CCTSI K12 Scholar Spotlight

Meghan Althoff, MD, PhD
Assistant Professor
Division of Pulmonary, Allergy, & Critical Care Medicine

Mentors:
Fernando Holguin, MD, MPH
Sunita Sharma, MD

cctsi.cuanschutz.edu

My Career Trajectory

Education

BA
Northwestern

MPH UC
Berkeley

MD/PhD in
Epidemiology
Tulane

NRSA F30

Training

Physician-Scientist
Training Program-
Internal Medicine
Residency

T32-supported
Pulmonary and
Critical Care
Fellowship

Faculty

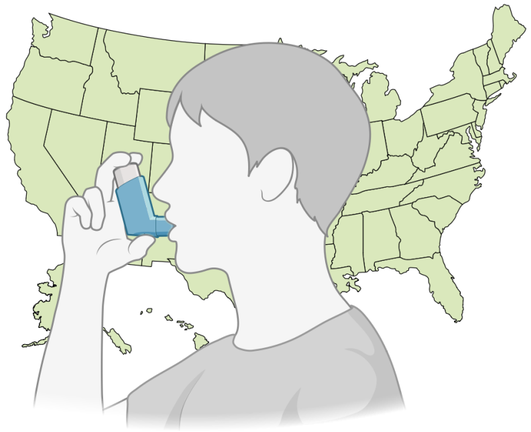
July 2023- Instructor of Medicine
Dec 2023- current CCTSI K12
July 2024- Promoted to Assistant Professor
May 2026- Projected start NHLBI K08

75% Research
25% Clinical
- Outpatient Asthma
- Medical ICU

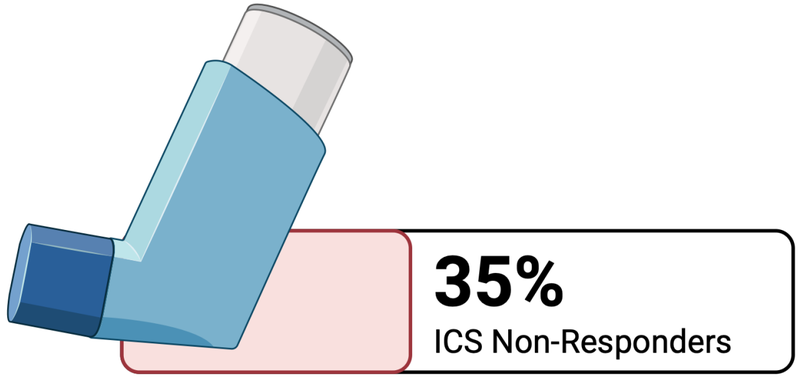
CCTSI Programs:
- K12 Scholar
- CO-Mentor
- Pre-K grant review

Current Research-*Relevance and Background*

7-9% of people in the US have asthma

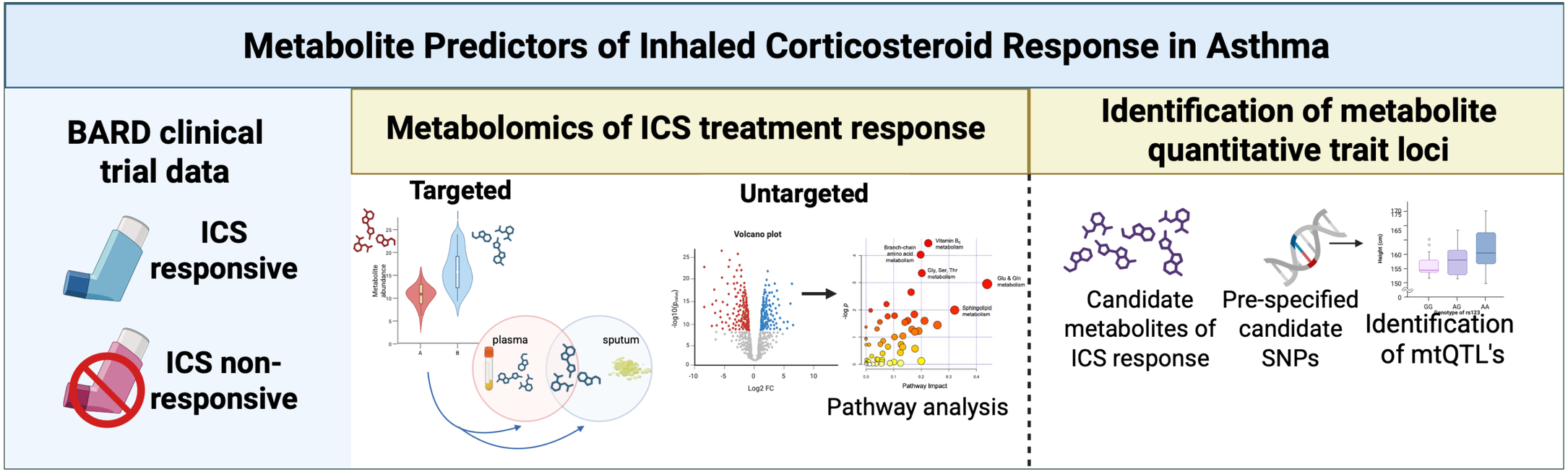


Inhaled corticosteroids (ICS) are the backbone of asthma management



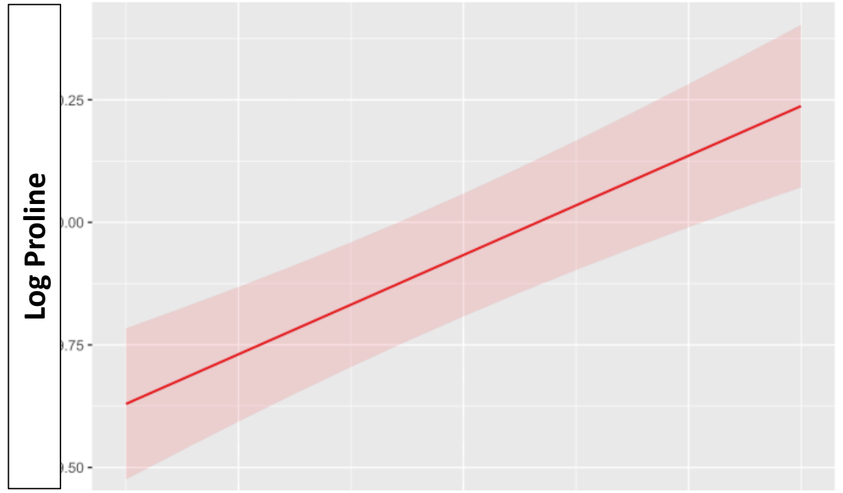
Current Research

Hypothesis: **There are distinct *metabolite profiles* that include arginine, oxylipin, and other inflammatory pathways associated with inhaled corticosteroid (ICS) response. ICS responses will differ by BMI.**

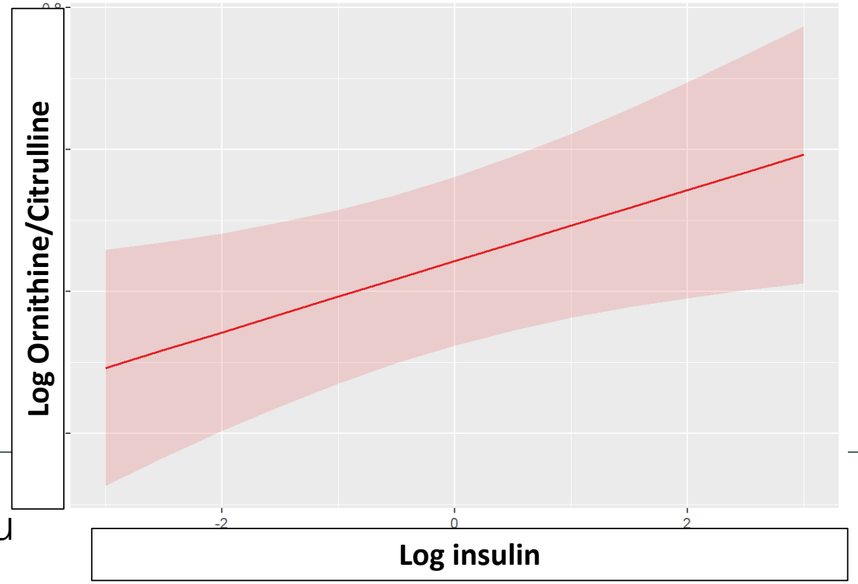


Data Summary:

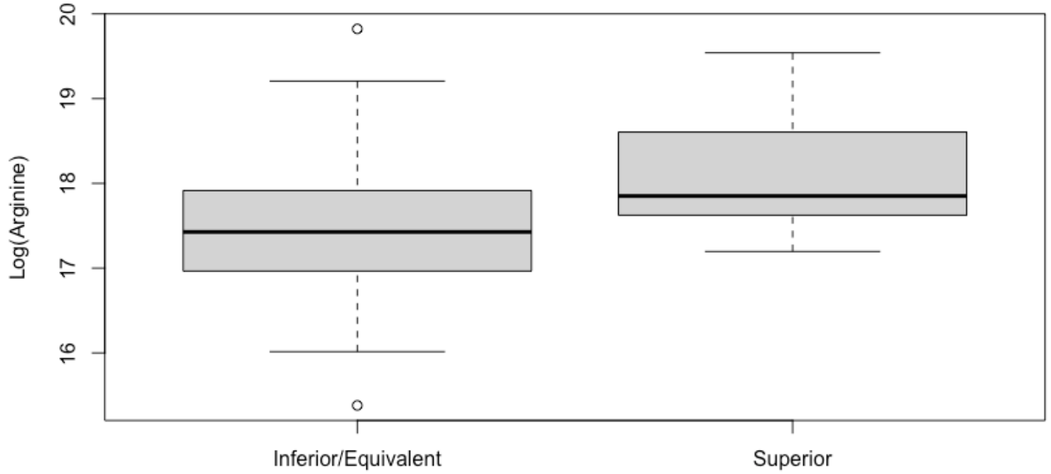
In patients with asthma, plasma, insulin levels are associated with arginase metabolites



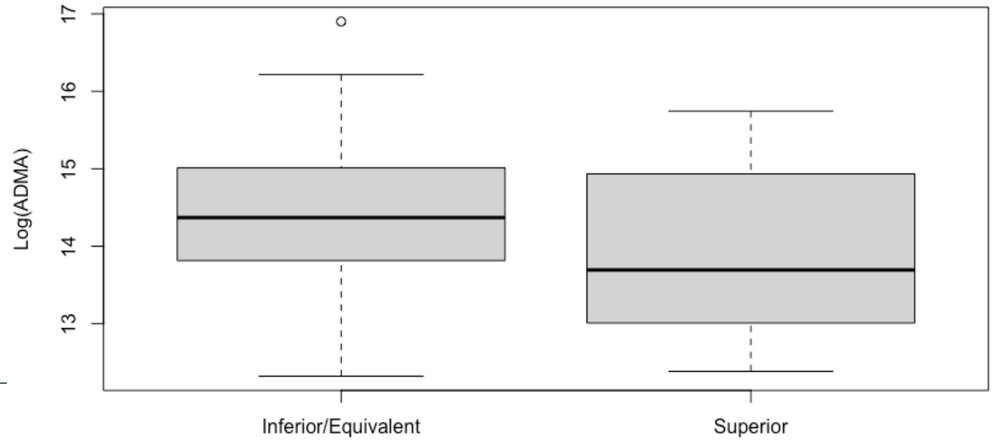
Adjusted predicted values of log(Ornithine/citruline) (ng/ml)



Values of sputum arginine and ADMA vary by ICS response

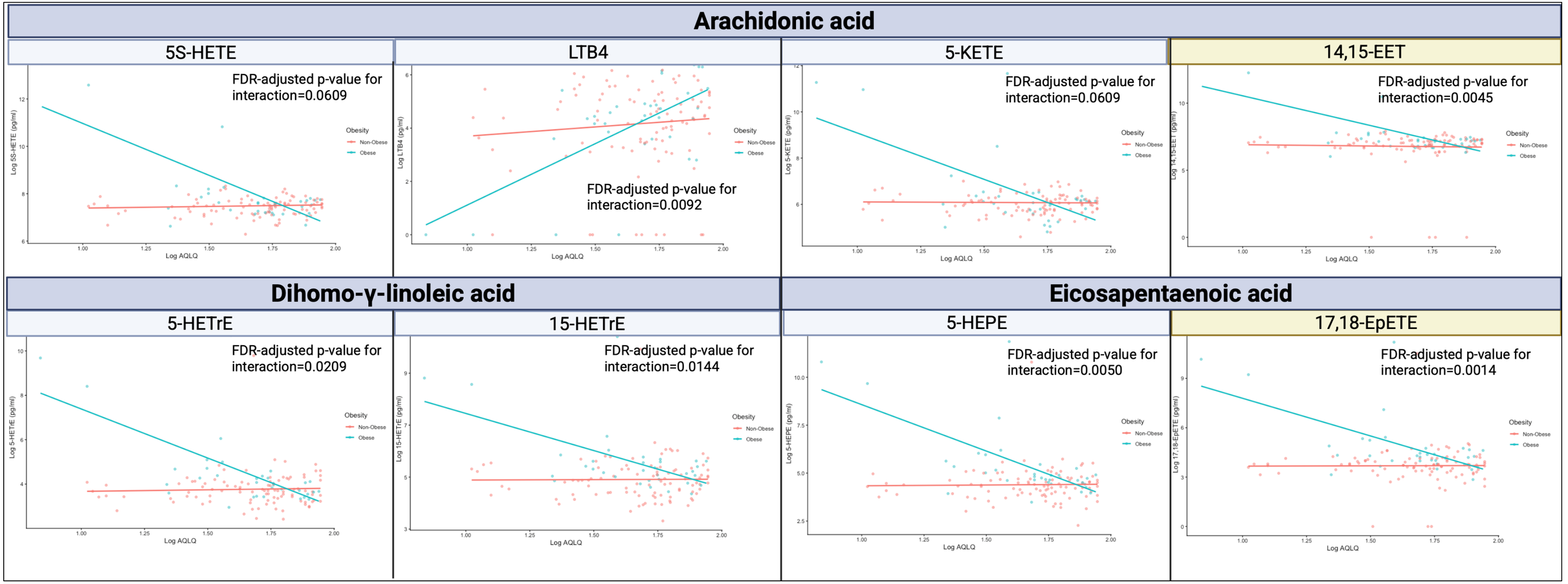


Exacerbations 5xICS vs 2.5xICS+SAL



AACD 5xICS vs 2.5xICS+SAL

Data Summary: Oxylipins



Among obese patients with asthma, quality of life metrics were inversely associated with concentrations of pro-inflammatory and resolving oxylipins. These oxylipins are primarily produced via lipoxygenases and may represent an important inflammatory pathway in obesity-associated asthma.

How K12 Helped Me Reach My Scientific Goals

- **Advanced analytics skills**
  - Metabolomics training
  - Advanced statistical mentorship
- **Time to engage mentors, new collaborators –developing new working relationships**
  - CO-Mentor program in 2024-25
- **Developed academic products**
  - 5 first or senior author manuscripts published
  - 2 first author manuscripts in progress
  - Presentations at national meetings

- **Grants submitted/funded**
  - Parker B Francis Fellowship
  - NHLBI K08
  - Institute of Cannabis Research

- **Promotion to Assistant Professor**
- **2026 ATS/AII Rising Star Award**

- **Leadership opportunities**
  - SOM Women's Leadership Training
  - Divisional Works in Progress leadership
  - Steering Committee of CLB Summit
  - National Leadership on ATS committees

How K12 Helped Me Reach My Scientific & Career Goals

	Scientific Goal	Career Goal
Short-term (K12)	• Published 5 first or senior author manuscripts • NHLBI K08- start date May	• Promotion to Assistant Professor • Training in metabolomics analysis • Robust mentor network • 2026 ATS/AII Rising Star Award
Medium-term (~5 years)	• Develop collaborations to deepen understanding of metabolic mechanisms in asthma treatment response • R01 submission (year 3 of K08)	• Training in multi-omics, machine learning • Promotion to Associate Professor • Leadership in Asthma Clinic at UCHealth
Long-term	• National leader in treatment response and obesity-related asthma research • Diverse research portfolio (MPI)	• Mentor fellows/early career faculty • Leadership in national asthma networks

CTS Roadblocks Addressed

- ***Workforce and Training Limitations:*** Prior to this project, my expertise was in clinical medicine and epidemiology. K12 support allowed me to expand my knowledge into metabolomics and genomics data acquisition and analysis, widely adaptable tools that will facilitate translation of my findings.
- ***Operational & Infrastructure Gaps:*** Clinical trials are expensive, time-consuming and not an efficient use of resources for many questions regarding mechanisms and biomarkers of treatment response. My use of existing data and biobanked specimens from a completed RCT allowed me to capitalize on features of randomized study design to answer mechanistic questions in a large, broadly representative cohort.
- ***Cultural and Structural Silos:*** My research requires expertise in mass spectroscopy, advanced genomics and biostatistics, and clinical expertise in asthma. Advanced training in metabolomics and statistics allowed me to effectively communicate and collaborate with experts from diverse backgrounds, including the Schools of Pharmacy, Public Health, and Medicine.