IMMUNO-model

Modelling immunotherapy response and toxicity in cancer

*IMMUNO-model webinar series presents:*

# 1st Webinar ***Emerging Innovations for Immuno-models***

December 14th 2023, at 2 - 3.30 pm CET

Live on ZOOM platform

Moderator: Barbara Breznik, National Institute of Biology, Slovenia

Contact: barbara.breznik@nib.si

IMMUNO-model COST Action CA21135

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# Presentation 1

## ClinoStar a purpose-built system for culturing cells as *in vivo* mimetic 3D structures

Krzysztof Wrzesinski, CelVivo ApS, Denmark, North-West University Potchefstroom

The prevailing consensus suggests that cultivating cells within a three-dimensional (3D) environment presents considerably greater challenges compared to the conventional two-dimensional (2D) monolayer cultures. This increased complexity often stems from the fact that the equipment required for effective 3D cell culture hasn't undergone the same level of optimization as its 2D counterpart. Moreover, the task of closely monitoring and regulating the intricate 3D environment proves to be significantly more demanding.

Various factors come into play, such as temperature control, growth media composition, atmospheric conditions, diffusion gradients, shear stress, and culture duration. These elements are pivotal when aiming to faithfully replicate in vivo conditions. Different types of cells and tissues demand precise adjustments of these parameters. Maintaining an optimal temperature is a widely recognized and employed regulation method in in vitro cultures. Manipulation in atmospheric composition is less common (majority of experiments utilizes standard cell culture incubator atmosphere: 5% CO2 in air resulting in approximately 19% of oxygen. Most cells within tissues have no direct contact with atmosphere. Oxygen concentrations in the human body fluctuate, ranging from approximately 12% in the lungs to 5% in the brain, down to as low as 0.1% in tumour tissues. Therefore, accurately establishing and monitoring of oxygen levels during the culture period is imperative for mimicking physiological conditions.

Introducing diffusion gradients becomes inherent when cultivating cells in clusters, this fact plays a pivotal role in prompting cellular metabolic reprograming that lead to behaviours more reminiscent of natural tissue. It's important to minimize liquid shear stress, as most cells within tissues are not subjected to it.

All these critical features can be effectively integrated, manipulated, and closely observed through the utilization of the CelVivo ClinoStar 3D cell culture system. This advanced system streamlines the intricate aspects of 3D cell culture, offering a comprehensive approach to tackling the challenges associated with faithfully emulating the conditions of living tissues.

# *Presentation 1*

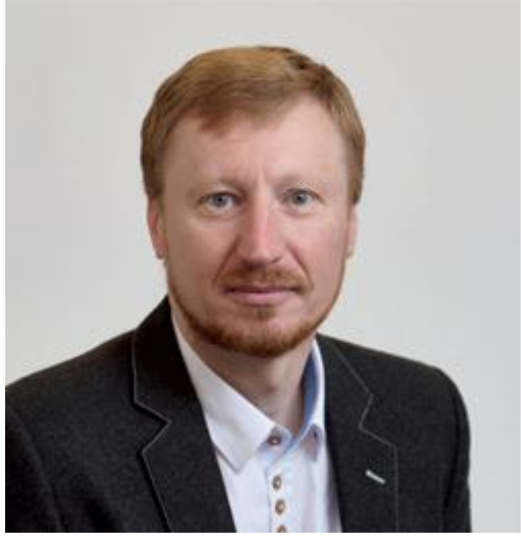
## Biography

Krzysztof Wrzesinski [Krystof Vresinsky] CSO and co-founder of CelVivo

K. Wrzesinski obtained his PhD from University of Southern Denmark, has a strong background in biomedical science having worked within research for the past 25 years.

He focusses on advanced cell culture technologies and development of drug testing pipelines based on in vitro models.

He is co-founder and CSO of CelVivo and Extraordinary Professor at Faculty of Health, The North-West University, South Africa.



# Presentation 2

## Microphysiological Systems as Disease Models

Devrim Pesen Okvur, CTO and co-founder of Initio Cell BV

Microphysiological Systems (MPS), commonly known as organ-on-chips, represent a revolutionary approach to advancing research in cancer, drug discovery, and precision medicine. The core principles of MPS, particularly its reliance on microfluidics, usher in a new era of experimentation characterized by enhanced precision, efficiency, and the faithful recreation of physiological conditions. At the heart of MPS technology lies microfluidics, a discipline that exploits the unique behaviors of fluids at the microscale. This innovation allows researchers to manipulate tiny sample volumes, a critical advantage in contexts such as cancer research and drug discovery where resources are often limited. Moreover, microfluidics grants researchers unparalleled control over spatial and temporal parameters, ensuring that experiments unfold with meticulous precision.MPS leverages these microfluidic capabilities to replicate physiological contexts successfully. This faithful mimicry is essential for generating clinically relevant data, especially in cancer research, where the microenvironment plays a pivotal role in tumor development and progression. By emulating the complexities of living organisms, MPS contributes to a deeper understanding of disease mechanisms and facilitates the discovery of targeted therapeutic interventions. One of the transformative aspects of MPS is its capacity for high-throughput experimentation. The microscale dimensions of these systems enable parallelized experiments, allowing researchers to investigate numerous conditions simultaneously. This accelerates the pace of research, making iterative processes more efficient, particularly in drug discovery where screening potential compounds is a time-consuming endeavor.

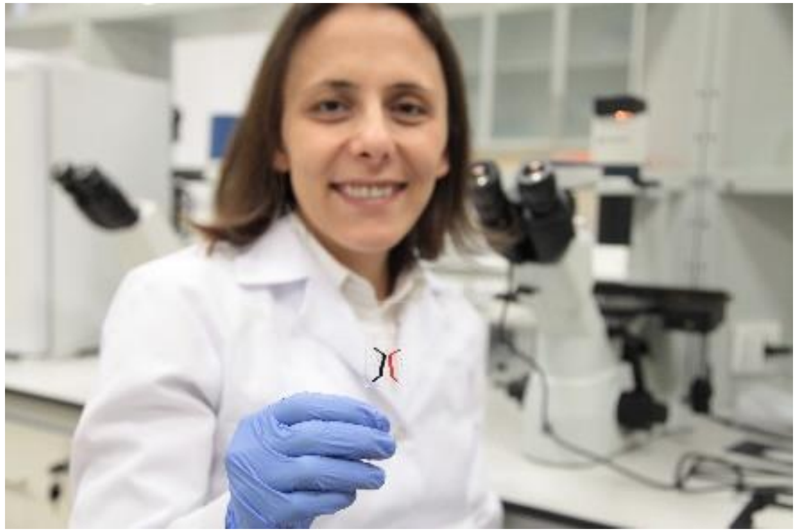
Initio Cell recognizes the transformative potential of MPS in reshaping the landscape of cancer research and drug discovery. Initio Cell's platforms are tailored to meet the diverse needs of researchers engaged in cancer studies, precision medicine, and drug discovery. Initio Cell facilitates the quantitative examination of various cellular dynamics, including cell-to-cell interactions, invasion and chemotaxis, extravasation, homing choices made by cancer cells, and the nuanced responses to varying doses of drugs and their combinations.

# Presentation 2

## Biography

Devrim Pesen Okvur, CTO and co-founder of Initio Cell BV

D. Pesen Okvur obtained her Ph.D. degree in Cellular and Molecular Physiology from the Johns Hopkins University in 2005. After postdoctoral studies at the Karolinska Institute (Microbiology, Tumor and Cell Biology Center), Royal Institute of Technology (Department of Applied Physics) and Albert Einstein College of Medicine (Department of Anatomy and Structural Biology), she joined the faculty of Izmir Institute of Technology in 2010. Her research focuses on i) design and fabrication of organ-on-a-chips that mimic the cellular microenvironment, ii) biophysical and micro-environmental control of metastasis.



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The COST Action **IMMUNO-model** CA21135 aims to foster research and innovation in the field of preclinical immuno-oncology models with the ultimate goal of advancing in the treatment of cancer patients by improving their outcomes and quality of life.

**IMMUNO-model** Website

www.immuno-model.eu

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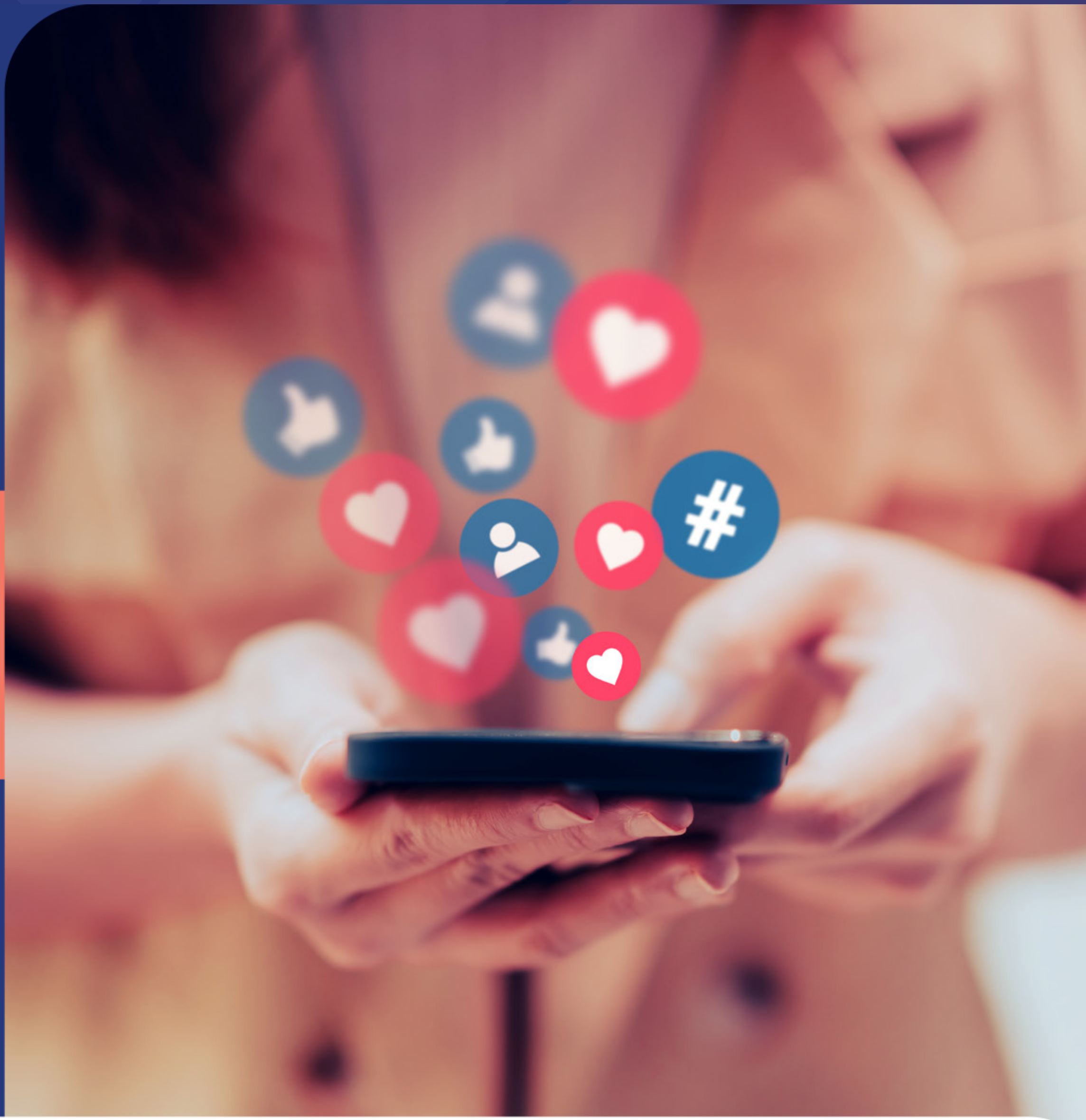

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