Marcos J. Ramos-Benítez, PhD

Assistant Professor

Microbiology Division, Health Sciences University Principal Investigator, Immunology & Molecular Pathogenesis Lab

Ponce Research Institute

Ponce Health Sciences University

RCMI Full Research Project 2024-Ongoing “Spleen Tyrosine Kinase Inhibition to target Neutrophil Extracellular Traps in Severe Persistent Asthma”

RESEARCH AREAS

- Neutrophils in inflammation and airway damage.
- HPS and PCD mechanisms to improve
- diagnosis and therapies.
- Immune responses in COVID-19 and dengue complications.
- Blood-based biomarkers with AI for personalized care.

SCIENTIFIC ACHIEVEMENTS

- Discovered that COVID-19 can persist in the body for months, advancing understanding of long COVID. Recipient of the NIH Director’s Award (2024).
- Established Puerto Rico’s first major clinical research program for Hermansky- Pudlak Syndrome (HPS), leading to new discoveries and better patient care. Awarded HPS Network Researcher of the Year (2024).
- Founded Ciencia en tus Manos (501c3) to make science accessible, impacting thousands through programs such as +Ciencia, the STEM 100x35 Science Fair, and the CETM Summer Camp.
- Mentored 30+ students now pursuing graduate/medical degrees; hosted 200+ students annually for lab tours

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SCIENTIFIC ADVANCE

Age-related neutrophil activation in Hermansky-Pudlak Syndrome Type-1. Orphanet J Rare Dis 20, 226 (2025). https://doi.org/10.1186/s13023-025-03758-5

Hermansky-Pudlak Syndrome type 1 (HPS-1) is a rare genetic disease especially common in Puerto Rico, and all affected individuals eventually develop pulmonary fibrosis, a serious scarring of the lungs. In this study, researchers examined immune activity in HPS-1 patients of different ages and observed that those over 40 showed signs of increased neutrophil activity—white blood cells involved in inflammation. These patients had higher levels of markers linked to inflammation and tissue injury, including neutrophil extracellular traps (NETs), IL-6, IL-8, and fibrosis-related proteins like MMP-7 and MMP-8. Levels of anandamide, a molecule associated with lung scarring, were also higher in this group and correlated with neutrophil activation markers. These findings suggest that age-related immune changes may play a role in lung damage in HPS-1, highlighting the need for further studies to elucidate this process and explore novel treatments.

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