**Division Data Summary**

### Research and Training Details

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<tr>
<td>Number of Faculty</td>
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<td>Number of Research Fellows</td>
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<td>Number of Research Students</td>
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<td>Number of Support Personnel</td>
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<td>Direct Annual Grant Support</td>
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<td>Peer Reviewed Publications</td>
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### Clinical Activities and Training

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<td>Number of Clinical Staff</td>
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<td>Number of Other Students</td>
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<td>Inpatient Encounters</td>
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<td>Outpatient Encounters</td>
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**Significant Publications**


Candidate gene case-control studies have identified several single nucleotide polymorphisms (SNPs) that are associated with asthma susceptibility. Most of these studies have been restricted to evaluations of specific SNPs within a single gene and within populations from European ancestry. Recently, there is an increasing interest in understanding racial differences in genetic risk associated with childhood asthma. Our aim was to compare association patterns of asthma candidate genes between children of European and African ancestry.


Asthma is a major public health burden worldwide. Studies from our group and others have demonstrated that SERPINB3 and SERPINB4 are induced in patients with asthma; however, their mechanistic role in asthma has yet to be determined.

**Division Highlights**

**Asthma Research**
A Pyrosequencing Core was approved by Research Administration and will be run by Asthma Research personnel. It is the first core managed by the division. It has a dedicated faculty member and staff member, and is located on the 8th floor of the S Building. There are external and internal marketing and public relations plans to assure that this core is advertised to a regional and national audience.

The two primary core objectives are:

1. To provide services to accurately measure DNA methylation level in a locus specific manner in a 96 well format, suitable for large-scale high-throughput validation analysis.

2. To provide services for mutation analysis and genotyping, suitable for detection, and quantification or genetic variations including insertion-deletions, single nucleotide poymorphisms, single tandem repeats, and variable gene copy number.

Also, the division increased its grant, contract and award volume by 18 percent during the past year. The dollar volume rose by 10 percent. It was a superb year given that NIH and many agencies restricted the volume of grants awarded, as well as the amount of funding per award. Dr. Brandt was awarded a third year of funding on a T32 grant, which originally had a two year award period.

Dr. Melinda Butsch Kovacic was selected to attend the Association Medical Colleges Early Career Women Faculty Professional Development Seminar in Washington, DC.

Dr. Tesfaye Mersha was selected as an editor for the *Frontiers in Applied Genetic Epidemiology*.

Dr. Umasundari Sivaprasad was a recipient of the *University of Cincinnati Research Council* grant.

### Division Collaboration

**Allergy/Immunology; Immunobiology; Biostatistics and Epidemiology; Human Genetics; Pathology** » Marc Rothenberg, MD, PhD; Marsha Wills-Karp, PhD; Lisa Martin, PhD; Keith Stringer, MD  
Asthma and Allergic Diseases Cooperative Research Center funded by the NIH.

**Emergency Medicine; Pulmonary Medicine; General and Community Pediatrics; Adherence Psychology; Biomedical Informatics; Allergy/Immunology** » Richard Ruddy, MD; Rick Strait, MD; Carolyn Kercsmar, MD; Jeffrey Simmons, MD; Rob Kahn, MD; Dennis Drotar, PhD; Bruce Aronow, PhD  
Asthma Nasal Epithelial Study: A collaborative study determining the molecular heterogeneity of the gene expression profile in response to the treatment of acute asthma exacerbations in hospitalized children with asthma.

**Pulmonary Medicine** » Carolyn Kercsmar, MD; Karen McDowell, MD; Gary McPhail, MD  
The Division of Asthma Research has partnered with the Asthma Center to form the CCHMC Asthma Program to improve the health of children with asthma by integrating evidence-based clinical care with innovative research that will lead to personalized asthma therapy for the children living in the Greater Cincinnati. Drs. Gurjit Khurana Hershey and Carolyn Kercsmar were recently awarded a $2.8M grant to participate in a national study aimed at preventing asthma in inner-city children. The asthma research is being done as part of an 11-site group called the "Inner City Asthma Consortium".

**Neonatology and Pulmonary Biology** » Tim Le Cras, PhD  
Impact of Early Life Diesel Exposure on Immune Patterning and Lung Structure/Function grant.

**Hematology/Oncology** » Susanne Wells, PhD  
HPV Replication and Transformation in FA Squamous Cell Carcinomas; HPV Prevalence Studies in Fanconi
Anemia Population.

Dermatology; Allergy/Immunology; Immunobiology; Hematology/Oncology » Anne Lucky, MD; Marc Rothenberg, MD, PhD; Fred Finkelman, MD

Role of IL-13 Receptors in Atopic Dermatitis grant.

Faculty Members

Gurjit Khurana Hershey, MD, PhD, Professor
   Division Director
   Kindervelt Endowed Chair
   Associate Director, Physician Scientist Training Program
   Research Interests Elucidating the mechanisms of allergic inflammation and asthma. The research centers on identifying genes important in asthma and allergy.

Melinda Butsch Kovacic, MPH, PhD, Assistant Professor
   Research Interests Using classical and molecular epidemiological approaches to evaluate environmental, infectious, genetic, and socioeconomic causes of chronic disease with current focuses on asthma and Fanconi anemia.

Weiguo Chen, MD, PhD, Assistant Professor
   Research Interests Mechanisms underlying airway hyperresponsiveness, inflammation and remodeling of allergic asthma.

Hong Ji, PhD, Assistant Professor
   Research Interests Epigenetic plasticity of development and disease; asthma epigenetics; genome-wide and locus specific DNA methylation analysis; epigenetic regulation of gene expression

Tesfaye Mersha, PhD, Assistant Professor
   Research Interests Integrating and using genomics, statistical genetics, biological profiling and pathway methods to elucidate the genetic architecture of complex diseases of public significance, including asthma.

Umasundari Sivaprasad, PhD, Assistant Professor
   Research Interests Allergic inflammation; atopic dermatitis; asthma; development of anti-inflammatory therapies

Trainees

- Rachael Mintz-Cole, BS, PL-4, University of Cincinnati
- Jayanta Gupta, MD/PhD, PGY7, University of Cincinnati
- Eric Brandt, PhD, PGY11, Institut Pasteur de Lille, France
- Hyun-Bae Jie, PhD, PGY10, Harvard Medical School
- Jocelyn Biagini Myers, PhD, PGY3, University of Cincinnati
- Gerald Lee, MD, PGY3, University of Cincinnati
- Lili Ding, PhD, PY1, University of Cincinnati
- Zhouyang Weng, PhD, PY1, University of Cincinnati
- Zonghua Zhang, MD, Vanderbilt University

Significant Accomplishments

Cooperative Research Grant
Our Asthma and Allergic Diseases Cooperative Research Center (AADCRC) is one of only 12 such centers in the United States. Gurjit Khurana Hershey, MD, PhD, is the principal investigator for this center, which received a renewal of its NIH-funded U19 grant this year.

The center’s overarching hypothesis is that epithelial cell genes play a central role in the pathogenesis of allergic disorders. Thus far, 10 peer-reviewed papers and five review articles and/or chapters have resulted from this grant.

Hershey, who also serves on the AADCRC steering committee, will continue to investigate the genetics of allergy-driven epithelial genes in children with asthma, atopic dermatitis and/or food allergy to identify shared and unique genes and pathways.

**Inner City Asthma Consortium**

Cincinnati Children’s was selected this year to join the NIAID-funded Inner City Asthma Research Consortium (ICAC). The consortium, which includes 11 research centers, is the nation’s largest effort to study the factors that promote asthma in an inner city environment. Gurjit Khurana Hershey is the principal investigator for the Cincinnati Children’s subcontract.

The consortium’s objectives include conducting clinical studies to improve asthma control, prevent asthma among inner city children, and improve asthma phenotyping using validated biomarkers. The group plans to conduct longitudinal birth cohort studies as well as mechanistic studies involving human subjects to gain information on the early immunopathogenesis of asthma, to identify asthma risk factors for inner city children, and to study the differences in the early immunopathogenesis of asthma between inner city and non-inner city children.

**Admixture Mapping in African American Asthmatic Children**

This study proposes that disease does not affect all populations equally. Therefore, screening the genome of African American mixed ancestry can be an efficient strategy to identify asthma genes. Tesfaye Mersha, PhD, is developing a program of study that would lead to an in-depth understanding of the genome of African American (AA) admixed populations and develop procedures and methods to localize asthma liability genes by utilizing this information and SNP markers for linkage disequilibrium admixture mapping.

**Division Publications**

6. Biagini Myers JM, Khurana Hershey GK. *Eczema in early life: genetics, the skin barrier, and lessons...*


Grants, Contracts, and Industry Agreements

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<td>Molecular Epidemiology in Children’s Environmental Health Training Program</td>
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<td><strong>BUTSCH KOVACIC, M</strong></td>
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<td>Exposure-Induced Systemic Oxidative Stress in Children with Asthma</td>
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<td>R21 ES016830</td>
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**KHURANA HERSHEY, G**

**Development of an Asthma Research Core Center**
National Institutes of Health
P30 HL 101333 09/30/09-08/31/11  $297,108

**Role of IL-13 Receptors in Atopic Dermatitis**
National Institutes of Health
R01 AR 054490 09/01/07-07/31/12  $301,610

**Inner City Asthma Consortium**
National Institutes of Health (University of Wisconsin-Madison)
HHSN272200900052C 03/01/11-09/29/14  $192,198

**KHURANA HERSHEY, G/LECRAS, T (MPI)**

**Impact of Early Life Diesel Exposure on Immune Patterning and Lung Structure/Function**
National Institutes of Health
R01 HL 097135 09/01/09-07/31/14  $347,205

**MERSHA, T**

**Admixture Mapping in African American Asthmatic Children**
National Institutes of Health
K01 HL 103165 07/14/10-05/31/15  $124,996

**MINTZ-COLE, R**

**Regulation of Foxp3 Expression by DNA Methylation in Mold-Induced Asthma**
National Institutes of Health
F30 HL 103087 07/01/10-06/30/14  $33,322

**Current Year Direct**  $1,472,994
**Total**  $1,472,994