability. *Am J Respir Cell Mol Biol*. 2015 Nov 24. [Epub ahead of print] PubMed PMID: 26600084.
- 16: **Yang IV, Fingerlin TE, Evans CM, Schwarz MI, Schwartz DA.** MUC5B and Idiopathic Pulmonary Fibrosis. *Ann Am Thorac Soc*. 2015 Nov;12 Suppl 2:S193-9. doi: 10.1513/AnnalsATS.201503-110AW. PubMed PMID: 26595739.
- 17: **Fingerlin TE, Hamzeh N, Maier LA.** Genetics of Sarcoidosis. *Clin Chest Med*. 2015 Dec;36(4):569-84. doi: 10.1016/j.ccm.2015.08.002. Epub 2015 Oct 1. Review. PubMed PMID: 26593134.
- 18: **Solomon JJ, Chung JH, Cosgrove GP, Demoruelle MK, Fernandez-Perez ER, Fischer A, Frankel SK, Hobbs SB, Huie TJ, Ketzer J, Mannina A, Olson AL, Russell G, Tsuchiya Y, Yunt ZX, Zelarny PT, Brown KK, Swigris JJ.** Predictors of mortality in rheumatoid arthritis-associated interstitial lung disease. *Eur Respir J*. 2015 Nov 19. pii: ERJ-00357-2015. doi: 10.1183/13993003.00357-2015. [Epub ahead of print] PubMed PMID: 26585429.
- 19: **Huang Y, Getahun A, Heiser RA, Detanico TO, Aviszus K, Kirchenbaum GA, Casper TL, Huang C, Aydinoglu MK, Carding SR, Ikuta K, Huang H, Wysocki LJ, Cambier JC, O'Brien RL, Born WK.** T Cells Shape Preimmune Peripheral B Cell Populations. *J Immunol*. 2016 Jan 1;196(1):217-31. doi: 10.4049/jimmunol.1501064. Epub 2015 Nov 18. PubMed PMID: 26582947; PubMed Central PMCID: PMC4684964.
- 20: **Walter ND, Miller MA, Vasquez J, Weiner M, Chapman A, Engle M, Higgins M, Quinones AM, Roselli V, Canono E, Yoon C, Cattamanchi A, Davis JL, Phang T, Stearman RS, Datta G, Garcia BJ, Daley CL, Strong M, Kechris K, Fingerlin TE, Reves R, Geraci MW.** Blood transcriptional biomarkers for active TB among US patients: A case-control study with systematic cross-classifier evaluation. *J Clin Microbiol*. 2015 Nov 18. pii: JCM.01990-15. [Epub ahead of print] PubMed PMID: 26582831.
- 21: **Bender BG, Dingae MB, Fending D, Liu AH, Make B.** Respiratory Care Training for Safety-Net Primary Care Practices. *Fam Med*. 2015 Jul-Aug;47(7):554-7. PubMed PMID: 26562645.
- 22: **Hines SE, Barker EA, Robinson M, Knight V, Gaitens J, Sills M, Duvall K, Rose CS.** Cross-Sectional Study of Respiratory Symptoms, Spirometry, and Immunologic Sensitivity in Epoxy Resin Workers. *Clin Transl Sci*. 2015 Dec;8(6):722-8. doi: 10.1111/cts.12341. Epub 2015 Nov 10. PubMed PMID: 26553118; PubMed Central PMCID: PMC4703542.
- 23: **Desch AN, Gibbings SL, Goyal R, Kolde R, Bednarek J, Bruno T, Slansky JE, Jacobelli J, Mason R, Ito Y, Messier E, Randolph GJ, Prabagar M, Atif SM, Segura E, Xavier RJ, Bratton DL, Janssen WJ, Henson PM, Jakubzick CV.** Flow Cytometric Analysis of Mononuclear Phagocytes in Non-diseased Human Lung and Lung-draining Lymph Nodes. *Am J Respir Crit Care Med*. 2015 Nov 9. [Epub ahead of print] PubMed PMID: 26551758.
- 24: **Leung DY.** Atopic dermatitis: Age and race do matter! *J Allergy Clin Immunol*. 2015 Nov;136(5):1265-7. doi: 10.1016/j.jaci.2015.09.011. PubMed PMID: 26549637.
- 25: **Li LB, Leung DY, Goleva E.** Activated p38 MAPK in Peripheral Blood Monocytes of Steroid Resistant Asthmatics. *PLoS One*. 2015 Oct 30;10(10):e0141909. doi: 10.1371/journal.pone.0141909. eCollection 2015. PubMed PMID: 26517722; PubMed Central PMCID: PMC4627650.
- 26: **Nichols DP, Jiang D, Happoldt C, Berman R, Chu HW.** Therapeutic Effects of 1-Antitrypsin on *Pseudomonas aeruginosa* Infection in ENaC Transgenic Mice. *PLoS One*. 2015 Oct 28;10(10):e0141232. doi: 10.1371/journal.pone.0141232. eCollection 2015. PubMed PMID: 26509529; PubMed Central PMCID: PMC4624966.
- 27: **Wechsler ME, Yawn BP, Fuhlbrigge AL, Pace WD, Pencina MJ, Doros G, Kazani S, Raby BA, Lanzillotti J, Madison S, Israel E; BELT Investigators.** Anticholinergic vs Long-Acting-Agonist in Combination With Inhaled Corticosteroids in Black Adults With Asthma: The BELT Randomized Clinical Trial. *JAMA*. 2015 Oct 27;314(16):1720-30. doi: 10.1001/jama.2015.13277. PubMed PMID: 26505596.

Selected 2015 Publications

- 28: Hardin M, Cho MH, McDonald ML, Wan E, Lomas DA, Coxson HO, MacNee W, Vestbo J, Yates JC, Agusti A, Calverley PM, Celli B, Crim C, Rennard S, Wouters E, Bakke P, Bhatt SP, Kim V, Ramsdell J, **Regan EA, Make BJ**, Hokanson JE, **Crapo JD**, Beaty TH, Hersh CP; ECLIPSE and COPDGene Investigators; COPDGene Investigators—clinical centers; A genome-wide analysis of the response to inhaled (2)-agonists in chronic obstructive pulmonary disease. *Pharmacogenomics J*. 2015 Oct 27. doi: 10.1038/tj.2015.65. [Epub ahead of print] PubMed PMID: 26503814.
- 29: Steele MP, **Luna LG**, Coldren CD, Murphy E, Hennessy CE, Heinz D, Evans CM, **Groshong S, Cool C, Cosgrove GP, Brown KK, Fingerlin TE**, Schwarz MI, **Schwartz DA, Yang IV**. Relationship between gene expression and lung function in Idiopathic Interstitial Pneumonias. *BMC Genomics*. 2015 Oct 26;16(1):869. doi: 10.1186/s12864-015-2102-3. PubMed PMID: 26503507; PubMed Central PMCID: PMC4621862.
- 30: **McElroy CS, Day BJ**. Antioxidants as potential medical countermeasures for chemical warfare agents and toxic industrial chemicals. *Biochem Pharmacol*. 2015 Oct 22. pii: S0006-2952(15)00657-7. doi: 10.1016/j.bcp.2015.10.003. [Epub ahead of print] PubMed PMID: 26476351.
- 31: **Chan SK, Gelfand EW**. Primary Immunodeficiency Masquerading as Allergic Disease. *Immunol Allergy Clin North Am*. 2015 Nov;35(4):767-78. doi: 10.1016/j.iac.2015.07.008. Epub 2015 Sep 4. Review. PubMed PMID: 26454318.
- 32: **Abbott JK, Gelfand EW**. Common Variable Immunodeficiency: Diagnosis, Management, and Treatment. *Immunol Allergy Clin North Am*. 2015 Nov;35(4):637-58. doi: 10.1016/j.iac.2015.07.009. Epub 2015 Sep 4. Review. PubMed PMID: 26454311.
- 33: **Jin N, Wang Y, Crawford F, White J, Marrack P, Dai S, Kappler JW**. N-terminal additions to the WE14 peptide of chromogranin A create strong autoantigen agonists in type 1 diabetes. *Proc Natl Acad Sci U S A*. 2015 Oct 27;112(43):13318-23. doi: 10.1073/pnas.1517862112. Epub 2015 Oct 9. PubMed PMID: 26453556; PubMed Central PMCID: PMC4629350.
- 34: Russell AM, Sprangers MA, Wibberley S, Snell N, Rose DM, **Swigris JJ**. The need for patient-centred clinical research in idiopathic pulmonary fibrosis. *BMC Med*. 2015 Sep 24;13:240. doi: 10.1186/s12916-015-0475-4. PubMed PMID: 26399318; PubMed Central PMCID: PMC4581492.
- 35: Fernandez-Boyanapalli RF, Falcone EL, Zerbe CS, Marciano BE, **Frasch SC, Henson PM, Holland SM, Bratton DL**. Impaired efferocytosis in human chronic granulomatous disease is reversed by pioglitazone treatment. *J Allergy Clin Immunol*. 2015 Nov;136(5):1399-1401.e3. doi: 10.1016/j.jaci.2015.07.034. Epub 2015 Sep 18. PubMed PMID: 26386811; PubMed Central PMCID: PMC4640967.
- 36: Somoskovi A, **Salfinger M**. The Race Is On To Shorten the Turnaround Time for Diagnosis of Multidrug-Resistant Tuberculosis. *J Clin Microbiol*. 2015 Dec;53(12):3715-8. doi: 10.1128/JCM.02398-15. Epub 2015 Sep 16. PubMed PMID: 26378276; PubMed Central PMCID: PMC4652131.
- 37: **Fenster BE, Holm KE, Weinberger HD, Moreau KL, Meschede K, Crapo JD, Make BJ, Bowler R, Wamboldt FS**, Hoth KF. Right ventricular diastolic function and exercise capacity in COPD. *Respir Med*. 2015 Oct;109(10):1287-92. doi: 10.1016/j.rmed.2015.09.003. Epub 2015 Sep 9. PubMed PMID: 26371994.
- 38: **Pacheco KA**. Allergy to Surgical Implants. *J Allergy Clin Immunol Pract*. 2015 Sep-Oct;3(5):683-95. doi: 10.1016/j.jaip.2015.07.011. PubMed PMID: 26362550.
- 39: **Rubtsova K, Rubtsov AV, Cancro MP, Marrack P**. Age-Associated B Cells: A Tbet-Dependent Effector with Roles in Protective and Pathogenic Immunity. *J Immunol*. 2015 Sep 1;195(5):1933-7. doi: 10.4049/jimmunol.1501209. Review. PubMed PMID: 26297793; PubMed Central PMCID: PMC4548292.
- 40: **Sandhaus RA, Knebel AR**. Might your respiratory patient have alpha-1 antitrypsin deficiency? *Heart Lung*. 2015 Nov-Dec;44(6):463-4. doi: 10.1016/j.hrtlng.2015.07.003. Epub 2015 Aug 8. PubMed PMID: 26260071.
- 41: **Fenster BE, Browning J, Schroeder JD, Schafer M, Podgorski CA, Smyser J, Silveira LJ, Buckner JK, Hertzberg JR**. Vorticity is a marker of right ventricular diastolic dysfunction. *Am J Physiol Heart Circ Physiol*. 2015 Sep 15;309(6):H1087-93. doi: 10.1152/ajpheart.00278.2015. Epub 2015 Aug 7. PubMed PMID: 26254331.
- 42: **Rabinovitch N, Shah D, Lanser BJ**. Look before you LEAP: Risk of anaphylaxis in high-risk infants with early introduction of peanut. *J Allergy Clin Immunol*. 2015 Sep;136(3):822. doi: 10.1016/j.jaci.2015.07.002. Epub 2015 Aug 5. PubMed PMID: 26253342.
- 43: Ryerson CJ, Cottin V, **Brown KK**, Collard HR. Acute exacerbation of idiopathic pulmonary fibrosis: shifting the paradigm. *Eur Respir J*. 2015 Aug;46(2):512-20. doi: 10.1183/13993003.00419-2015. PubMed PMID: 26232481.
- 44: **Gibbins SL, Goyal R, Desch AN, Leach SM, Prabagar M, Atif SM, Bratton DL, Janssen W, Jakubzick CV**. Transcriptome analysis highlights the conserved difference between embryonic and postnatal-derived alveolar macrophages. *Blood*. 2015 Sep 10;126(11):1357-66. doi: 10.1182/blood-2015-01-624809. Epub 2015 Jul 31. PubMed PMID: 26232173; PubMed Central PMCID: PMC4566811.
- 45: **Fenster BE, Freeman AM, Silveira L, Buckner JK, Curran-Everett D, Carroll JD**. Exercise treadmill saline contrast echocardiography for the detection of patent foramen ovale in hypoxia. *Int J Cardiovasc Imaging*. 2015 Dec;31(8):1537-43. doi: 10.1007/s10554-015-0727-6. Epub 2015 Aug 1. PubMed PMID: 26231342.
- 46: **Gerber AN**. Glucocorticoids and the Lung. *Adv Exp Med Biol*. 2015;872:279-98. doi: 10.1007/978-1-4939-2895-8_12. Review. PubMed PMID: 26215999.
- 47: **Lukowski AV, Morris CD, Young SE, Tinkelman D**. Quitline Outcomes for Smokers in 6 States: Rates of Successful Quitting Vary by Mental Health Status. *Nicotine Tob Res*. 2015 Aug;17(8):924-30. doi: 10.1093/ntr/ntu252. PubMed PMID: 26180216.
- 48: Fischer A, Antoniou KM, **Brown KK**, Cadranel J, Corte TJ, du Bois RM, Lee JS, Leslie KO, **Lynch DA**, Matteson EL, Mosca M, Noth I, Richeldi L, Strek ME, Swigris JJ, Wells AU, West SG, Collard HR, Cottin V; "ERS/ATS Task Force on Undifferentiated Forms of CTD-ILD". An official European Respiratory Society/American Thoracic Society research statement: interstitial pneumonia with autoimmune features. *Eur Respir J*. 2015 Oct;46(4):976-87. doi: 10.1183/13993003.00150-2015. Epub 2015 Jul 9. PubMed PMID: 26160873.
- 49: **Gould NS, Min E, Huang J, Chu HW, Good J, Martin RJ, Day BJ**. Glutathione Depletion Accelerates Cigarette Smoke-Induced Inflammation and Airspace Enlargement. *Toxicol Sci*. 2015 Oct;147(2):466-74. doi: 10.1093/toxsci/kfv143. Epub 2015 Jul 6. PubMed PMID: 26149495; PubMed Central PMCID: PMC4707200.
- 50: **Merkel PA, O'Sullivan MD, Ridge C, Knight V**. Critique on the quantitative nature of IgE antibody measurements. *J Allergy Clin Immunol Pract*. 2015 Nov-Dec;3(6):973-5. doi: 10.1016/j.jaip.2015.06.004. Epub 2015 Jul 2. PubMed PMID: 26143018.
- 51: **Nelson HS**. Allergen immunotherapy: what's new, what's next? *Expert Rev Clin Immunol*. 2015;11(9):959-61. doi: 10.1586/1744666X.2015.1062726. Epub 2015 Jul 1. PubMed PMID: 26134252.
- 52: **Huang Y, Yang Z, McGowan J, Huang H, O'Brien RL, Born WK**. Regulation of IgE Responses by T Cells. *Curr Allergy Asthma Rep*. 2015 Apr;15(4):13. doi: 10.1007/s11882-015-0519-z. Review. PubMed PMID: 26130476.
- 53: **Malik V**. Sleep and circadian rhythms in the intensive care unit. *Crit Care Clin*. 2015 Jul;31(3):xiii-xiv. doi: 10.1016/j.ccc.2015.05.001. Epub 2015 May 26. PubMed PMID: 26118923.
- 54: **Morgan D, Tsai SC**. Sleep and the endocrine system. *Crit Care Clin*. 2015 Jul;31(3):403-18. doi: 10.1016/j.ccc.2015.03.004. Review. PubMed PMID: 26118912.
- 55: Schindler T, Michel S, **Wilson AW**. Nutrition Management of Cystic Fibrosis in the 21st Century. *Nutr Clin Pract*. 2015 Aug;30(4):488-500. doi: 10.1177/0884533615591604. Epub 2015 Jun 25. Review. PubMed PMID: 26113561.
- 56: **Dunn R, Wechsler ME**. Reducing asthma attacks in patients with severe asthma: The role of bronchial thermoplasty. *Allergy Asthma Proc*. 2015 Jul-Aug;36(4):242-50. doi: 10.2500/aap.2015.36.3851. PubMed PMID: 26108080.
- 57: **Regan EA, Lynch DA, Curran-Everett D, Curtis JL, Austin JH, Grenier PA, Kauczor HU, Bailey WC, DeMeo DL, Casaburi RH, Friedman P, Van Beek EJ, Hokanson JE, **Bowler RP**, Beaty TH, Washko GR, Han MK, Kim V, Kim SS, Yagihashi K, Washington L, McEvoy CE, Tanner C, Mannino DM, Make BJ, Silverman EK, Crapo JD; Genetic Epidemiology of COPD (COPDGene) Investigators. Clinical and Radiologic Disease in Smokers With Normal Spirometry. *JAMA Intern Med*. 2015 Sep;175(9):1539-49. doi: 10.1001/jamainternmed.2015.2735. Erratum in: *JAMA Intern Med*. 2015 Sep;175(9):1588. PubMed PMID: 26098755; PubMed Central PMCID: PMC4564354.**
- 58: **Chu HW, Rios C, Huang C, Wesolowska-Andersen A, Burchard EG, O'Connor BP, Fingerlin TE, Nichols D, Reynolds SD, Seibold MA**. CRISPR-Cas9-mediated gene knockout in primary human airway epithelial cells reveals a proinflammatory role for MUC18. *Gene Ther*. 2015 Oct;22(10):822-9. doi: 10.1038/gt.2015.53. Epub 2015 Jul 2. PubMed PMID: 26043872; PubMed Central PMCID: PMC4600011.

Selected 2015 Publications

- 59: **Rubtsov AV, Rubtsova K, Kappler JW, Jacobelli J, Friedman RS, Marrack P.** CD11c-Expressing B Cells Are Located at the T Cell/B Cell Border in Spleen and Are Potent APCs. *J Immunol.* 2015 Jul 1;195(1):71-9. doi: 10.4049/jimmunol.1500055. Epub 2015 Jun 1. PubMed PMID: 26034175; PubMed Central PMCID: PMC4475418.
- 60: **Ito Y, Correll K, Zemans RL, Leslie CC, Murphy RC, Mason RJ.** Influenza induces IL-8 and GM-CSF secretion by human alveolar epithelial cells through HGF/c-Met and TGF- β /EGFR signaling. *Am J Physiol Lung Cell Mol Physiol.* 2015 Jun 1;308(11):L1178-88. doi: 10.1152/ajplung.00290.2014. Epub 2015 Apr 10. PubMed PMID: 26033355; PubMed Central PMCID: PMC4451400.
- 61: **Lynch DA, Chung JH.** Chest Imaging. Preface. *Clin Chest Med.* 2015 Jun;36(2):xv-xvi. doi: 10.1016/j.ccm.2015.03.001. Epub 2015 Apr 9. PubMed PMID: 26024610.
- 62: **Richards JC, Lynch DA, Chung JH.** Cystic and nodular lung disease. *Clin Chest Med.* 2015 Jun;36(2):299-312, ix. doi: 10.1016/j.ccm.2015.02.011. Epub 2015 Apr 2. Review. PubMed PMID: 26024606.
- 63: **Tsuchiya Y, Fischer A, Solomon JJ, Lynch DA.** Connective Tissue Disease-related Thoracic Disease. *Clin Chest Med.* 2015 Jun;36(2):283-97, ix. doi: 10.1016/j.ccm.2015.02.010. Epub 2015 Apr 8. Review. PubMed PMID: 26024605.
- 64: **Koelsch TL, Chung JH, Lynch DA.** Radiologic evaluation of idiopathic interstitial pneumonias. *Clin Chest Med.* 2015 Jun;36(2):269-82, ix. doi: 10.1016/j.ccm.2015.02.009. Epub 2015 Apr 1. Review. PubMed PMID: 26024604.
- 65: **Germinaro M, Reynolds P, Knight V, Alam R.** Association of B-cell activating factor receptor deficiency with the P21R polymorphism and common variable immunodeficiency. *Ann Allergy Asthma Immunol.* 2015 Jul;115(1):82-3. doi: 10.1016/j.anai.2015.04.020. Epub 2015 May 23. PubMed PMID: 26012370.
- 66: **Fenster BE, Lasalvia L, Schroeder JD, Smyser J, Silveira LJ, Buckner JK, Brown KK.** Galectin-3 levels are associated with right ventricular functional and morphologic changes in pulmonary arterial hypertension. *Heart Vessels.* 2015 May 15. [Epub ahead of print] PubMed PMID: 25976729.
- 67: **Lynch DA, Austin JH, Hogg JC, Grenier PA, Kauczor HU, Bankier AA, Barr RG, Colby TV, Galvin JR, Gevenois PA, Coxson HO, Hoffman EA, Newell JD Jr, Pistolesi M, Silverman EK, Crapo JD.** CT-Definable Subtypes of Chronic Obstructive Pulmonary Disease: A Statement of the Fleischner Society. *Radiology.* 2015 Oct;277(1):192-205. doi: 10.1148/radiol.2015141579. Epub 2015 May 11. PubMed PMID: 25961632; PubMed Central PMCID: PMC4613878.
- 68: **Wesolowska-Andersen A, Seibold MA.** Airway molecular endotypes of asthma: dissecting the heterogeneity. *Curr Opin Allergy Clin Immunol.* 2015 Apr;15(2):163-8. doi: 10.1097/ACI.000000000000148. PubMed PMID: 25961390.
- 69: **Bender BG.** Motivating patient adherence to allergic rhinitis treatments. *Curr Allergy Asthma Rep.* 2015 Mar;15(3):10. doi: 10.1007/s11882-014-0507-8. Review. PubMed PMID: 25956611.
- 70: **Huie TJ, Brown KK.** Definitions of disease: should possible and probable idiopathic pulmonary fibrosis be enrolled in treatment trials? *Respir Investig.* 2015 May; 53(3):88-92. doi: 10.1016/j.resinv.2014.12.005. Epub 2015 Mar 4. Review. PubMed PMID: 25951093.
- 71: **Brauweiler AM, Goleva E, Hall CF, Leung DY.** Th2 Cytokines Suppress Lipoteichoic Acid-Induced Matrix Metalloproteinase Expression and Keratinocyte Migration in Response to Wounding. *J Invest Dermatol.* 2015 Oct;135(10):2550-3. doi: 10.1038/jid.2015.181. Epub 2015 May 7. PubMed PMID: 25950824; PubMed Central PMCID: PMC4567972.
- 72: **Collard HR, Bradford WZ, Cottin V, Flaherty KR, King TE Jr, Koch GG, Kolb M, Martinez FJ, Montgomery B, Raghu G, Richeldi L, Rose D, Wells AU, Brown KK.** A new era in idiopathic pulmonary fibrosis: considerations for future clinical trials. *Eur Respir J.* 2015 Jul;46(1):243-9. doi: 10.1183/09031936.00200614. Epub 2015 Apr 21. PubMed PMID: 25900377.
- 73: **Bai X, Kinney WH, Su WL, Bai A, Ovrutsky AR, Honda JR, Netea MG, Henaio-Tamayo M, Ordway DJ, Dinarello CA, Chan ED.** Caspase-3-independent apoptotic pathways contribute to interleukin-32-mediated control of Mycobacterium tuberculosis infection in THP-1 cells. *BMC Microbiol.* 2015 Feb 21;15:39. doi: 10.1186/s12866-015-0366-z. PubMed PMID: 25887904; PubMed Central PMCID: PMC4439755.
- 74: **Wu Q, Jiang D, Huang C, van Dyk LF, Li L, Chu HW.** Trehalose-mediated autophagy impairs the anti-viral function of human primary airway epithelial cells. *PLoS One.* 2015 Apr 16;10(4):e0124524. doi: 10.1371/journal.pone.0124524. eCollection 2015. PubMed PMID: 25879848; PubMed Central PMCID: PMC4400043.
- 75: **Meltzer LJ, Faino A, Szefer SJ, Strand M, Gelfand EW, Beebe DW.** Experimentally manipulated sleep duration in adolescents with asthma: Feasibility and preliminary findings. *Pediatr Pulmonol.* 2015 Apr 14. doi: 10.1002/ppul.23179. [Epub ahead of print] PubMed PMID: 25872769.
- 76: **Olson AL, Swigris JJ, Belkin A, Hannen L, Yagihashi K, Schenkman M, Brown KK.** Physical functional capacity in idiopathic pulmonary fibrosis: performance characteristics of the continuous-scale physical function performance test. *Expert Rev Respir Med.* 2015 Jun;9(3):361-7. doi: 10.1586/17476348.2015.1030396. Epub 2015 Apr 5. PubMed PMID: 25843290.
- 77: **Leslie CC.** Cytosolic phospholipase A : physiological function and role in disease. *J Lipid Res.* 2015 Aug;56(8):1386-402. doi: 10.1194/jlr.R057588. Epub 2015 Apr 2. PubMed PMID: 25838312; PubMed Central PMCID: PMC4513982.
- 78: **Yunt ZX, Solomon JJ.** Lung disease in rheumatoid arthritis. *Rheum Dis Clin North Am.* 2015 May;41(2):225-36. doi: 10.1016/j.rdc.2014.12.004. Epub 2015 Feb 3. Review. PubMed PMID: 25836639; PubMed Central PMCID: PMC4415514.
- 79: **Bishwakarma R, Kinney WH, Honda JR, Mya J, Strand MJ, Gangavelli A, Bai X, Ordway DJ, Iseman MD, Chan ED.** Epidemiologic link between tuberculosis and cigarette/biomass smoke exposure: Limitations despite the vast literature. *Respirology.* 2015 May;20(4):556-68. doi: 10.1111/resp.12515. Epub 2015 Mar 25. PubMed PMID: 25808744.
- 80: **Li Y, Qi X, Liu B, Huang H.** The STAT5-GATA2 pathway is critical in basophil and mast cell differentiation and maintenance. *J Immunol.* 2015 May 1;194(9):4328-38. doi: 10.4049/jimmunol.1500018. Epub 2015 Mar 23. PubMed PMID: 25801432; PubMed Central PMCID: PMC4405376.
- 81: **Gelfand EW, Alam R.** The other side of asthma: Steroid-refractory disease in the absence of TH2-mediated inflammation. *J Allergy Clin Immunol.* 2015 May;135(5):1196-8. doi: 10.1016/j.jaci.2015.01.032. Epub 2015 Mar 13. PubMed PMID: 25772592.
- 82: **Walter ND, Dolganov GM, Garcia BJ, Worodria W, Andama A, Musisi E, Ayakaka I, Van TT, Voskuil MI, de Jong BC, Davidson RM, Fingerlin TE, Kechris K, Palmer C, Nahid P, Daley CL, Geraci M, Huang L, Cattamanchi A, Strong M, Schoolnik GK, Davis JL.** Transcriptional Adaptation of Drug-tolerant Mycobacterium tuberculosis During Treatment of Human Tuberculosis. *J Infect Dis.* 2015 Sep 15;212(6):990-8. doi: 10.1093/infdis/jiv149. Epub 2015 Mar 11. PubMed PMID: 25762787; PubMed Central PMCID: PMC4548467.
- 83: **Choi JY, Duraisingh MT, Marti M, Ben Mamoun C, Voelker DR.** From Protease to Decarboxylase: THE MOLECULAR METAMORPHOSIS OF PHOSPHATIDYLSERINE DECARBOXYLASE. *J Biol Chem.* 2015 Apr 24;290(17):10972-80. doi: 10.1074/jbc.M115.642413. Epub 2015 Feb 26. PubMed PMID: 25724650; PubMed Central PMCID: PMC4409258.
- 84: **Leung DY.** Porphyllactin emollient use beginning at birth prevents atopic dermatitis. *J Pediatr.* 2015 Mar;166(3):777-8. doi: 10.1016/j.jpeds.2014.12.045. PubMed PMID: 25722275.
- 85: **Jaramillo JD, Wilson C, Stinson DS, Lynch DA, Bowler RP, Lutz S, Bon JM, Arnold B, McDonald ML, Washko GR, Wan ES, DeMeo DL, Foreman MG, Soler X, Lindsay SE, Lane NE, Genant HK, Silverman EK, Hokanson JE, Make BJ, Crapo JD, Regan EA, COPD Gene Investigators.** Reduced Bone Density and Vertebral Fractures in Smokers. Men and COPD Patients at Increased Risk. *Ann Am Thorac Soc.* 2015 May;12(5):648-56. doi: 10.1513/AnnalsATS.201412-5910C. Erratum in: *Ann Am Thorac Soc.* 2015 Jul;12(7):1112. Stinson, Douglas J [corrected to Douglas S]. PubMed PMID: 25719895; PubMed Central PMCID: PMC4418341.
- 86: **Hamzeh N, Steckman DA, Sauer WH, Judson MA.** Pathophysiology and clinical management of cardiac sarcoidosis. *Nat Rev Cardiol.* 2015 May;12(5):278-88. doi: 10.1038/nrcardio.2015.22. Epub 2015 Feb 24. Review. PubMed PMID: 25707386.
- 87: **Nambu A, Zach J, Schroeder J, Jin GY, Kim SS, Kim YI, Schnell C, Bowler R, Lynch DA.** Relationships between diffusing capacity for carbon monoxide (DLCO), and quantitative computed tomography measurements and visual assessment for chronic obstructive pulmonary disease. *Eur J Radiol.* 2015 May;84(5):980-5. doi: 10.1016/j.ejrad.2015.01.010. Epub 2015 Jan 22. PubMed PMID: 25704753.
- 88: **Li L, Hamzeh N, Gillespie M, Elliott J, Wang J, Gottschall EB, Mroz PM, Maier LA.** Beryllium increases the CD14(dim)CD16+ subset in the lung of chronic beryllium disease. *PLoS One.* 2015 Feb 17;10(2):e0117276. doi: 10.1371/journal.pone.0117276. eCollection 2015. PubMed PMID: 25689051; PubMed Central PMCID: PMC4331542.

Selected 2015 Publications

- 89: Riches DW, Backos DS, **Redente EF**, ROCK and Rho: Promising therapeutic targets to ameliorate pulmonary fibrosis. *Am J Pathol*. 2015 Apr;185(4):909-12. doi: 10.1016/j.ajpath.2015.01.005. Epub 2015 Feb 14. PubMed PMID: 25687558; PubMed Central PMCID: PMC4380839.
- 90: Martiniano SL, **Nick JA**. Nontuberculous mycobacterial infections in cystic fibrosis. *Clin Chest Med*. 2015 Mar;36(1):101-15. doi: 10.1016/j.ccm.2014.11.003. Review. PubMed PMID: 25676523.
- 91: **Kasperbauer SH**, De Groote MA. The treatment of rapidly growing mycobacterial infections. *Clin Chest Med*. 2015 Mar; 36(1):67-78. doi: 10.1016/j.ccm.2014.10.004. Epub 2014 Nov 5. Review. PubMed PMID: 25676520.
- 92: **Honda JR, Knight V, Chan ED**. Pathogenesis and risk factors for nontuberculous mycobacterial lung disease. *Clin Chest Med*. 2015 Mar;36(1):1-11. doi: 10.1016/j.ccm.2014.10.001. Epub 2014 Nov 6. Review. Erratum in: *Clin Chest Med*. 2015 Jun;36(2):xvii. PubMed PMID: 25676515.
- 93: **Dunn RM, Wechsler ME**. Anti-interleukin therapy in asthma. *Clin Pharmacol Ther*. 2015 Jan;97(1):55-65. doi: 10.1002/cpt.11. Epub 2014 Dec 15. Review. PubMed PMID: 25670383.
- 94: Sicherer SH, **Leung DY**. Advances in allergic skin disease, anaphylaxis, and hypersensitivity reactions to foods, drugs, and insects in 2014. *J Allergy Clin Immunol*. 2015 Feb;135(2):357-67. doi: 10.1016/j.jaci.2014.12.1906. Review. PubMed PMID: 25662305.
- 95: **Boguniewicz M, Leung DY**. Targeted therapy for allergic diseases: at the intersection of cutting-edge science and clinical practice. *J Allergy Clin Immunol*. 2015 Feb;135(2):354-6. doi: 10.1016/j.jaci.2014.12.1907. PubMed PMID: 25662304.
- 96: **Jett JR, Dyer DS**. Should lung cancer screening with low-dose computed tomography be routine for smokers and former smokers? Most certainly! *Clin Adv Hematol Oncol*. 2014 Oct;12(10):701-3. PubMed PMID: 25658897.
- 97: **O'Brien RL, Born WK**. Dermal T cells--What have we learned? *Cell Immunol*. 2015 Jul;296(1):62-9. doi: 10.1016/j.cellimm.2015.01.011. Epub 2015 Jan 28. Review. PubMed PMID: 25649119; PubMed Central PMCID: PMC4466165.
- 98: **Olin JT, Clary MS, Deardorff EH, Johnston K, Morris MJ, Sokoya M, Staudenmayer H, Christopher KL**. Inducible laryngeal obstruction during exercise: moving beyond vocal cords with new insights. *Phys Sportsmed*. 2015 Feb;43(1):13-21. doi: 10.1080/00913847.2015.1007026. Epub 2015 Feb 2. PubMed PMID: 25644598.
- 99: Varkey B, **Maier LA**. Chronic respiratory diseases: challenges in diagnosis and prevention. *Curr Opin Pulm Med*. 2015 Mar;21(2):111-3. doi: 10.1097/MCP.000000000000146. PubMed PMID: 25621561.
- 100: **Christianson CA, Goplen NP, Zafar I, Irvin C, Good JT Jr, Rollins DR, Gorentla B, Liu W, Gorska MM, Chu H, Martin RJ, Alam R**. Persistence of asthma requires multiple feedback circuits involving type 2 innate lymphoid cells and IL-33. *J Allergy Clin Immunol*. 2015 Jul;136(1):59-68.e14. doi: 10.1016/j.jaci.2014.11.037. Epub 2015 Jan 21. PubMed PMID: 25617223; PubMed Central PMCID: PMC4494983.
- 101: **Boguniewicz M**. Atopic dermatitis: the updated practice parameter and beyond. *Allergy Asthma Proc*. 2014 Nov-Dec;35(6):429-34. doi: 10.2500/aap.2014.35.3798. Review. PubMed PMID: 25584909.
- 102: Kreff SD, **Meehan R, Rose CS**. Emerging spectrum of deployment-related respiratory diseases. *Curr Opin Pulm Med*. 2015 Mar;21(2):185-92. doi: 10.1097/MCP.000000000000143. Review. PubMed PMID: 25575366.
- 103: **Numata M, Kandasamy P, Nagashima Y, Fickes R, Murphy RC, Voelker DR**. Phosphatidylinositol inhibits respiratory syncytial virus infection. *J Lipid Res*. 2015 Mar;56(3):578-87. doi: 10.1194/jlr.M055723. Epub 2015 Jan 5. PubMed PMID: 25561461; PubMed Central PMCID: PMC4340305.
- 104: **Rubtsova K, Marrack P, Rubtsov AV**. TLR7, IFN γ , and T-bet: their roles in the development of ABCs in female-biased autoimmunity. *Cell Immunol*. 2015 Apr;294(2):80-3. doi: 10.1016/j.cellimm.2014.12.002. Epub 2014 Dec 13. Review. PubMed PMID: 25541140; PubMed Central PMCID: PMC4380581.
- 105: **Meltzer LJ, Sanchez-Ortuno MJ, Edinger JD, Avis KT**. Sleep patterns, sleep instability, and health related quality of life in parents of ventilator-assisted children. *J Clin Sleep Med*. 2015 Mar 15;11(3):251-8. doi: 10.5664/jcsm.4538. PubMed PMID: 25515280; PubMed Central PMCID: PMC4346646.
- 106: Putcha N, Puhan MA, Drummond MB, Han MK, **Regan EA**, Hanania NA, Martinez CH, Foreman M, Bhatt SP, **Make B**, Ramsdell J, DeMeo DL, Barr RG, Rennard SI, Martinez F, Silverman EK, **Crapo J**, Wise RA, Hansel NN. A simplified score to quantify comorbidity in COPD. *PLoS One*. 2014 Dec 16;9(12):e114438. doi: 10.1371/journal.pone.0114438. eCollection 2014. PubMed PMID: 25514500; PubMed Central PMCID: PMC4267736.
- 107: **Lindsay RS**, Corbin K, Mahne A, **Levitt BE, Gebert MJ, Wigton EJ, Bradley BJ, Haskins K, Jacobelli J**, Tang Q, Krummel MF, **Friedman RS**. Antigen recognition in the islets changes with progression of autoimmune islet infiltration. *J Immunol*. 2015 Jan 15;194(2):522-30. doi: 10.4049/jimmunol.1400626. Epub 2014 Dec 10. PubMed PMID: 25505281; PubMed Central PMCID: PMC4282963.
- 108: **Fernandez-Boyanapalli RF, Frasch SC, Thomas SM, Malcolm KC, Nicks M, Harbeck RJ, Jakubzick CV**, Nemenoff R, **Henson PM**, Holland SM, **Bratton DL**. Pioglitazone restores phagocyte mitochondrial oxidants and bactericidal capacity in chronic granulomatous disease. *J Allergy Clin Immunol*. 2015 Feb;135(2):517-527.e12. doi: 10.1016/j.jaci.2014.10.034. Epub 2014 Dec 10. PubMed PMID: 25498313; PubMed Central PMCID: PMC4331116.
- 109: **Bowler RP, Jacobson S, Cruickshank C, Hughes GJ, Siska C, Ory DS, Petrache I, Schaffer JE, Reisdorph N, Kechris K**. Plasma sphingolipids associated with chronic obstructive pulmonary disease phenotypes. *Am J Respir Crit Care Med*. 2015 Feb 1;191(3):275-84. doi: 10.1164/rccm.201410-1771OC. PubMed PMID: 25494452; PubMed Central PMCID: PMC4351578.
- 110: Volckaert T, **De Langhe SP**. Wnt and FGF mediated epithelial-mesenchymal crosstalk during lung development. *Dev Dyn*. 2015 Mar;244(3):342-66. doi: 10.1002/dvdy.24234. Epub 2014 Dec 29. Review. PubMed PMID: 25470458; PubMed Central PMCID: PMC4344844.
- 111: **Taylor-Cousar JL**, Wiley C, Felton LA, **St Clair C, Jones M, Curran-Everett D, Poch K, Nichols DP**, Solomon GM, **Saavedra MT**, Accurso FJ, **Nick JA**. Pharmacokinetics and tolerability of oral sildenafil in adults with cystic fibrosis lung disease. *J Cyst Fibros*. 2015 Mar;14(2):228-36. doi: 10.1016/j.jcf.2014.10.006. Epub 2014 Nov 13. PubMed PMID: 25466700; PubMed Central PMCID: PMC4355330.
- 112: **Li L, Huang Z, Gillespie M, Mroz PM, Maier LA**. p38 Mitogen-Activated Protein Kinase in beryllium-induced dendritic cell activation. *Hum Immunol*. 2014 Dec;75(12):1155-62. doi: 10.1016/j.humimm.2014.10.010. Epub 2014 Oct 22. PubMed PMID: 25454621; PubMed Central PMCID: PMC4258464.
- 113: **De Arras L, Guthrie BS, Alper S**. Using RNA-interference to investigate the innate immune response in mouse macrophages. *J Vis Exp*. 2014 Nov 3;(93):e51306. doi: 10.3791/51306. PubMed PMID: 25407484.
- 114: **Kannan M, Riekhof WR, Voelker DR**. Transport of phosphatidylserine from the endoplasmic reticulum to the site of phosphatidylserine decarboxylase2 in yeast. *Traffic*. 2015 Feb;16(2):123-34. doi: 10.1111/tra.12236. Epub 2014 Dec 11. Review. PubMed PMID: 25355612.
- 115: **Nelson HS**. Oral/sublingual Phleum pretense grass tablet (Grazax/Grastek) to treat allergic rhinitis in the USA. *Expert Rev Clin Immunol*. 2014 Nov;10(11):1437-51. doi: 10.1586/1744666X.2014.963556. Review. PubMed PMID: 25340426.
- 116: **Finigan JH, Vasu VT, Thaikootathil JV, Mishra R, Shatat MA, Mason RJ, Kern JA**. HER2 activation results in -catenin-dependent changes in pulmonary epithelial permeability. *Am J Physiol Lung Cell Mol Physiol*. 2015 Jan 15;308(2):L199-207. doi: 10.1152/ajplung.00237.2014. Epub 2014 Oct 17. PubMed PMID: 25326580; PubMed Central PMCID: PMC4338945.
- 117: **Leung DY**, Guttman-Yassky E. Deciphering the complexities of atopic dermatitis: shifting paradigms in treatment approaches. *J Allergy Clin Immunol*. 2014 Oct;134(4):769-79. doi: 10.1016/j.jaci.2014.08.008. Review. PubMed PMID: 25282559; PubMed Central PMCID: PMC4186710.
- 118: Kozora E, Zell J, **Swigris J**, Strand M, Duggan EC, Burleson A, **Make B**. Cardiopulmonary correlates of cognition in systemic lupus erythematosus. *Lupus*. 2015 Feb;24(2):164-73. doi: 10.1177/0961203314551810. Epub 2014 Sep 23. PubMed PMID: 25249596.
- 119: **Fischer A, Brown KK**. Interstitial lung disease in undifferentiated forms of connective tissue disease. *Arthritis Care Res (Hoboken)*. 2015 Jan;67(1):4-11. doi: 10.1002/acr.22394. Review. PubMed PMID: 25048539.
- 120: Lommatzsch SE, **Martin RJ, Good JT Jr**. Importance of fiberoptic bronchoscopy in identifying asthma phenotypes to direct personalized therapy. *Curr Opin Pulm Med*. 2013 Jan;19(1):42-8. doi: 10.1097/MCP.0b013e32835a5bdc. Review. PubMed PMID: 23197289.

RECOGNITION



National Jewish Health is the only hospital with a primary focus on pulmonary and related diseases. We are now at 25 locations in Colorado and at the Mount Sinai – National Jewish Health Respiratory Institute in New York City.



National Jewish Health has been ranked by *U.S. News & World Report* as number 1 or 2 every year that the pulmonology category has been included in the rankings (since 1997).



U. S. News & World Report rated the COPD care provided at National Jewish Health as “high performing,” the highest rating possible.

National Jewish Health has 30 doctors named as “America’s Top Doctors” by Castle Connolly, including 13 in Pulmonary Disease (most in the nation in this category).

National Jewish Health is in the top 6 percent of institutions in the country funded by the NIH, in terms of absolute dollars.

BREAKTHROUGHS IN RESEARCH

National Jewish Health has advanced the understanding of medicine with key scientific discoveries. A few of these important advances are listed below.

IgE. The molecule responsible for allergic reactions. This discovery has become the basis for many new treatments for asthma and allergies.

The T-cell receptor gene. Plays a crucial role in recognizing foreign invaders and orchestrating an immune response. It opened the door to understanding how bodies fight viruses, bacteria and cancer.

Superantigens. Extremely powerful bacterial toxins associated with particularly virulent diseases, such as toxic shock syndrome and Legionnaire’s disease.

Combined chemotherapy for tuberculosis. National Jewish Health physicians were among the leaders in developing this crucial tool for fighting tuberculosis.

Mechanisms of apoptosis. Pioneering efforts have helped doctors understand how the body effectively removes and recycles up to two billion cells a day and resolves inflammation in the lung.

Allergies to artificial joints. Researchers have developed a blood test that can detect allergy to nickel used in artificial joints, a common cause of failure.

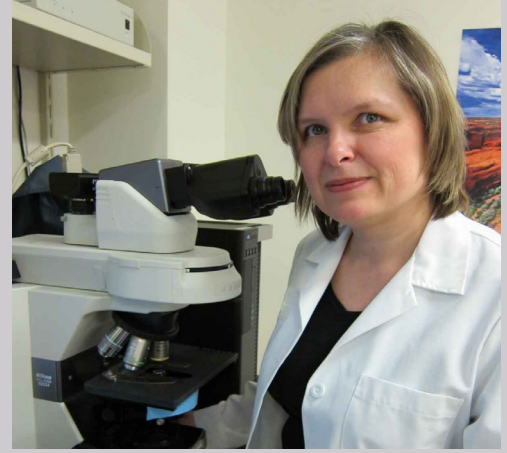




FOCUS, EXPERIENCE, COLLABORATION

With a 117-year history of transformative medicine, National Jewish Health is the only organization of its kind in the world dedicated exclusively to respiratory and related diseases. Today, National Jewish Health has an unparalleled pulmonary expertise, with internationally recognized physician-scientists bringing their extensive experience and knowledge to many of the most challenging respiratory cases in the nation. Pulmonologists work closely with their colleagues in cardiology, gastroenterology, allergy, immunology, oncology and radiology to understand the whole person and find solutions for our patients.

How to reach us?
Call our Physician Line at 800.652.9555.
Or learn more at njhealth.org.



**National Jewish
Health[®]**

Science Transforming Life[®]

njhealth.org