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# Johns Hopkins All Children's Hosts Important Conference on Metabolism and Immunity

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Gina DeNicola, Ph.D., Moffitt Cancer Center, Timothy F. Osborne, Ph.D., Johns Hopkins All Children's Hospital, and Bret H. Goodpaster, Ph.D., AdventHealth  
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Researchers from three Central Florida medical institutions — Johns Hopkins All Children's Hospital, the H. Lee Moffitt Cancer Center and Research Institute, and the AdventHealth Translational Research Institute for Diabetes and Metabolism — co-sponsored a conference that was held in the Research and Education Building on the Johns Hopkins All Children's Hospital campus in St. Petersburg, Florida, on March 2-3

The organizers labeled the consortium "The Central Florida Metabolism Triangle" to highlight the collaborative partnership among the three participating organizations and the meeting was entitled "Metabolism and Physiology 2023" to emphasize the fundamental role that cellular metabolism plays in all major physiologic and pathophysiologic processes.

According to [Timothy Osborne, Ph.D.](#), associate dean for basic research, director of the [Institute for Fundamental Biomedical Research](#) at the Johns Hopkins All Children's Hospital and professor of medicine in the Division of Endocrinology, Diabetes and Metabolism of the Johns Hopkins University School of Medicine, the conference was

both a hallmark and the beginning of something bigger as it will help put Johns Hopkins All Children's "on the map" as a leader in biomedical research in Florida. The hospital has a goal of becoming the #1 pediatric academic medical center in the Southeast.

"We put together a symposium to explore the fundamental and unifying theory about metabolism and physiology," says Osborne, who also served as moderator for one of the scientific sessions. "The conference initially served to bring together — in person and virtually — researchers from Central Florida and from around the country. We had over 100 people attend in person and there was an additional 50 who joined by zoom with participants from as far away as Oregon and Connecticut."

One of the major themes was cancer research as one of the key conference planners was Gina DeNicola, Ph.D., interim chair and associate member of Moffitt Cancer Center's Department of Metabolism and Physiology and leader of Moffitt's Metabolism Program.

"We thought the meeting was a great success," says DeNicola. "Many attendees appreciated the diversity of the talk topics and the combination of basic science and clinical research presented. Everyone came away from the event having learned something new and thinking about their research in new ways." She adds that, for Moffitt attendees, the conference was "the first local metabolism symposium happening in our own neighborhood" and "everyone enjoyed being able to attend a local, in-person symposium with leaders from across the country."

## Johns Hopkins All Children's Researchers on 'Center Stage'

Those from Johns Hopkins All Children's participating by presenting their most recent research were [Laszlo Nagy, M.D., Ph.D.](#), a professor in the Division of Endocrinology, Diabetes and Metabolism in the Departments of Medicine and Biological Chemistry at the Johns Hopkins University School of Medicine and co-director of the Johns Hopkins All Children's Institute for Fundamental Biomedical Research, and [Matthew Poy, Ph.D.](#), associate professor, with all of the same academic affiliations.

## Macrophages and Inflammation – A 'Double-Edged Sword'

Nagy's presentation, titled "How macrophages harm and heal skeletal muscle: Lessons from snakebites help understand Duchenne Muscular Dystrophy," focused on his long-standing [interest in muscle regeneration](#).

Nagy, who says he has always been fascinated in general by how cells work, and in particular by the interaction between the immune system and metabolic processes, has been working on ways to empower the immune system to facilitate muscle regeneration and growth by harnessing the features of macrophages, which are key cells of the innate immune system. These cells are well known for their ability to "track down" and engulf both invading pathogens and damaged host cells "Macrophages are essential for tissue regeneration as they regulate both the initiation and resolution of an acute inflammatory response that is essential to proper healing," explains Nagy. His work on macrophages, inflammation and muscle regeneration translates into new insights into the nature of muscle damage associated with Duchenne Muscular Dystrophy (DMD), which is also an important focus at Johns Hopkins All Children's.



# CADM1 and Type-1 Diabetes

Poy's presentation, titled "Development of Therapeutic and Diagnostic Strategies Targeting CADM1 during Type 1 Diabetes," focused on [groundbreaking research](#) that may someday prevent and perhaps even cure Type 1 diabetes (T1D).

"There is no cure for T1D, and its causes are not well understood, but we have come a long way in better understanding it," explains Poy.

T1D is mediated through an auto-immune reaction where the body's immune cells attack the pancreatic beta cells that normally produce insulin. Without functional beta cells, the body loses the ability to naturally regulate glucose and lipid metabolism, which results in significant negative effects in multiple organs and tissues. A potential big step in this research came with the understanding of the cell adhesion molecule 1 (CADM1) and its role in possibly mediating the initial interaction between immune cells and beta cells during the development of T1D. This work has been pioneered by Poy who believes that understanding how CADM1 functions may lead to methods to "target" the cellular interactions to prevent T1D.

Nagy and Poy presented their studies in a session focused on metabolism and the immune system. There were also sessions devoted to the role of metabolic cross talk between cancer cells and neighboring cells in the "tumor microenvironment," another session on cancer cachexia where certain cancers hijack the host metabolism to fuel their growth leaving the host energy depleted. Other sessions focused on how metabolism changes with aging, and how the microbes present in our gut communicate with the host by producing and responding to small molecule metabolites.

## Future Conferences to Expand to International Venues

The conference also marked an important beginning for wider and more comprehensive collaboration between researchers and clinicians that will have a national impact in the larger biomedical research community. "We established this conference to explore the unifying theory that metabolic flow is associated with all physiologic processes, and this knowledge has developed into a robust, cross disciplinary field of biomedical research," explains Osborne. "We had good participation from colleagues from the University of Florida and there were attendees from other local Florida institutions as well. It was a great pleasure to work with our associates at Moffitt and AdventHealth, and we look forward to future conferences. Gina and I will get together with Bret Goodpaster, director of the Translational Research Institute, and colleagues from the University of Florida to plot a future course for the 'Central Florida Metabolism Triangle'. We had a very strong turnout, which suggests there might be an appetite to continue the conference as a recurring series, possibly rotating the location around to Moffitt, AdventHealth and maybe the University of Florida. It is our hope that our future metabolism and physiology conferences will become international events."

DeNicola concurs, saying, "We hope this will be the start of both new collaborations between Moffitt, Johns Hopkins All Children's and AdventHealth as well as the first of many annual metabolism symposia where we can come together to share our research and start new conversations."