Icahn School of Medicine at Mount Sinai
The Mindich Child Health and Development Institute

MCHDI Developmental Outcomes

SPRING 2024

Research Advancements: Neurodevelopmental Disorders

Transforming Treatment Paradigms for Down Syndrome: Targeting Preleukemia Early

Down syndrome, known medically as trisomy 21 (T21), affects approximately 1 in 700 newborns and is associated with a spectrum of health challenges, including a heightened risk of leukemia and liver diseases. Notably, around 30% of Down syndrome newborns develop a preleukemic condition known as transient abnormal myelopoiesis (TAM), which can evolve into acute myeloid leukemia. Addressing these conditions early could significantly alter outcomes for these vulnerable children.

Our research project is focused to unravel the cellular and molecular mechanisms underpinning the onset of preleukemia in children with Down syndrome. By focusing on hematopoietic stem cells (HSCs) within the fetal liver — the primary site of blood cell production during prenatal development — we aim to discover how the additional genetic material in individuals with Down syndrome impacts cell development and function.

Utilizing advanced technologies such as single-cell RNA sequencing, our team is profiling the gene expression and mutational landscape of these cells — one cell at a time. This high-resolution analysis allows us to explore cellular heterogeneity in a way that was previously not possible. Moreover, our studies extend to examine the fetal liver microenvironment, assessing how it may foster preleukemic conditions. We are particularly interested in how natural killer cells, known for their roles in immune regulation and cytotoxicity, interact with other cellular components in the liver, potentially leading to dysfunctions such as liver fibrosis — a severe complication associated with TAM that can result in organ failure and death.

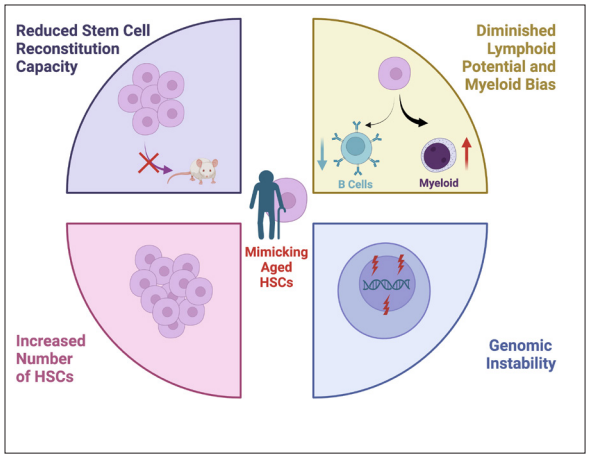


Figure: Trisomy 21 fetal hematopoietic stem cells have deficiencies that are typically associated with hematopoietic stem cells in aged individuals.

Preliminary data from our research has revealed dramatic changes in blood cell production during fetal development in those with trisomy 21. We have observed an increased number of HSCs, yet these cells exhibit reduced self-renewal capacity and dysfunctional gene expression profiles. Notably, these HSCs demonstrate an inability to balance differentiation output towards B-cells and myeloid cells, exhibiting characteristics typically associated with aged HSCs. This early aging phenotype may contribute significantly to the development of hematological diseases and other complications in Down syndrome.

Collaboration is at the heart of our research. Our project synergizes the expertise of Dr. Chris Sturgeon, known for his work on human primary natural killer cells, and Dr. Elvin Wagenblast, an expert in Down syndrome fetal hematopoiesis. This collaboration facilitates a comprehensive approach to tackle the complex challenges associated with Down syndrome and enhances the potential for significant health outcomes improvements through the identification of novel therapeutic interventions.

Our project aims to identify therapeutic targets to prevent the development of TAM, resolve associated liver fibrosis, and halt the progression to leukemia. Our approach seeks to shift away from chemotherapy treatment, which, while managing symptoms, do not prevent the transformation of TAM into leukemia and carry the risk of long-term health complications.

Elvin Wagenblast, PhD
Assistant Professor, Pediatrics and Oncological Sciences

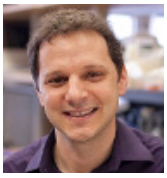
Expanding Our Knowledge of the Genetic Underpinnings of Intellectual Disability

Intellectual disability (ID) affects ~1% of the population, with many cases thought to have a genetic origin. Over the past few decades, multiple different types of mutation in several hundred human genes have been implicated as causes of ID. However, even using state-of-the-art techniques, causal genetic mutations in these genes are typically identified in less than half of individuals referred for clinical genetic testing, indicating that our current knowledge of the causal factors and our ability to identify the full spectrum of mutations underlying genetic disease is incomplete[1].

Current research in the laboratory of Dr. Andrew Sharp is focused on characterizing particular types of genetic mutation called "tandem repeat expansions". The human genome contains hundreds of thousands of sections of DNA in which a short tandem motif is repeated numerous times, e.g. CAGCAGCAGCAGCAGCAG. Most of the time, these tandem repeats are benign. Occasionally, however, some tandem repeats can mutate and grow to extreme length, forming long stretches of tandem repeat composed of hundreds or even thousands of copies. When these tandem repeat expansions occur in important genes, this can lead to genetic disease. Several dozen human disorders that are caused by tandem repeat expansions are currently known[2], including fragile X syndrome, which is one of the most common genetic causes of ID and autism[3]. However, because of their unusual repetitive structure, tandem repeat expansions are difficult to detect with standard genetic testing methods, and, as a result, we believe that there are probably many disease-causing tandem repeat expansions that are yet to be discovered.

In this latest work[4], we designed a study to discover new tandem repeat expansions and determine what effect they have on human disease. One side-effect of many repeat expansions, including the one that causes fragile X, is that they cause increased levels of DNA methylation around the expanded repeat. We therefore used this epigenetic signature as a handle to screen a population cohort of >5,000 individuals, identifying 24 repeat expansions that resemble the one that causes fragile X.

Then, to study whether any of these repeat expansions might influence human disease risk, we used an approach termed Phenome-Wide Association Studies, or PheWAS. We performed a large-scale PheWAS using 168,000 individuals from in the UK Biobank: first identifying people who carried each repeat expansion and then investigating their association with thousands of human traits and diseases by comparing against medical records. Among the many associations we found, one located in a gene called *AFF3* stood out. In the set of individuals in the UK Biobank who carried a tandem repeat expansion in *AFF3*, educational performance tended to be much worse, with carriers completing a high school or university education at about half the rate compared to controls, suggesting that this repeat expansion has a strong negative impact on cognition and other health-related traits (Figure 1). Furthermore, it was remarkably common in the general population, occurring at ~5- to 10-fold higher frequency than the repeat expansion that causes fragile X.



Andrew J. Sharp, PhD
Professor, Genetics and Genomic Sciences

To further assess the effects of this *AFF3* expansion, we then studied an additional cohort of patients with ID that had been referred for clinical genetic testing, and yet remained unsolved despite undergoing state-of-the-art genetic testing. Here, we found a significant enrichment for patients with ID to carry this same *AFF3* expansion, thus confirming that this mutation represents a major and previously unrecognized cause of neurodevelopmental disorders.

Immediate impacts of this work will be improved diagnostic testing for patients with ID worldwide. Our next goals are to recruit and study in more detail a cohort of patients with *AFF3* expansions to better understand the clinical spectrum associated with these mutations and the underlying mechanisms of how it causes disease, both of which are required for improved clinical management and potential therapies.

Citations

1. van der Sanden BPGH, Schobers G, Corominas Galbany J, Koolen DA, Sinnema M, van Reeuwijk J, et al. The performance of genome sequencing as a first-tier test for neurodevelopmental disorders. *Eur J Hum Genet.* 2023 Jan;31(1):81-88.

2. Depienne C, Mandel JL. 30 years of repeat expansion disorders: What have we learned and what are the remaining challenges? *Am J Hum Genet.* 2021 May 6;108(5):764-785.

3. Hagerman RJ, Berry-Kravis E, Hazlett HC, Bailey DB Jr, Moine H, Kooy RF, et al. Fragile X syndrome. *Nat Rev Dis Primers.* 2017 Sep 29;3:17065.

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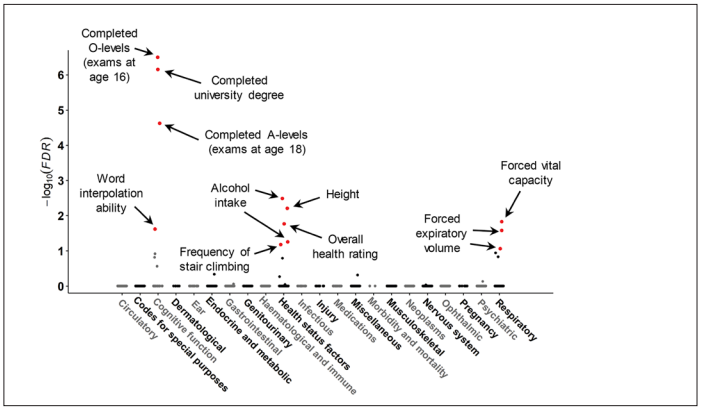


Figure legend: AFF3 expansions associate with reduced educational attainment and markers of morbidity. Results of a phenome-wide association study for the GCC expansion in *AFF3* using the UK Biobank. The expansion associates with reduced educational attainment and a variety of other traits that indicate negative impacts on health.

Pilot Project: 2024 Awardees

Project Title: Exploring the Function of p57KIP2 in Diseases of the Human Pancreatic Beta Cell

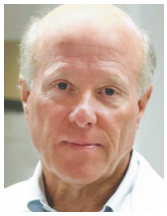
Principal Investigators: Lauryn Choleva, MD, MSc (Communicating PI) and Andrew F. Stewart, MD (Co-PI)

Abstract: p57KIP2, encoded by the CDKN1C gene on chromosome 11, is of particular interest in pediatric endocrinology, since mutations in CDKN1C underlie multiple pediatric endocrine syndromes. These include Beckwith-Wiedemann Syndrome (BWS), IMAGe Syndrome, Russel-Silver Syndrome (RSS), and the Focal Variant of Congenital Hyperinsulinism (FoCHI). In addition, p57KIP2 expression is reduced in human insulinomas. Finally, human beta cell regenerative drugs lead to suppression of p57KIP2. Thus, p57KIP2 is central both to rare pediatric endocrine syndromes, as well as to therapies for Type 1 and Type 2 Diabetes.

Surprisingly, despite its obvious clinical relevance, p57KIP2 is very poorly studied. p57KIP2 is a member of the CIP-KIP family of cell cycle inhibitors that also includes p21CIP1 and p27KIP1. In contrast to other cell cycle inhibitors, it is distinguished by the presence of a large proline-alanine-rich domain, and by its expression in only a subset of beta cells. Remarkably, unlike other cell cycle inhibitors, p57KIP2 is expressed in most human tissues during embryogenesis, but is limited in adult humans to only a few tissues, one of which is the human beta cell. Despite this central role in pediatric disease and pancreatic beta cell biology, very little is known about the function of p57KIP2 in any cell type, including the human beta cell. We hypothesize that p57KIP2 has yet-unknown functions that extend beyond cell cycle control and are unique to the human beta cell. In this proposal, we will perform the first structure-function studies of human p57KIP in the human beta cell. These studies comprise the first complete detailed analysis of this important, but understudied, human disease-associated gene and protein.

Lauryn Choleva, MD, MSc (Communicating PI)
Assistant Professor, Pediatrics
Mindich Child Health and Development Institute

Andrew F. Stewart, MD (Co-PI)
Director, Diabetes Obesity Metabolism Institute
Mindich Child Health and Development Institute



Project Title: Identification and Characterization of Novel Tandem Repeat Expansions in Intellectual Disability

Principal Investigators: Alejandro Martin Trujillo, PhD (Communicating PI) and Silvia DeRubeis, PhD (Co-PI)

Abstract: Exome and genome sequencing applied to human disease cohorts have helped identify the genetic bases of many Mendelian disorders. However, a substantial fraction of cases often remains unexplained, suggesting the involvement of alternative pathogenic mechanisms. Tandem repeat expansions (TREs) are a class of mutation that are typically missed by standard genomic analyses and have primarily been associated with late-onset neurological disorders. We have recently discovered a TRE in the promoter of AFF3 in a fraction of unexplained cases of intellectual disability (ID)1. Given this discovery, we hypothesize that TREs are the underlying genetic cause for ID and related neurodevelopmental disorders, potentially accounting for the missing heritability in current studies.

To test this hypothesis, we will screen for TREs in the genomes of ~500,000 individuals from UK Biobank, and test these for association with educational ascertainment and quantitative measures of cognitive ability as proxies for ID. Furthermore, to gain insights into the pathogenic mechanism by which TREs may impact phenotype, we will investigate the effect of these expansions on the expression levels of nearby genes and local DNA methylation profiles. Focusing on our recent observations on TRE-mediated epigenetic silencing of AFF3 in ID, we will conduct transcriptional analysis following the silencing of Aff3 in primary embryonic murine neurons.

Following this approach, we anticipate that we will likely identify novel TRs contributing to ID, thus expanding our understanding of the genetic risk factors and mechanisms underlying this disorder. Additionally, we aim to construct a model for studying the biology of the genes impacted by TREs.

Alejandro Martin Trujillo, PhD (Communicating PI)
Assistant Professor, Genetics and Genomic Sciences

Silvia De Rubeis, PhD (Co-PI)
Associate Professor, Psychiatry
Mindich Child Health and Development Institute
Friedman Brain Institute
Seaver Autism Center for Research and Treatment

Pilot Project: 2024 Awardees

Project Title: Dissecting Natural Killer Cell Deficiencies in Down Syndrome Children

Principal Investigators: Elvin Wagenblast, PhD (Communicating PI) and Chris Sturgeon, PhD (Co-PI)

Abstract: Down syndrome (DS), also known as trisomy 21 (T21), is the most common cytogenetic abnormality in newborns and occurs with a rate of 1/700 live births. Children with DS have an increased risk of leukemia and autoimmune diseases. In addition, DS children are at higher risk of developing viral infections such as severe pneumonia and COVID-19. Intrinsic immune system defects in DS children include abnormal natural killer (NK) cells with low cytotoxic activity and an overactive interferon response. Decreased NK cell cytotoxicity could lead to physiological dysfunctions including lower immunity against infections and increased risk towards liver diseases. We hypothesize that NK cell deficiencies in DS initiates at the fetal liver stage. The objectives of this pilot project are to characterize underlying T21-specific characteristics of NK cells in the human fetal liver and establish a model system to functionally assess NK cell activity. In AIM 1, we will transcriptionally profile human primary NK cells from disomic and T21 fetal livers at single-cell resolution and identify the molecular underpinnings of NK cell deficiency. In AIM 2, we will functionally characterize NK cells through isolation and derivation of disomic and T21 fetal liver-derived NK cells. With this data in hand, we propose to explore how abnormal NK cell activity could predispose DS children to aberrant liver conditions such as liver fibrosis, as all DS children have greater risk of developing liver diseases during childhood. In addition, 15% of DS newborns with a preleukemic condition in the fetal liver, which is characterized by a high number of abnormal megakaryoblasts, can develop into progressive and lethal liver fibrosis. Thus, the long-term goal is to find targetable pathways that could ameliorate liver diseases in affected DS children.

Elvin Wagenblast, PhD (Communicating PI)
Assistant Professor, Oncological Sciences and Pediatrics
Mindich Child Health and Development Institute
Black Family Stem Cell Institute
Tisch Cancer Institute

Chris Sturgeon, PhD (Co-PI)
Associate Professor, Cell, Developmental and Regenerative Biology and Medicine
Mindich Child Health and Development Institute
Black Family Stem Cell Institute

New Extramural Faculty

Shlomit Beker, PhD

Shlomit Beker, PhD is a cognitive Neuroscientist, focusing on studying physiological mechanisms of neurodevelopmental disorders. She gained her BSc in Psychology and Philosophy and MSc. in Cognitive Psychology from Tel Aviv University, and PhD in neurophysiology from Bar Ilan University, Israel. In her PhD work, she studied the effects of Alzheimer's disease (AD) pathology on neuronal structure and function using intracellular recordings in-vivo from an AD mouse model. Following her PhD, Dr. Beker moved to New York for her post-doctoral training at Albert Einstein College of Medicine, where she studied altered EEG functions in children and adults with autism.

Dr. Beker has recently joined the faculty of the Seaver Autism Center at Mount Sinai as an Assistant Professor. The study in the Beker lab will seek to identify physiological measures of altered synchronization between individuals with autism, and their physical and social environment, using EEG, behavior and measures from the body. Alongside the goal of elucidating the understanding of the latter, Dr. Beker's long-term goal is to use these noninvasive readouts to advance biomarkers for diagnosis and treatment of autism and other neurodevelopmental disorders.

Shlomit Beker, PhD
Assistant Professor, Psychiatry and Neuroscience

Key Publications:

1. Brima T.*, **Beker S.***, Prinsloo K, Butler JS, Djukic A, Freedman EG, Molholm S, Foxe JJ. Probing a Neural Unreliability Account of Auditory Sensory Processing Atypicalities in Rett Syndrome. *J Neurodev Disord.* 2024. In Press (*Equal contribution)
2. **Beker S,** Molholm S. Do we all synch alike? Brain-body-environment interactions in ASD. *Front Neural Circuits*. 2023 Dec 20;17:1275896.
3. **Beker S,** Foxe JJ, Molholm S. Oscillatory entrainment mechanisms and anticipatory predictive processes in children with autism spectrum disorder. *J Neurophysiol.* 2021 Nov 1;126(5):1783-1798.
4. **Beker S,** Foxe JJ, Venticinque J, Bates J, Ridgeway EM, Schaaf RC, Molholm S. Looking for consistency in an uncertain world: test-retest reliability of neurophysiological and behavioral readouts in autism. *J Neurodev Disord.* 2021 Sep 30;13(1):43.
5. **Beker S,** Foxe JJ, Molholm S. Ripe for solution: Delayed development of multisensory processing in autism and its remediation. *Neurosci Biobehav Rev.* 2018 Jan;84:182-192.

Allison Bond, PhD

Allison Bond, PhD is an Assistant Professor in the Departments of Neuroscience and Cell, Developmental, and Regenerative Biology. She is also a member of the Friedman Brain Institute, the Institute for Regenerative Medicine, and the Alper Center for Neural Development and Regeneration. Dr. Bond received her undergraduate degree in Psychology and her Ph.D. in Neuroscience from Northwestern University in Chicago, where she studied signaling mechanisms regulating adult neurogenesis. She then completed her postdoc at the University of Pennsylvania in Philadelphia, where she explored the origin and development of neural stem cells in the adult brain. Dr. Bond recently established her own lab at Mount Sinai focused on uncovering endogenous programs that regulate neural stem cell capacity across the lifespan. The goal of her research program is to successfully target the brain's innate regenerative capacity to promote neuroplasticity in vivo for therapeutic purposes. Dr. Bond is particularly interested in understanding how neural stem cell capacity is regulated by changes in the cellular environment across development and uses the hippocampus region of the mammalian brain as a model for long-lived neural stem cells. The lab employs clonal lineage tracing, single-cell omics, flow cytometry, and advanced imaging techniques to investigate neural stem cell behavior in an in vivo mouse model, and cell type-specific genetic manipulation to investigate how cell-cell interactions drive brain development. Future projects will investigate how experience, pathology, and disease-associated genetic interventions during development can a have long-term impact on neural stem cell behavior and brain function.

Key Publications:

1. Zhou Y, Su Y, Li S, Kennedy BC, Zhang DY, **Bond AM,** Sun Y, Jacob F, Lu L, Hu P, Viaene AN, Helbig I, Kessler SK, Lucas T, Salinas RD, Gu X, Chen HI, Wu H, Kleinman JE, Hyde TM, Nauen DW, Weinberger DR, Ming G and Hongjun Song. Molecular landscapes of human hippocampal immature neurons across lifespan. *Nature,* 2022 Jul; 607(7919):527-533.
2. **Bond AM**, Ming GL, Song H. What is the relationship between hippocampal neurogenesis across different stages of the lifespan?. *Frontiers in Neuroscience,* 2022 May; 16: 891713.
3. **Bond AM,** Ming GL, Song H. Ontogeny of adult neural stem cells in the mammalian brain. *Current Topics in Developmental Biology*, 2021; 142:67-98.
4. **Bond AM,** Berg DA, Lee S, Garcia-Epelboim AS, Adusumilli VS, Ming GL, Song H. Differential timing and coordination of neurogenesis and astrogenesis in developing mouse hippocampal subregions. *Brain Sciences,* 2020 Nov; 10(12): 909.
5. Berg DA, Su Y, Jimenez-Cyrus D, Patel A, Huang N, Morizet D, Lee S, Shah R, Ringeling FR, Jain, R, Epstein JA, Wu QF, Canzar S, Ming GL, Song H, **Bond AM.** A common embryonic origin of stem cells drives developmental and adult neurogenesis. *Cell,* 2019 April; 177(3): 654-668.

Allison Bond, PhD
Assistant Professor, Neuroscience and
Cell, Developmental & Regenerative Biology

Erik Wambre, PhD

Erik Wambre, PhD, is a Professor in the Department of Pediatrics Allergy, Immunology and Immunotherapy and Director of Technology and Business Development at the Human Immune Monitoring Center (HIMC) at the Icahn School of Medicine at Mount Sinai. He is also CEO & co-founder of OCCAM Immune, an Academic Research Organization, spin-off of the Human Immune Monitoring Center at Mount Sinai, offering immune monitoring solutions for industry conducting advanced clinical studies.

Dr. Wambre received a MSc in Biochemistry and Molecular Biology from the University Lille, France and attended the School of Industrial Biology, France, where he received his Master of Business Engineering. He then earned his doctor-

Key Publications

1. Voskamp AL, Khosa S, Phan T, DeBerg HA, Bingham J, Hew M, Smith W, Abramovitch J, Rolland JM, Moyle M, Nadeau KC, Lack G, Larché M, **Wambre E,** O'Hehir RE, Hickey P, Prickett SR. Phase 1 trial supports safety and mechanism of action of peptide immunotherapy for peanut allergy. *Allergy.* 2024 Feb;79(2):485-498.
2. Ferslew BC, Smulders R, Zhu T, Blauwet MB, Kusawake T, Spence A, Aldridge K, DeBerg HA, Khosa S, **Wambre E,** Chichili GR. Safety and immunopharmacology of ASP0892 in adults or adolescents with peanut allergy: two randomized trials. *Allergy*. 2024 Feb;79(2):456-470.
3. Calise J, DeBerg H, Garabatos N, Khosa S, Bajzik V, Calderon LB, Aldridge K, Rosasco M, Ferslew BC, Zhu T, Smulders R, Wheatley LM, Laidlaw TM, Qin T, Chichili GR, Adelman DC, Farrington M, Robinson D, Jeong D, Jones SM, Sanda S, Larson D, Kwok WW, Baloh C, Nepom GT, **Wambre E;** IMPACT. Distinct trajectories distinguish antigen-specific T cells in peanut-allergic individuals undergoing oral immunotherapy. *J Allergy Clin Immunol.* 2023 Jul;152(1):155-166.e9.

ate in Immunology summa cum laude from the University Paris Sorbonne, France. Dr. Wambre completed his postdoctoral training at the Benaroya Research Institute at Virginia Mason Hospital, Seattle, WA. In his role as a professor, his research has focused on understanding the mechanisms that control the development and functional identity of pathogenic TH2 cells, and examining how these regulations are changed during Immunotherapy. His research profile is defined by a relentless pursuit of innovative solutions and comprehensive understanding of pathogenic immune responses, particularly in the context of clinical trial samples.

A significant part of his work involves the creation and development of advanced immunological tools and technology platforms, designed to track antigen-specific immune responses effectively and to maximize information obtained from limited biological samples.

Erik Wambre, PhD
Associate Professor, Pediatrics
Director, HIMC

4. Bajzik V, DeBerg HA, Garabatos N, Rust BJ, Obrien KK, Nguyen QA, O'Rourke C, Smith A, Walker AH, Quinn C, Gersuk VH, Farrington M, Jeong D, Vickery BP, Adelman DC, **Wambre E**. Oral desensitization therapy for peanut allergy induces dynamic changes in peanut-specific immune responses. *Allergy.* 2022 Aug;77(8):2534-2548.
5. **Wambre E,** Bajzik V, DeLong JH, O'Brien K, Nguyen QA, Speake C, Gersuk VH, DeBerg HA, Whalen E, Ni C, Farrington M, Jeong D, Robinson D, Linsley PS, Vickery BP, Kwok WW. A phenotypically and functionally distinct human TH2 cell subpopulation is associated with allergic disorders. *Sci Transl Med.* 2017 Aug 2;9(401):eaam9171.

Faculty Grants/Awards/Honors

Faculty Grants/Awards/Honors

Supinda Bunyavanich, MD, MPH, MPhil, Scott Sicherer, MD, and Robert Wood, MD (mPIs), NIAID, UM1, "New Horizons for the Prevention and Treatment of food Allergy"

Silvia De Rubeis, PhD, Editor-in-chief, Neurogenetics (Springer Nature)

Bruce D. Gelb, MD, NHLBI, UM1, "Pediatric Heart Network New York Consortium"

Bruce D. Gelb, MD, Visiting Professor at Duke University School of Medicine, Child Health Research Week, Pediatric Grand Rounds, April 9, 2024

Nicole Ramsey, MD, PhD, 2024 AAP National Conference & Exhibition, Atopic Dermatitis: Moving Beyond the Surface for Treatment, Section on Allergy and Immunology Program: Day 1, Dawn of a New Era: Incorporating the Latest Evidence into Practice

Nicole Ramsey, MD, PhD and Maria Lafaille, PhD (mPIs), Foundation Grant, Food Allergy Fund, "Repurposing abrocitinib for food allergy: understanding the implications of JAK1 inhibition on B cell phenotype and allergen-specific IgE and IgG4

Donald Scott, PhD, Adolfo Garcia-Ocana, PhD and Maureen A. Gannon, PhD (mPIs), NIDDK, R01, "Nrf2 and the expansion and preservation of beta cell mass"

Scott H. Sicherer, MD, NIAID, U01, "Mount Sinai's CoFAR Clinical Research Center"

Scott H. Sicherer, MD, Distinguished Clinician Award, American Academy of Allergy, Asthma and Immunology

Ryan Walker, PhD, NIDDK, R01, "The effects of a high fructose diet on the gut microbiome and metabolic health: A controlled clinical intervention study"

Trainee and Volunteer Grants/ Awards/Honors

Sophie Gao, PI: Tirtha Das, PhD, Regeneron Science Talent Search Contest 2024, Top 40 Nationwide Finalist, "Uncovering Mechanisms of Action and Resistance for KRASG12D inhibitor MRTX1133 Using Drosophila melanogaster Models"

Marta Garcia-Forn, PhD, Brain & Behavior Research Foundation, 2024 Young Investigator Grant, "Cortical glutamatergic lineages in the co-morbidity of autism and anxiety in a mouse model"

Marta Garcia-Forn, PhD, Uplifting Athletes & DDX3X Foundation, 2024 Young Investigator Draft, "Prenatal mechanisms of DDX3X syndrome: investigating cortical development in a Ddx3x mutant mouse model"

Alexa von Mueffling, BA, Undergraduate trainee, Barnard College 2024 Christina L Williams Prize for Original Neuroscience Research Publication or Scientific Meeting Presen-

tation, “Examining a subpopulation of cortical glutamatergic neurons in a mouse model of DDX3X syndrome”

Bhavana Shewale, MBBS, MS, American Heart Association, Predoctoral Fellowship, “Role of RNA binding protein DDX3X in cardiac development”

Isabelle Tse, Best pre-doctoral oral presentation, Boston-Ithica Islet Club, Weill-Cornell, April 6-7, 2024, “Molecular glues prevent glucolipotoxicity in β-cells”

Miranda Wilson, BS, The Allied Genetics Conference 2024, oral presentation, “The RNA-binding protein, Rbpms2, regulates mTor signaling via the Gator2 complex protein, Mios, to promote oogenesis and female fate in zebrafish”

Miranda Wilson, BS, TAGC Attendance Support for Minoritized Scientists-NSF Rising Scientist Award

Angela Wang, PI: Tirtha Das, PhD, NYC Terra STEM Fair (NYSSEF) 2024, Finalist, “Drosophila Discovery Platforms to Treat Luna Cancer: Identifying Resistance Mechanisms driven by KIF5B-RET-G810R and Reversing it via Multikinase Inhibitor Treatment”

Angela Wang, PI: Tirtha Das, PhD, Junior Science and Humanities Symposium Competition 2024, Semifinalist, “Drosophila Discovery Platforms to Treat Luna Cancer: Identifying Resistance Mechanisms driven by KIF5B-RET-G810R and Reversing it via Multikinase Inhibitor Treatment”

Faculty Highlights

Publications

Baumel-Alterzon S, **Katz LS**, **Lambertini L**, Tse I, Heidery F, **Garcia-Ocaña A**, **Scott DK**. Nrf2 is required for neonatal mouse beta cell growth by maintaining redox balance and promoting mitochondrial biogenesis and function. *Diabetologia.* 2024 Mar;67(3):547-60.

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Quinn TP, Hess JL, Marshe VS, Barnett MM, Hauschild AC, Maciukiewicz M, ... **Breen MS**, ... **Chen J**, ... Glatt SJ. A primer on the use of machine learning to distil knowledge from data in biological psychiatry. *Mol Psychiatry.* 2024 Jan 4.

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Yalung JE, Shifman HP, Manning ER, Beck A, **Bucuvalas J**, Lai JC, Wadhwani SI. Ambient air pollution is associated with graft failure/death in pediatric liver transplant recipients. *Am J Transplant.* 2024 Mar;24(3):448-57.

Zhang L, Chun Y, Arditi Z, Grishina G, Lo T, Wisotzkey K, ... **Wang J**, **Sampson HA**, **Sicherer S**, **Berin MC**, **Bunyavanich S**. Joint transcriptomic and cytometric study of children with peanut allergy reveals molecular and cellular cross talk in reaction thresholds. *J Allergy Clin Immunol.* 2024 Jan 23.

Bunyavanich S, Becker PM, Altman MC, Lasky-Su J, Ober C, Zengler K, ... Hasegawa K. Analytical challenges in omics research on asthma and allergy: A national institute of allergy and infectious diseases workshop. *J Allergy Clin Immunol.* 2024 Apr;153(4):954-68.

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Wang Y, Hermetz K, Burt A, Kennedy EM, **Lesseur C**, Panuwet P, ... **Hao K**, **Chen J**, Marsit CJ. Placental transcriptome variation associated with season, location, and urinary prenatal pyrethroid metabolites of thai farm-working women. *Environ Pollut.* 2024 Mar 28;349:123873.

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