



## **“Biology-Inspired Microphysiological System Approaches to Advance Patient Benefit and Animal Welfare”**

*A Center for Alternatives to Animal Testing – Europe (CAAT-Europe)’s Transatlantic Think Tank for Toxicology (t<sup>4</sup>), together with Hoffmann-La Roche, TissUse, and RISK-HUNT3R (ASPIS)*

*Date & Venue:* June 23 – 24, 2023 at JW Marriott Hotel Berlin (Stauffenbergstraße 26, 10785 Berlin)

*Format:* Working meeting with attendance by invitation only

*Meeting outcome:* Published report in a peer-reviewed journal (ALTEX)

*Think Tank Chairs:* Uwe Marx (TissUse GmbH); Adrian B. Roth (Hoffmann La-Roche Ltd.); Thomas Hartung (CAAT)

*Meeting moderator:* Danilo Tagle (NIH/NCATS); Thomas Hartung (CAAT)

*Coordinator:* Giorgia Pallocca (CAAT-Europe)

### **Background and workshop rationale**

Advanced human in vitro models are needed urgently to add predictive value to the preclinical evaluation of the safety and efficacy of new drugs and advanced therapies, thus, reducing the use of laboratory animals. The first microfluidic microphysiological systems (MPS) entered the academic scene more than a decade ago. Only a few dozen organ-on-a-chip papers had been published by a small community by 2010. Since that time, the scientific landscape has changed dramatically, with an increasing output of more than a thousand papers published annually.

MPS are now considered an enabling technology for the development of approaches to reliably predict the safety and efficacy of novel drug candidates and add valuable data to precision medicine approaches. CAAT t4 Think Tanks on biology-inspired MPS were held in June 2015 and June 2019 in Berlin, Germany, and resulted in two well-received think tank reports published in ALTEX ([Marx et al. 2016](#), [Marx et al. 2020](#)). A roadmap towards the reduction and replacement of animals by MPS for the benefit of patients was proposed. The workshops stimulated the implementation of an annual MPS World Summit and the formation of an international MPS society.

Despite the MPS hype in academia and science, which has, indeed, reshaped the entire in vitro culture landscape in basic and applied research, MPS approaches have not yet been widely adopted by the pharmaceutical industry and are not yet in use as precision medicine tools.

Therefore, this third CAAT workshop on biology-inspired microfluidic MPS approaches aims to analyze the following three topics thoroughly:

1. *How to match human biology in MPS-based organ modelling?*
2. *Do MPS-based models enable disruptive discoveries in human life science?*
3. *How to achieve regulatory accepted MPS- based decision-making in health care?*

Due to the gratifyingly strong global spread of organ-on-chip technologies, the working groups will not focus on an all-encompassing analysis of the respective focal point, but rather on the highlights achieved and the greatest remaining challenges. Subsequently, reporting on their status quo and developing recommendations to overcome remaining hurdles will be the expected output of the workshop.

At the same time, the aim of the workshop is to summarize the development status of the International MPS Society and its interaction with national activities and structures in the different regions of the world. Recommendations for further improvements in this field are envisioned for the report.

## Program

Day 1 -23 June 2023

Time	Topics	Speakers/Chairs
9:30 – 10:00	Welcome	Uwe Marx
10:00 – 10:30	Introduction to the workshop by the moderators	Danilo Tagle Thomas Hartung
10:30 – 11:00	Introduction to Working Group (WG) -1: <i>Organ modelling matching human biology</i>	Uwe Marx
11:00 – 11:30	Introduction to WG -2: <i>Enabling disruptive discoveries in human life science</i>	Thomas Hartung
11:30 – 12:00	Introduction to WG -3: <i>Supporting regulatory accepted decision-making in healthcare</i>	Adrian Roth
12:00 – 13:00	Lunch	
13:00 – 15:30	Discussion in separate working groups	
15:30 – 16:00	Coffee break	
16:00 – 17:00	Discussion of preliminary outcome	
19:00 – 21:00	Dinner at Weilandts	

Day 2 – 24 June 2023

Time	Topics
<b>9:30 – 12:00</b>	Discussion in separate working groups
<b>12:00 – 13:00</b>	Lunch
<b>13:00 – 15:30</b>	Discussion in separate working groups
<b>15:30 – 16:00</b>	Coffee break
<b>16:00 – 17:30</b>	Presentation of the final outcome and wrap-up.
<b>19:00 – 21:30</b>	Invited Arise Grand Show at Friedrich-Stadtpalast (voluntary)