Hesperos and UCF Showcase First-of-its-Kind Human-on-a-Chip® Comorbidity Model to Accelerate Drug Discovery for Aging Populations

Published in Advanced Biology, the multi-organ system models sarcopenia and hypertrophic cardiomyopathy in a single recirculating platform to evaluate complex multi-disease drug interactions.

Orlando, Florida — 17 September 2026 — Hesperos, Inc., a global leader focused on improving preclinical drug development with its Human-on-a-Chip® (HoaC) single- and multi-organ system platforms, today announced the publication of a new study conducted in collaboration with the University of Central Florida in *Advanced Biology*. The study titled "Development of a Multi-Organ Microphysiological (MPS) Model to Study Age-Related Comorbidities" was funded by the National Institute on Aging to develop a human-based organ-on-a-chip model to replicate the comorbidities of sarcopenia and hypertrophic cardiomyopathy (HCM) simultaneously, alongside primary human liver tissue.

This study provides a promising approach for studying the phenotypic characteristics of sarcopenic skeletal muscle and HCM, as it can replicate certain *in vivo* cellular behaviors and organ-specific interactions with high fidelity. This innovative comorbidity model offers a robust platform for investigating underlying pathophysiological mechanisms and testing therapeutic interventions.

Introduction & Impact:

Aging is frequently accompanied by multiple comorbidities that contribute to physiological decline. Currently, standard preclinical testing systems rely on single-disease cell assays or animal models that fail to capture complex multi-organ interactions. The Hesperos-UCF multi-organ system helps bridge this translational gap by enabling multiple disorders to be evaluated in a single platform.

Two such distinct but concurrent conditions are sarcopenia and HCM, often present in the elderly. This study developed a multi-organ microphysiological system that incorporates primary human hepatocytes, human induced pluripotent stem cell (hiPSC)-derived skeletal muscle, and cardiac tissue to model sarcopenia and HCM and how these diseased tissue constructs interact with each other and the liver replicating *in vivo* conditions.

Notably, this new multi-organ system incorporates real-time functional biomechanics and electrophysiology rather than relying on static cell assays. The system utilizes microcantilevers to track physical muscle contraction forces and microelectrode arrays to measure cardiac electrical signals (QT intervals and conduction velocity) over a 14-day period. The study findings show that sarcopenia severity worsened when coupled with HCM, mimicking true clinical progression.

This work emphasizes the need for novel integrated disease modeling platforms to advance therapeutic development for complex, interconnected disorders. Additionally, it overcomes animal model limitations, including high costs and low predictive translatability in clinical trials.

"With aging populations facing multiple chronic conditions, testing drugs on isolated organs in animal models is no longer sufficient," said Dr. James J. Hickman, Chief Scientist at Hesperos and Professor at UCF. "*This multi-organ comorbidity platform allows biopharma researchers to simultaneously evaluate both efficacy and on- and off-target safety risks across multiple diseased organs, significantly lowering preclinical costs and improving clinical trial success rates*."

Link to study: doi.org/10.1002/adbi.70147

Key Results:

Researchers developed a multi-organ MPS that incorporates primary human hepatocytes, human iPSC-derived skeletal muscle, and cardiac tissue to model comorbidities.

About Hesperos

Hesperos is a global contract research organization (CRO) specializing in preclinical drug development services utilizing its Human-on-a-Chip® platform. By replicating key aspects of human biology (and thus avoiding expensive, time-consuming, and often less informative animal testing), Human-on-a-Chip® organ-system models provide product development teams with more meaningful insights that can accurately predict an agent's therapeutic profile while lowering costs and accelerating development timelines. For more information, https://hesperosinc.com.

About the UCF NanoScience Technology Center (NSTC)

The UCF NanoScience Technology Center (NSTC) is a multidisciplinary research hub at the University of Central Florida focused on advanced materials and nanotechnology. The center integrates research, education, and innovation across diverse areas including green energy, bioimaging, robotics, and nanoelectronics to address real-world technological challenges. Learn more at https://nanoscience.ucf.edu/.

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