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**Media Release – For Immediate Distribution**

# New Study Highlights Value of Physiologically Relevant 3D InSight™ Liver Microtissues for Nanomaterial Safety Assessments

## *Findings represent key milestone in PATROLS initiative to establish tools for evaluating health and environmental risks of nanomaterials*

**Schlieren, Switzerland – June 19, 2019** In a new study published in *Scientific Reports,* scientists from the Nano-Safety Research Group at the Heriot-Watt University and InSphero AG evaluated 3D cell-based liver models for predicting adverse effects caused by chronic exposure to engineered nanomaterial (ENM). The research team, led by Heriot-Watt Professor Vicki Stone, a particle toxicology expert, investigated how the presence and inter-donor variability of liver immune cells (specifically, Kupffer cell populations) governs the hepatic response to ENMs. The study, conducted as part of the the EU-funded project Physiologically Anchored Tools for Realistic nanomaterial hazard aSessment (PATROLS), established InSphero 3D InSight™ Multi-Donor Human Liver Microtissues as a valuable nanotoxicology risk assessment tool.

ENMs, which are commonly used in consumer products ranging from sunscreens and cosmetics to clothing and sports gear, have unique physical characteristics that can induce toxic responses, particularly in organs involved in nanoparticle accumulation and subsequent clearance, such as the liver.

"3D InSight™ Human Liver Microtissues are engineered to reflect the complex multicellular composition and function of human liver for up to 4 weeks in culture. Unlike traditional 2D and simple 3D monoculture models, our microtissues can capture immune responses of the liver as well as effects of toxins on basic liver function," said co-author Dr. Wolfgang Moritz, InSphero Head of External Collaborations and IP. 3D InSight™ Human Liver Microtissues are produced from multi-donor primary hepatocytes in co-culture with Kupffer cells and liver endothelial cells, the three liver cell types that cooperate in eliminating toxins and particulates from the body.

Heriot-Watt Research Toxicologist Dr. Ali Kermanizadeh added, "The presented data confirm that InSphero's human liver microtissues are more suitable for hazard assessment in response to chronic ENM exposure, given particularly by their longevity and immune-competence provided by the inclusion of Kupffer cells."

The PATROLS project coordinator, Professor Shareen H. Doak from Swansea University said, "This research illustrates the value of using 3D primary human liver microtissue models to provide a better understanding of nanomaterial safety. A key focus of the PATROLS project is development of more-realistic, next-generation culture systems that allow us to move away from the need to test nanomaterials in animals. This paper is a great example of how PATROLS is making significant progress in this area."

To read the *Nature Scientific Reports* paper, titled "The importance of inter-individual Kupffer cell variability in the governance of hepatic toxicity in a 3D primary human liver microtissue model", see: https://www.nature.com/articles/s41598-019-43870-8.

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## Additional Information

For more information about InSphero, see www.insphero.com.
For more information about the Heriot-Watt University, see https://www.hw.ac.uk/
For more information about PATROLS, see: https://www.patrols-h2020.eu/

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## About InSphero

InSphero is the pioneer of industrial-grade, 3D-cell-based assay solutions and scaffold-free 3D organ-on-a-chip technology. Through partnerships, InSphero supports pharmaceutical and biotechnology researchers in successful decision-making by accurately rebuilding the human physiology *in vitro*. Its robust and precisely engineered suite of 3D InSight™ human tissue platforms are used by major pharmaceutical companies worldwide to increase efficiency in drug discovery and safety testing. The company specializes in liver toxicology, metabolic diseases (e.g., T1 & T2 diabetes and NAFLD & NASH liver disease), and oncology (with a focus on immuno-oncology and PDX models). The scalable Akura™ technology underlying the company's 3D InSight™ Discovery and Safety Platforms includes 96 and 384-well plate formats and the Akura™ Flow organ-on-a-chip system to drive efficient innovation throughout all phases of drug development.

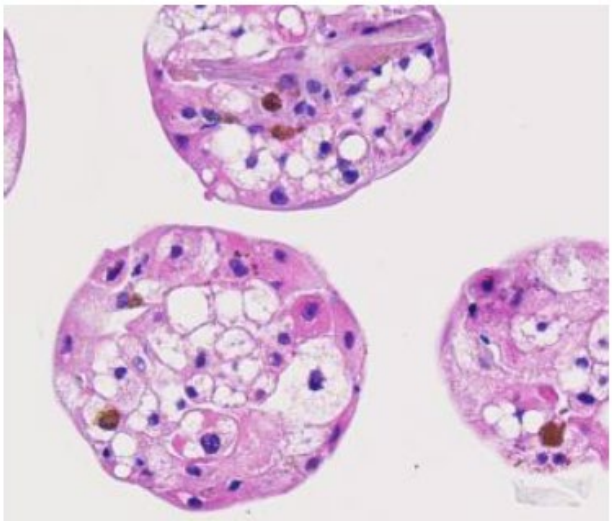
Learn more at www.insphero.com and follow us on Twitter and LinkedIn.

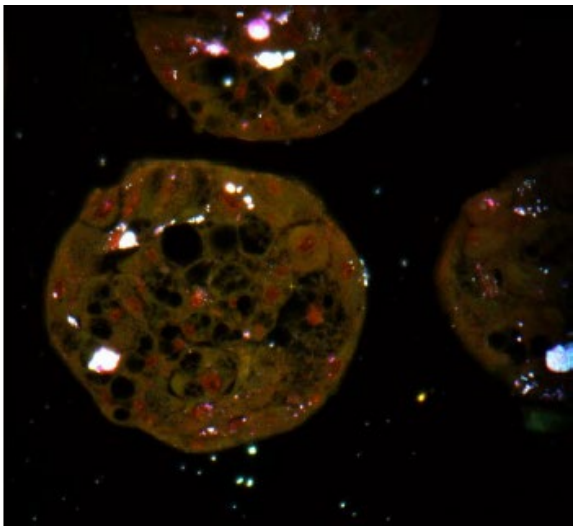
## About PATROLS

PATROLS is an international project combining a team of academics, industrial scientists, government officials and risk assessors, aimed at delivering advanced and realistic tools and methods for nanomaterial safety assessment. PATROLS will provide an innovative and effective set of laboratory techniques and computational tools to more reliably predict potential human and environmental hazards resulting from long-term engineered nanomaterial (ENM) exposures. These tools will include more realistic 3D tissue models of the human; innovative methods for safety assessment in ecologically relevant test systems and organisms, selected according to their position in the food chain; development of computational methods for ENM exposure and dose modelling, as well as hazard prediction. The approaches developed through the PATROLS project will minimize the necessity of animal testing and will support future categorisation of ENM in order to support safety frameworks. The PATROLS project has been funded through the European Union's Horizon 2020 research and innovation programme under grant agreement No 760813.

Learn more at www.patrols-h2020.eu and follow us on Twitter and LinkedIn.

**Images**





3D InSight™ Human Liver Microtissue co-culture models containing hepatocytes and Kupffer cells better reflect the human response to nanomaterial exposure. Representative brightfield (left) and enhanced darkfield (right) images of H&E stained cross sections show the distribution of titanium dioxide ($TiO_2$) nanoparticles in the model after 3 weeks exposure in culture.