News Release

Your Contact
Media Relations
gangolf.schrimpf@emdgroup.com
Phone: +49 151 1454-9591

May 20, 2025

Merck KGaA, Darmstadt, Germany, and imec Collaborate to Develop Disruptive Microphysiological Systems Platform

- **Partnership aims at developing next-generation microphysiological systems (MPS)-on-a-chip through multipartner collaboration program**
- **Modular, scalable MPS platform envisions unprecedented accuracy in simulating human body responses, providing reliable and high-quality training data for AI models**
- **Aiming to enhance drug discovery, expedite drug candidate development, deliver safer, more effective treatments to patients, and reduce animal testing**

Darmstadt, Germany, May 20, 2025 – Merck KGaA, Darmstadt, Germany, a leading science and technology company, and imec, a world-leading research and innovation hub in nanoelectronics and digital technologies , announced a strategic partnership to develop an advanced microphysiological systems (MPS) platform. Their collaboration aims to drive both partners' efforts to make drug discovery and development more efficient by increasing the predictive validity of next-generation preclinical models and progressively reducing the reliance on animal testing.

"By integrating industry leading induced pluripotent stem cells and patient derived organoids portfolio offered by our company with the disruptive joint hardware platform that features an unprecedented number of biosensors, we're creating a connected in-vitro and in-silico pipeline capable of generating the high-quality biological training data that is critically needed. When coupled with AI-driven drug

News Release

discovery, this closed-loop operating model will greatly improve data translatability to humans, speed discovery of new drug candidates, and enable researchers to more closely simulate the human body than ever before," said Steven Johnston, Vice President and Head of Technology Enablement at Merck KGaA, Darmstadt, Germany, with regards to the transformative potential of this collaboration.

"Adequate preclinical models require biological relevance and the ability to generate rich and diverse data sets at high throughput—something that no current model can provide. At imec, we are building a unique chip technology to fill this data gap. Combined with the expertise of our new partner across the Life Science and Healthcare sectors, we will be able to address the growing need for preclinical models to guide AI models for drug discovery," added Paru Deshpande, Vice President R&D at imec.

This first-of-its kind co-development program aims to integrate cutting-edge organoid biology models with advanced semiconductor hardware incorporating biosensing and microfluidic capabilities, all validated for ease-of-use in the Healthcare business sector laboratory setting of Merck KGaA, Darmstadt, Germany, and globally offered by its Life Science business sector. This approach is to enable scientists to gain time-relevant insights from individual organ health to a multi-organ connected system, paving the way for more accurate and efficient drug development processes.

A key element of this disruptive hardware development partnership is the jointly developed highly adaptable modular system, facilitating seamless expansion from single to multi-organ configurations. The system's standardized interfaces will enable custom configurations from the broad portfolio of Merck KGaA, Darmstadt, Germany, of induced pluripotent stem cells and patient derived organoids models. Combined with imec's unique expertise in sensor technologies, state-of-the-art integrated biosensors will enable customers to obtain better-quality data through in situ, label-free measurements as well as cell culture control and reproducibility. This is expected to result in more reliable predictions and real-time identification of human organ responses to drug and chemical stimuli with application in pre-clinical safety and toxicity studies as well as in drug metabolism and pharmacokinetics.

News Release

Additionally, the standardized set of building blocks underpinning this technology enables ease of use and data consistency across different experimental setups. This standardization is expected to facilitate more comparable and reproducible results across the pharmaceutical industry, to further speed the drug development timeline and reducing costs.

Both Merck KGaA, Darmstadt, Germany, and imec invite other biopharma players to join this ongoing collaboration to develop the next generation of MPS models with the potential to bring safer, more effective treatments to patients faster than ever before.

About imec
Imec is a world-leading research and innovation center in nanoelectronics and digital technologies. Imec leverages its state-of-the-art R&D infrastructure and its team of more than 6,000 employees and top researchers, for R&D in advanced semiconductor and system scaling, silicon photonics, artificial intelligence, beyond 5G communications and sensing technologies, and in application domains such as health, automotive, agritech and energy. Imec unites world-industry leaders across the semiconductor value chain, Flanders-based and international tech, pharma, medical and ICT companies, start-ups, and academia and knowledge centers. Imec is headquartered in Leuven (Belgium), and has research sites across Belgium, in the Netherlands, the UK and the USA, and representation in 3 continents. In 2024, imec's revenue (P&L) totaled € 1.034 billion.
Further information on imec can be found at www.imec-int.com

The imec group holds a global trademark portfolio, including word marks and combined figurative registered and unregistered trademarks, across national, regional, and international territories. Its lawful use requires prior written consent of IMEC in compliance with the IMEC branding guidelines, which may be updated periodically. The latest version is available upon written request.

About Merck KGaA, Darmstadt, Germany
Merck KGaA, Darmstadt, Germany, a leading science and technology company, operates across life science, healthcare and electronics. More than 62,000 employees work to make a positive difference to millions of people's lives every day by creating more joyful and sustainable ways to live. From providing products and services that accelerate drug development and manufacturing as well as discovering unique ways to treat the most challenging diseases to enabling the intelligence of devices – the company is everywhere. In 2024, Merck KGaA, Darmstadt, Germany, generated sales of € 21.2 billion in 65 countries.
The company holds the global rights to the name and trademark "Merck" internationally. The only exceptions are the United States and Canada, where the business sectors of Merck KGaA, Darmstadt, Germany, operate as MilliporeSigma in life science, EMD Serono in healthcare and EMD Electronics in electronics. Since its founding in 1668, scientific exploration and responsible entrepreneurship have been key to the company's technological and scientific advances. To this day, the founding family remains the majority owner of the publicly listed company.

All Merck KGaA, Darmstadt, Germany, press releases are distributed by e-mail at the same time they become available on the EMD Group website. In case you are a resident of the USA or Canada, please go to www.emdgroup.com/subscribe to register for your online, change your selection or discontinue this service.