



Baylor  
College of  
Medicine

THE MARGARET M. AND ALBERT B. ALKEK  
DEPARTMENT OF  
MEDICINE

**FEB 27, 2023**  
CULLEN AUDITORIUM

**NANCY CHANG, PhD**  
**RESEARCH SYMPOSIUM**

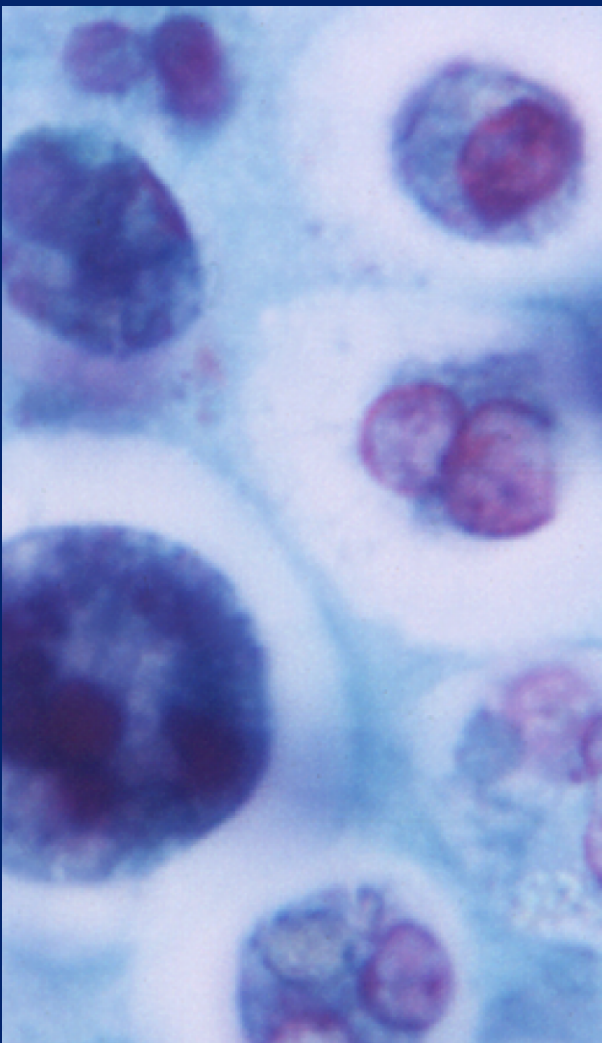
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***NOVEL ASPECTS OF IMMUNE  
RESPONSES IN HEALTH AND DISEASE***



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# ACKNOWLEDGMENTS

## PLANNING COMMITTEE

**Hashem El-Serag, MD, MPH** | Margaret M. and Albert B. Alkek Professor and Chair, Department of Medicine, Baylor College of Medicine

**Rolando Rumbaut, MD, PhD** | Professor and Vice Chair for Research, Department of Medicine, Baylor College of Medicine

**Farrah Kheradmand, MD** | Nancy Chang, PhD Professor for the Biology of Inflammation Center, Department of Medicine, Baylor College of Medicine

**David Corry, MD** | Former Nancy Chang, PhD Professor for the Biology of Inflammation Center; Fulbright Endowed Chair in Pathology, Professor, Departments of Medicine and Pathology & Immunology, Baylor College of Medicine

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# OVERVIEW

The Department of Medicine at Baylor College of Medicine is delighted to host the inaugural Nancy Chang, Ph.D. Research Symposium on February 27, 2023. This symposium seeks to recognize the scientific achievements and philanthropic contributions of Dr. Chang to Baylor College of Medicine, and to highlight research conducted by investigators supported by Dr. Chang under the theme of: “Novel aspects of immune responses in health and disease.”

Below is a list of current Baylor College of Medicine faculty member recipients of research support from Dr. Chang.

## **Nancy Chang, PhD Professorships and/or Endowed Chairs**

**David Corry, MD**, Professor, Biology of Inflammation Center, Medicine (Former Professorship)

**Farrah Kheradmand, MD, MS**, Professor, Biology of Inflammation Center, Medicine (Professorship)

**Andrew Rice, PhD**, Professor, Molecular Virology and Microbiology (Professorship)

**Sanjiv Sur, MD**, Professor, Biology of Inflammation Center, Medicine (Endowed Chair)

## **Nancy Chang, PhD Awards for Research Excellence**

**(2013) Mirjana Maletic-Savatic, MD, PhD**, Associate Professor, Pediatrics, Neurology

**(2014) Joel Neilson, PhD**, Associate Professor, Integrative Physiology

**(2015) Joshua Shulman, MD, PhD**, Professor, Neurology

**(2016) David Durgan, PhD**, Assistant Professor, Integrative Physiology

**(2017) Sanjiv Harpavat, MD, PhD**, Associate Professor, Pediatrics, Gastroenterology

**(2018) Shinya Yamamoto, DVM, PhD**, Assistant Professor, Molecular & Human Genetics

**(2019) Melanie Samuel, PhD**, Associate Professor, Neuroscience

**(2020) Sean Hartig, PhD**, Associate Professor, Medicine, Diabetes, Endocrinology & Metabolism

**(2020) Atul Maheshwari, MD**, Associate Professor, Neurology

**(2021) Bruno Di Stefano, PhD**, Assistant Professor, Molecular & Cellular Biology

# Nancy Chang, PhD Research Symposium

*Novel aspects of immune responses in health and disease*

Cullen Auditorium | Monday, February 27, 2023 | 8:30 am – 3:45 pm

## Welcome and Introductions

- 8:30 AM** Coffee and Check-In
- 9:00 AM** **Rolando Rumbaut, MD, PhD**, Professor and Vice Chair for Research, Department of Medicine, Baylor College of Medicine
- 9:05 AM** **Paul Klotman, MD**, President, CEO, and Executive Dean, Baylor College of Medicine
- 9:10 AM** **Mary Dickinson, PhD**, Senior Vice President and Dean of Research, Baylor College of Medicine
- 9:15 AM** **Hashem El-Serag, MD, MPH**, Margaret M. and Albert B. Alkek Professor and Chair, Department of Medicine, Baylor College of Medicine
- 9:20 AM** **Nancy Chang, PhD**, President, The Tang Family Foundation; Adjunct Professor, Baylor of College of Medicine

## Session 1 | Host: David Corry, MD

- 9:30 AM** ***New insights in immune response to airway mycosis***  
**David Corry, MD**, Former Nancy Chang, PhD Professor for the Biology of Inflammation Center; Fulbright Endowed Chair in Pathology, Professor, Departments of Medicine and Pathology & Immunology, Baylor College of Medicine
- 9:55 AM** ***Innate immune cells in neural development and disease***  
**Melanie Samuel, PhD**, 2019 Recipient of The Nancy Chang, PhD Award for Research Excellence, Associate Professor, Department of Neuroscience, Baylor College of Medicine
- 10:20 AM** ***Oxidative stress in immune responses to allergens***  
**Sanjiv Sur, MD**, Nancy Chang, PhD Endowed Chair for the Biology of Inflammation Center, Professor, Department of Medicine, Baylor College of Medicine

**Break | 10:45 AM – 11:00 AM**

## Session 2 | Host: Farrah Kheradmand, MD

- 11:00 AM** ***Roles of NEAT1 lncRNA in HIV infection and innate immunity***  
**Andrew Rice, PhD**, Nancy Chang, PhD Professor for the Department of Molecular Virology and Microbiology, Baylor College of Medicine
- 11:25 AM** ***Immune responses in insulin sensitivity and obesity***  
**Sean Hartig, PhD**, 2020 Recipient of The Nancy Chang, PhD Award for Research Excellence, Associate Professor, Department of Medicine, Baylor College of Medicine
- 11:50 AM** ***Role of acquired immunity in COPD***  
**Farrah Kheradmand, MD**, Nancy Chang, PhD Professor for the Biology of Inflammation Center, Department of Medicine, Baylor College of Medicine

**Lunch | 12:15 PM – 1:30 PM**

## Poster Session | Rayzor Lounge

- 1:30 PM** Poster Presentations
- 3:30 PM** Poster Session Awards and Closing

**Reception and Dinner (By invitation only) | 5:00 PM**

# ABOUT NANCY CHANG, PhD



Dr. Nancy Chang is a Taiwanese American biochemist, entrepreneur, business executive and philanthropist. She completed her undergraduate studies at Taiwan National Tsing Hua University and Brown University and attended the Ph. D. program at the Division of Medical Sciences at Harvard Medical School as one of the first few international students. With a Ph.D. in biochemistry and her pioneering postdoctoral research work at Roche on interferons, Nancy joined the founding team at Centocor, where she served as director of research and made substantial contributions to the development of monoclonal antibody as therapeutics and to the HIV field including the development of the first HIV diagnosis assay. Centocor was later acquired by Johnson & Johnson and formed the foundation of Janssen Biotech.

In 1986, Nancy moved to Houston and joined Baylor College of Medicine, where she served as Associate Professor of Virology until 1991. During this tenure, Nancy co-founded Tanox, with a vision to treat immunological diseases including allergy, asthma, and inflammation by using antibodies as a therapeutic agent. With Nancy serving as Chairman and CEO, Tanox achieved the then largest IPO in 2000 on NASDAQ and launched Xolair in 2003, the first biotech product cleared for treating patients with moderate and severe asthma. Tanox was acquired in 2007 by Genentech for \$919 million.

Afterward the sale of Tanox, Nancy led OrbiMed's Asia fund as the chairman, founder and managing director. She served on the board of directors for various institutes including the Federal Reserve Bank in Houston, BioHouston, Biotechnology Innovation Organization (Bio), Charles River Laboratories, and several biotech companies. Throughout her career, she received numerous awards from academic, industrial, national and international organizations. She was named the Most Respected Woman in Biotechnology in 2005, Forbes Twenty-Five Notable Chinese Americans list in 2008 and was the first woman to receive the Biotechnology Heritage Award in 2012.

During her 40-year tenure in the biotechnology industry, Nancy has developed and commercialized several highly successful diagnostic and therapeutic products for cancers, HIV infection and for treating inflammatory disease including Crohn's disease, Ulcerative colitis, psoriasis, and rheumatoid arthritis, atopic dermatitis, allergy and asthma. In 2018, Trogarzo was approved by the FDA for HIV treatment. Trogarzo was originally developed by Tanox as TNX-355 under Dr. Chang. Even today, there are breakthrough drugs which are coming to the market due to Dr. Chang's work. In 2020, Lilly paid \$1.1 billion to acquire Dermira for the anti-IL-13 antibody lebrikizumab. Lebrikizumab was TNX-650. The drug was developed at Tanox under Dr. Chang. Lilly reported the drug's success in two phase 3 clinical trials in treating moderate-to-severe atopic dermatitis in late 2021. Lebrikizumab was approved by the EMEA in 2022 and is expected to gain FDA approval in 2023. In addition, Tanox's Anti-tryptase antibody is in phase III clinical development by Genentech for IgE-independent severe asthma.

Currently, Nancy serves as president of the Tang Family Foundation and dedicates her time to supporting the development of novel scientific breakthroughs aimed at treating unmet medical needs.

# MEET THE SPEAKERS

*Welcome and Introductions | 9:00 AM*



**Rolando Rumbaut, MD, PhD**

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Professor and Vice Chair for Research, Department of Medicine, Baylor College of Medicine



**Paul Klotman, MD**

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President, CEO, and Executive Dean, Baylor College of Medicine



**Mary Dickinson, PhD**

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Senior Vice President and Dean of Research, Baylor College of Medicine



**Hashem El-Serag, MD, MPH**

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Margaret M. and Albert B. Alkek Professor and Chair, Department of Medicine, Baylor College of Medicine



**Nancy Chang, PhD**

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President, The Tang Family Foundation; Adjunct Professor, Baylor College of Medicine

## Session 1 | 9:30 AM



### David Corry, MD

*Former Nancy Chang, PhD Professor for the Biology of Inflammation Center; Fulbright Endowed Chair in Pathology, Professor, Departments of Medicine and Pathology & Immunology, Baylor College of Medicine*

#### ***New insights in immune response to airway mycosis***

The mechanisms by which fungi elicit characteristic eosinophilic airway inflammation have long remained unclear. We have shown that fungi causing non-invasive airway infections, termed airway mycosis, do so through the expression of a variety of virulence factors, including proteinases secreted by filamentous molds (e.g., *Aspergillus* spp.) and candidalysin secreted by the yeast *Candida albicans*. We demonstrate how these virulence factors activate the mouse airway immune system to generate the T helper cell type 2 (Th2) and Th17 responses that drive expression of asthma-like disease.



### Melanie Samuel, PhD

*2019 Recipient of The Nancy Chang, PhD Award for Research Excellence, Associate Professor, Department of Neuroscience, Baylor College of Medicine*

#### ***Innate immune cells in neural development and disease***

Microglia are resident central nervous system (CNS) immune cells that display defined windows of heightened phagocytosis. These phagocytic periods align precisely with the timing of neuron growth and remodeling, as well as with neural disease progression. However, the molecular mechanisms controlling microglia phagocytic clockwork were unknown. In this presentation, Dr. Samuel will present new data highlighting her lab's discovery of an important regulator of this process, the innate immune molecule SIRPa.





## Sanjiv Sur, MD

*Nancy Chang, PhD Endowed Chair for the Biology of Inflammation Center, Professor, Department of Medicine, Baylor College of Medicine*

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### ***Oxidative stress in immune responses to allergens***

In the past decade many biologics have been developed that inhibit Th2 cytokines, their receptors, or cytokines that promote Th2 phenotype. None of these treatment focus on the early innate events that occur after exposure to allergen, such as oxidative DNA damage, double strand DNA damage, and innate chemokine synthesis. We begin to address this major gap in knowledge in this presentation. We will show that exposure allergens rapidly induces single stand oxidative DNA damage within 15 minutes, and excised damaged bases from this damaged DNA stimulates allergic lung inflammation. Exposure to allergens rapidly induces DNA sensing protein cGAS-dependent double strand DNA damage, and treatment of allergic mice with cGAS inhibitor blocks DNA damage and allergic inflammation. Treatment of allergic mice with recombinant NEIL2, an oxidative DNA damage repair enzyme, blocks the binding of NFkB to DNA, and inhibits chemokine synthesis and allergic lung inflammation. Finally, oral administration of Iadarixin, a small molecule inhibitor for chemokine receptors, vigorously blocks allergen-induced blocks both Th2 and Th17 mediated asthma. This work sets the stage for development of cGAS inhibitor, rNEIL2 and CXCR2 inhibitors as novel treatments of asthma that focus on the very early events that occur after allergen challenge.

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## Session 2 | 11:00 AM



## Andrew Rice, PhD

*Nancy Chang, PhD Professor for the Department of Molecular Virology and Microbiology, Baylor College of Medicine*

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### ***Roles of NEAT1 lncRNA in HIV infection and innate immunity***

HIV-1 persists during suppressive antiviral therapy as a latent integrated provirus able to reactivate to productive infection, thereby constituting a barrier to a cure of infection. Establishment of this latent viral state and reactivation are dependent upon host cell factors. Recent research will be presented that has identified a multifunctional long noncoding RNA (lncRNA) known as NEAT1 that has contrasting functions for HIV-1. NEAT1 lncRNA has an anti-HIV-1 function, as well as a function that enhances reactivation of latent HIV-1. Insight into mechanisms underlying these functions may provide novel therapeutic strategies.





## Sean Hartig, PhD

*2020 Recipient of The Nancy Chang, PhD Award for Research Excellence, Associate Professor, Department of Medicine, Baylor College of Medicine*

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### ***Immune responses in insulin sensitivity and obesity***

Obesity is an inflammatory condition that remains a universal contributor to type 2 diabetes. Despite significant research efforts and exhaustive clinical studies, however, broad targeting of inflammation lacks durable therapeutic effects on body weight or glucose levels in people with obesity. In recent studies, our laboratory performed computational screens to identify new therapies for obesity. Our efforts discovered the FDA-approved rheumatoid arthritis drug auranofin has previously unrecognized anti-diabetic effects in preclinical models. In addition to recent studies that explore the cellular contributions to body weight, we are pursuing the mechanisms of auranofin action in efforts to uncover new methods that can slow the progression of obesity to type 2 diabetes.



## Farrah Kheradmand, MD

*Nancy Chang, PhD Professor for the Biology of Inflammation Center, Department of Medicine, Baylor College of Medicine*

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### ***Role of acquired immunity in COPD***

The undisputed role of innate immune cells in the pathophysiology of smoking-induced emphysema dominated the field in the basic research arena for many years. Critically, however, the question of why emphysema progresses in a subset of former smokers remained a mystery. The recognition of activated and organized tertiary T and B lymphoid aggregates in emphysematous lungs provided the first clue that adaptive immune cells may play a crucial role in its pathophysiology. Based on these findings from human translational studies, experimental animal models of emphysema were used to determine the mechanisms through which smoke exposure initiates and orchestrates adaptive autoreactive inflammation in the lungs. These new findings offer a novel opportunity to explore the mechanisms underlying the inflammatory landscape in the lung and offer insights for development of precision-based treatment to halt lung destruction.

# POSTER PRESENTATIONS

## Group 1 | 1:30 PM

*Bolded names indicate presenter*

- 1 **L. Bimler**, Y. Wu, K. Mauk, Y. Ko, B. Deneen, J. Naglik, B. Hube, & D. B. Corry. *Developing a Chronic Model of Candida albicans Cerebral Mycosis through Gut Colonization.*
- 3 **S. Ayyaswamy**, B. Zhang, H. Shi, S. Phillips, R. Bryan, & D. J. Durgan. *Obstructive Sleep Apnea Induced Gut Dysbiosis Stimulates a Proinflammatory Response that Promotes Neuroinflammation and Hypertension.*
- 5 **J. B. Felix**, P. Saha, R. Sharp, A. Cox, P. Masschelin, & S. Hartig. *Regulation of Metabolite pools Influences Adipocyte Differentiation and Antioxidant Capacity.*
- 7 **C. Y. Chang**, R. You, D. Armstrong, & F. Kheradmand. *Chronic Exposure to Carbon Black Ultrafine Particles Reprograms Macrophage Metabolism and Accelerates Lung Cancer.*
- 9 **B. Moscoso**, R. Yang, A. Sonesra, A. Ntamatungiro, A. Chavez, M. Ruiz, C. Dunbar, S. Agashe, E. Bartoli, & A. Maheshwari. *Right-Lateralized Posterior Parietal Oscillations During a Sustained Attention Task in Mice.*
- 11 **S. Osenberg**, M. Sundberg, A. Bajic, G. Cappuccio, T. Polanco, M. Sahin, & M. Maletic-Savatic. *16p11.2 Deletion Affects the Transcriptome and the Lipidome of Human Ipsc-Derived Neurons and Brain Organoids.*
- 13 A. Chaudhur, N. Kongchan, R. Pal, N. Zhao, Y. Zhu, E. Olokpa, S. A. Cheema, S. del Rincon, L. C. Reineke, S. Mao, R. E. Lloyd, M. Sardiello, J. M. Rosen, J. Ferreón, & **J. R. Neilson**. *Targeting EMT-Specific mRNA Translation as a Differentiation Therapy for Breast Cancer.*
- 15 **P. I. Andrade**, D. Jiang, C. A. Burger, D. P. Schafer, & M. A. Samuel. *Regional Regulation of Microglial Phagocytosis in the Developing Visual System by Neuronal SIRP.*
- 17 **K. Hosoki**, A. Govindhan, M. Knight, T. Hazra, S. Sur. *Allosteric Inhibition of CXCR1/2 Chemokine Receptors Attenuates Th2/Th17 Allergic Lung Inflammation.*
- 19 **S. L. Deal**, E. S. Seto, D. Bei, S. B. Gibson, H. Seo-Delgado, & S. Yamamoto. *Using Drosophila Cuticle Melanization to Dissect Dopamine Metabolism and Identify Novel Regulators of Dopamine.*
- 21 **J. W. Mok**, L. MacKay, O. Kanca, F. V. Sirias, Center for Precision Medicine Models (CPMM), Undiagnosed Diseases Network (UDN), M. F. Wangler, H. J. Bellen, A. Milosavljevic, L. C. Burrage, J. D. Heaney, K. Machol, & S. Yamamoto. *Functional Studies Using Drosophila Facilitate Rare Disease Research in the UDN and CPMM.*
- 23 **E. J. Park**, Y. Cui, & B. Di Stefano. *The Interplay of Transcriptional and Post-Transcriptional Regulation Control Mammalian Cell Fate.*

# POSTER PRESENTATIONS

## Group 2 | 2:30 PM

*Bolded names indicate presenter*

- 2 **K. Mauk**, L. Bimler, J. M. Knight, M. Lorenz, J. Naglik, B. Hube, & D. B. Corry. ***Long-Term Persistence of Candida albicans in the Murine Gastrointestinal Tract.***
- 4 **S. Harpavat**, K. Borovsky, M. Scheurer, D. N. Cerminara, M. E. M. Tessier, & B. L. Shneider. ***Post-Hoc Analysis of a Phase 2 Trial of N-Acetylcysteine Following Kasai Procedure for Biliary Atresia.***
- 6 **Y. Zhang**, H. C. Hodges, M. Campen, D. B. Corry, & F. Kheradmand. ***Reprogramming of Innate Tissue Immunity in Vitamin E Acetate-Induced Lung Injury.***
- 8 **D. Armstrong**, C. Y. Chang, J. Hong, Y. Shen, A. Carisey, X. Zhang, L. K. Green, D. R. Lazarus, D. B. Corry, & F. Kheradmand. ***MAGE-A4 in Bronchial Epithelial Cells Induces Lung Adenocarcinoma and Tumor-Promoting Plasma Cells.***
- 10 **E. Ortiz**, B. Moscoso, R. Yang, A. Sonesra, A. Ntamatungiro, A. Chavez, M. Ruiz, C. Dunbar, S. Agashe, E. Bartoli, & A. Maheshwari. ***The Effect of Sensory Deprivation and Mutant Gene Dosage on Seizures and Attention in a Mouse Model of Absence Epilepsy.***
- 12 **G. Cappuccio**, J. Sheppard, A. Bajic, S. Osenberg, S. Khalil, A. Mahat, F. Li, & M. Maletic-Savatic. ***Novel Insights from Metabolomic Analysis of Human Neurons Derived from Patients with MECP2-Related Syndromes.***
- 14 **R. Mackin**, J. Liang, C. Burger, & M. Samuel. ***Retinal Dopaminergic Amacrine Cell Diversity is Regulated by the Kinase LKBI.***
- 16 **T. Wu**, J. Deger, C. Guo, J. Dhindsa, B. Pekarek, Y. Li, R. Al-Ouran, & J. Shulman. ***Cell Specific Transcriptional Responses to Tauopathy in the Aging Brain.***
- 18 **A. Govindhan**, K. Hosoki, A. Rodriguez, T. Hazra, & S. Sur. ***Epithelial cGAS Mediates Allergen-Induced Neutrophil and Dendritic Cell Recruitment in the Early Stages of Allergic Airway Inflammation.***
- 20 J. M. Harnish, L. Li, S. Rogic, G. Poirier-Morency, S. J. Kim, Undiagnosed Diseases Network, K. M. Boycott, M. F. Wangler, H. J. Bellen, P. Hieter, P. Pavlidis, Z. Liu, & **S. Yamamoto**. ***ModelMatcher: A Scientist-Centric Online Platform to Facilitate Collaborations Between Stakeholders of Rare and Undiagnosed Disease Research.***
- 22 **S. Kodali**, L. Proietti, G. Valcarcel, A. V. Lopez-Rubio, P. Pessina, T. Eder, J. Shi, A. Jen, A. Starner, M. Bartels, Y. Cui, F. Levin, E. Shishkova, R. E. Rau, B. M. Javierre, J. Coon, Q. Chen, E. Van Nostrand, J. L. Sardina, F. Grebien, & B. Di Stefano. ***Hijacking of RNA Condensates Corrupts Hematopoietic Cell Identity and Promotes Oncogenesis.***