

Asthma Research

Division Details

RESEARCH AND TRAINING DETAILS

| | |
|-------------------------------------|-------------|
| Faculty | 5 |
| Research Fellows and Post Docs | 7 |
| Research Graduate Students | 2 |
| Total Annual Grant Award Dollars | \$3,845,610 |
| Total Annual Industry Award Dollars | \$156,475 |



Row 1: S Itskovich, S Moore, K Keidel, R Alarcon, A Jagpal, G Khurana Hershey

Row 2: H Johansson, T Mersha, H Ji, T Baker, K Curtsinger, A Baatyrbek kyzy, K Titus, B Ruff, A Sadler, Z Zhang

Row 3: M Butsch Kovacic, A Vockell, M Stevens, J Burleson, S Sauter

Row 4: B Grashel, E Schauburger, Y Gautam, S Ghandikota, J Loch, A Patterson, P Bolcas, J Kroner, E Brandt, M Wathen, P Groh, J Biagini Myers

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Division Highlights

Repurposing an FDA approved Drug for Asthma: Gurjit Khurana Hershey, MD, PhD; and Jocelyn Biagini Myers, PhD

The Adare Drug Repurposing and Optimization Innovation Fund awarded [Dr. Khurana Hershey, MD, PhD](#), and her team to repurpose an FDA-approved drug for an asthma indication. Her laboratory previously identified this drug target as part of a study to understand why some children with asthma respond effectively to asthma medications while others do not. More recently, the laboratory has identified that this new drug target may be effective at treating asthma as a single agent. Based on these findings, they are preparing a pilot trial to test the safety, tolerance and efficacy of this drug in adult asthmatics, with the goal of moving towards a full clinical trial.

Development of Online Genome-wide Ancestry Tool: Tesfaye B. Marsha, PhD

[Dr. Tesfaye Mersha, PhD](#), and his team developed, and made freely available, an online genome-wide ancestry informative markers (AIMs) tool, *AncestrySNPminer*, the first web-based bioinformatics tool specifically designed to retrieve AIMs from ever growing genomic datasets and link these informative markers to genes and ontological annotation classes [Cincinnati Children's Hospital Medical Center Technology Disclosure #: 2011-1105]. The tool includes an automated and simple "scripting at the click of a button" function that enables researchers to retrieve DNA variants between populations with different allele frequency and selection pressure with user-friendly querying and filtering of datasets across various ancestries through a single web interface. This is a timely resource for the population genomics research community. As of June 20, 2017, more than 17,667 registered users from around the world have freely accessed this resource.

Personalized Treatment Algorithms for Difficult-to-Treat Asthma: Gurjit Khurana Hershey, MD, PhD; Jocelyn Biagini Myers, PhD; Melinda Butsch Kovacic, PhD; and Hong Ji, PhD

The Academic and Research Committee awarded the development of a Bench to Community Asthma Center that brings together faculty across Cincinnati Children's to work together develop personalized treatment algorithms for difficult-to-treat asthma. Asthma is heterogeneous in terms of treatment response and natural history. This heterogeneity contributes to the difficulty in both studying and treating asthma. This project will explore the biologic mechanisms underlying difficult-to-treat patients, which are the most challenging and account for >50% of asthma health care utilization. We will conduct home visits and collect biospecimens to define and quantify known molecular, genetic, genomic, epigenetic, immunologic, and exposure biomarkers along with clinical, psychosocial, and adherence data to develop personalized treatment plans. This study will provide a foundation and framework for the development and implementation of multi-modality treatment strategies specifically designed for difficult-to-treat asthmatics.

Study to Analyze the Expression of a Peripheral Blood Receptor in Healthy Volunteers of Different Age Group: Gurjit Khurana Hershey, MD, PhD

[Novartis](#) selected Dr. Hershey and her team to participate in a non-interventional study to compare the expression of a peripheral blood receptor in children compared to the expression in adults. Novartis engaged in a project to determine the efficacy of a drug that targets this receptor in the treatment of asthma. We enrolled 40 participants (20 children and 20 adults), and collected peripheral blood on these 40 participants for analysis. The findings from this study will help establish the need for a full randomized controlled trial.

New Cohort to Study Atopic Dermatitis in Children: Jocelyn Biagini Myers, PhD; and Gurjit Khurana Hershey, MD, PhD

As part of their National Institutes of Health funded Asthma and Allergic Diseases Center U19 grant, Drs. [Jocelyn Biagini Myers, PhD](#), and [Gurjit Khurana Hershey, MD, PhD](#), are recruiting a new cohort of 500 toddlers with eczema. It is the first cohort of children with eczema in the U.S. Fifty percent of these children will develop asthma. Drs. Myers and Hershey will follow these children for five years to determine the factors that promote asthma among children with atopic dermatitis.

Division Publications

1. Yang IV; Pedersen BS; Liu AH; O'Connor GT; Pillai D; Kattan M; Misiak RT; Gruchalla R; Szeffler SJ; Khurana Hershey GK. **The nasal methylome and childhood atopic asthma.** *Journal of Allergy and Clinical Immunology.* 2017; 139:1478-1488.
2. Krouse RZ; Sorkness CA; Wildfire JJ; Calatroni A; Gruchalla R; Hershey GKK; Kattan M; Liu AH; Makhija M; Teach SJ. **Minimally important differences and risk levels for the Composite Asthma Severity Index.** *Journal of Allergy and Clinical Immunology.* 2017; 139:1052-1055.
3. Hall SL; Baker T; Lajoie S; Richgels PK; Yang Y; McAlees JW; van Lier A; Wills-Karp M; Sivaprasad U; Acciani TH. **IL-17A enhances IL-13 activity by enhancing IL-13-induced signal transducer and activator of transcription 6 activation.** *Journal of Allergy and Clinical Immunology.* 2017; 139:462-471.e14.
4. Zhang Z; Biagini Myers JM; Brandt EB; Ryan PH; Lindsey M; Mintz-Cole RA; Reponen T; Vesper SJ; Forde F; Ruff B. **β -Glucan exacerbates allergic asthma independent of fungal sensitization and promotes steroid-resistant TH2/TH17 responses.** *Journal of Allergy and Clinical Immunology.* 2017; 139:54-65.e8.
5. Pongracic JA; Krouse RZ; Babineau DC; Zoratti EM; Cohen RT; Wood RA; Khurana Hershey GK; Kerckmar CM; Gruchalla RS; Kattan M. **Distinguishing characteristics of difficult-to-control asthma in inner-city children and adolescents.** *Journal of Allergy and Clinical Immunology.* 2016; 138:1030-1041.

6. Liu AH; Babineau DC; Krouse RZ; Zoratti EM; Pongracic JA; O'Connor GT; Wood RA; Khurana Hershey GK; Kercksmar CM; Gruchalla RS. **Pathways through which asthma risk factors contribute to asthma severity in inner-city children.** *Journal of Allergy and Clinical Immunology*. 2016; 138:1042-1050.
7. Zoratti EM; Krouse RZ; Babineau DC; Pongracic JA; O'Connor GT; Wood RA; Khurana Hershey GK; Kercksmar CM; Gruchalla RS; Kattan M. **Asthma phenotypes in inner-city children.** *Journal of Allergy and Clinical Immunology*. 2016; 138:1016-1029.
8. Gupta J; Johansson E; Bernstein JA; Chakraborty R; Khurana Hershey GK; Rothenberg ME; Mersha TB. **Resolving the etiology of atopic disorders by using genetic analysis of racial ancestry.** *Journal of Allergy and Clinical Immunology*. 2016; 138:676-699.
9. Brandt EB; Khurana Hershey GK. **A combination of dexamethasone and anti-IL-17A treatment can alleviate diesel exhaust particle-induced steroid insensitive asthma.** *Journal of Allergy and Clinical Immunology*. 2016; 138:924-928.e2.
10. Giridhar PV; Bell SM; Sridharan A; Rajavelu P; Kitzmiller JA; Na CL; Kofron M; Brandt EB; Ericksen M; Naren AP. **Airway Epithelial KIF3A Regulates Th2 Responses to Aeroallergens.** *Journal of immunology (Baltimore, Md. : 1950)*. 2016; 197:4228-4239.
11. Wikenheiser-Brokamp KA; Klein M; Hershey GKK; Devarajan P; DeWitt TG; Loch J; Strauss AW; Muglia LJ; Hostetter MK. **Evaluation of Fellows' CrossTalk Effectiveness in Promoting Transdisciplinary Networking and Research.** *The Journal of Pediatrics*. 2017; 181:5-6.e3.
12. Zhang Z; Reponen T; Hershey GKK. **Fungal Exposure and Asthma: IgE and Non-IgE-Mediated Mechanisms.** *Current Allergy and Asthma Reports*. 2016; 16:86.
13. Heymann PW; Nguyen HT; Steinke JW; Turner RB; Woodfolk JA; Platts-Mills TAE; Martin L; He H; Myers JB; Lindsey M. **Rhinovirus infection results in stronger and more persistent genomic dysregulation: Evidence for altered innate immune response in asthmatics at baseline, early in infection, and during convalescence.** *PLoS one*. 2017; 12:e0178096.
14. Ji H; Myers JMB; Brandt EB; Brokamp C; Ryan PH; Hershey GKK. **Air pollution, epigenetics, and asthma.** *Allergy, Asthma and Clinical Immunology*. 2016; 12:51.
15. Kannan JA; Brokamp C; Bernstein DI; Lemasters GK; Hershey GKK; Villareal MS; Lockey JE; Ryan PH. **Parental Snoring and Environmental Pollutants, but Not Aeroallergen Sensitization, Are Associated with Childhood Snoring in a Birth Cohort.** *Pediatric, Allergy, Immunology, and Pulmonology*. 2017; 30:31-38.
16. Chidambaran V; Zhang X; Martin LJ; Ding L; Weirauch MT; Geisler K; Stubbeman BL; Sadhasivam S; Ji H. **Dna methylation at the mu-1 opioid receptor gene (OPRM1) promoter predicts preoperative, acute, and chronic postsurgical pain after spine fusion.** *Pharmacogenomics and Personalized Medicine*. 2017; Volume 10:157-168.
17. Edukulla R; Rehn KL; Liu B; McAlees JW; Hershey GK; Wang YH; Lewkowich I; Lindsley AW. **Intratracheal myriocin enhances allergen-induced Th2 inflammation and airway hyper-responsiveness.** *Immunity, Inflammation and Disease*. 2016; 4:248-262.

Grants, Contracts, and Industry Agreements

Annual Grant Award Dollars

| Investigator | Title | Sponsor | ID | Dates | Amount |
|---------------------------------|---|--|-----------------|-------------------------------|-----------|
| Gurjit Khurana Hershey, MD, PhD | Ohio Children's Hospitals Asthma Task Force | Ohio Depart of Jobs and Family Services (Nationwide Children's Hospital) | G-1 213-07-0561 | 07/01/2012 - 06/30/2017 | \$92,116 |
| Gurjit Khurana Hershey, MD, PhD | Inner City Asthma Consortium 3 | National Institutes of Health (University of Wisconsin-Madison) | UM1 AI114271 | 08/05/2014 - 07/31/2021 | \$625,753 |

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|---------------------------------|--|--|--------------------|-------------------------------|-------------|
| Hong Ji, PhD | Epigenetic Programming of Innate Immunity in Pediatric Airway Epithelium | National Institutes of Health (U.C. Davis Medical Center) | R21 AI116129 | 07/15/2015 - 06/30/2017 | \$26,993 |
| Tesfaye B Mersha, PhD | Unraveling Ancestry and Environmental Exposure Interactions in Childhood Asthma | National Institutes of Health | R01 HL132344 | 04/01/2016 - 03/31/2021 | \$676,584 |
| Gurjit Khurana Hershey, MD, PhD | Ohio Children's Hospital Asthma Task Force | Ohio Department of Medicaid (ODM) (Ohio Children's Hospital Association Fdn) | OCHAF-ODM | 07/01/2015 - 06/30/2017 | \$551,580 |
| Gurjit Khurana Hershey, MD, PhD | Epithelial Genes in Allergic Inflammation | National Institutes of Health | U19 AI070235 | 09/01/2016 - 08/31/2021 | \$1,642,142 |
| Tesfaye B Mersha, PhD | Ancestry-Environmental Exposure Interactions and Asthma Risk in Admixed Population | National Institutes of Health | R03 HL133713 | 09/01/2016 - 08/31/2018 | \$78,000 |
| Gurjit Khurana Hershey, MD, PhD | Children's Respiratory Research and Environment Workgroup | National Institutes of Health (University of Wisconsin-Madison) | UG3OD023282 | 09/21/2016 - 08/31/2023 | \$69,442 |
| Tesfaye B Mersha, PhD | Interactions Between Genetic Ancestry and Environmental Risk Factors in Asthma | National Institutes of Health (University of Cincinnati) | P30 ES006096 | 04/01/2016 - 03/31/2017 | \$5,000 |
| Gurjit Khurana Hershey, MD, PhD | Airway Inflammation and Airway Monitoring | National Institutes of Health (University of California San Diego) | UCSanDiego,U19supp | 09/01/2016 - 08/31/2017 | \$78,000 |

Total Annual Grant Award Dollars

\$3,845,610

Annual Industry Award Dollars

| Investigator | Industry Sponsor | Amount |
|--|--------------------------|------------------|
| Gurjit Khurana Hershey, MD, PhD | Novartis Pharmaceuticals | \$156,475 |
| Total Annual Industry Award Dollars | | \$156,475 |
